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КАФЕДРА «ІНОЗЕМНІ МОВИ ТА ПЕРЕКЛАД»

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Навчальний посібник

PROFESSIONAL ENGLISH FOR TRANSPORT SERVICES (PART I)

для здобувачів спеціальності J5 «Морський та внутрішній водний транспорт)»

освітнього рівня «Бакалавр» (3 курс)

(денна / заочна форми навчання)

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Навчальний посібник “Professional English for Transport Services” для здобувачів спеціальності J5 «Морський та внутрішній водний транспорт)» освітнього рівня «Бакалавр» (3 курс) (денна / заочна форма навчання) / автори В. М. Смаглій, Т. М. Корольова, І. О. Ківенко. Одеса : ОНМУ, 2026. 425 с.

Навчальний посібник “Professional English for Transport Services” призначено для здобувачів спеціальності J5 «Морський та внутрішній водний транспорт)» освітнього рівня «Бакалавр» (3 курс) (денна / заочна форма навчання) й спрямовано на формування ґрунтовних знань із базових понять, ключових процесів та сучасної ролі логістичних сервісів у системі транспортної інфраструктури, розвиток практичних умінь щодо організації логістичних ланцюгів у сфері морського та внутрішнього водного транспорту. У навчальному посібнику представлені теми, що розглядають різні види транспорту в логістичних системах, способи перевезення вантажу, складування, процеси впровадження інновацій та діджиталізації в логістичній сфері, тощо. Навчальний посібник може бути використано як для самостійного опрацювання, так і в процесі аудиторного навчання.

ЗМІСТ

UNIT 1: INTRODUCTION TO TRANSPORT AND LOGISTICS SYSTEMS

TEXT 1: THE ROLE OF TRANSPORT IN MODERN LOGISTICS SYSTEMS

Transport plays a crucial role in modern logistics systems by enabling the efficient movement of goods from producers to consumers. As a core component of logistics, transportation is responsible for the timely delivery of raw materials, intermediate goods, and finished products across domestic and international markets. Without well-functioning transport systems, logistics chains would be ineffective and unable to support economic growth or meet customer expectations.

There are several modes of transport used in logistics: road, rail, maritime, air, and pipeline. Each mode has its own advantages and limitations depending on factors such as cost, speed, flexibility, and cargo characteristics. For instance, road transport is highly flexible and ideal for door-to-door delivery over short to medium distances. Rail transport is cost-effective for heavy and bulk cargo over long distances, while maritime transport is preferred for international shipments and containerized goods due to its low cost per unit. Air transport, although expensive, is crucial for time-sensitive and high-value goods. Pipeline transport is specialized, used mainly for liquids and gases like oil and natural gas.

In a logistics system, transport serves multiple purposes: ensuring availability of goods, reducing lead times, optimizing inventory levels, and improving service quality. It is closely integrated with other logistics functions such as warehousing, packaging, order processing, and customer service. Efficient coordination between these elements leads to improved supply chain performance and customer satisfaction.

The concept of multimodal and intermodal transport has become increasingly important. Multimodal transport refers to the use of two or more modes of transportation under a single contract or operator, while intermodal transport emphasizes the integration of modes where the cargo stays in the same unit (e.g., a container) throughout the journey. These systems aim to combine the strengths of each transport mode, reduce environmental impact, and lower operational costs.

Technological advancements have transformed transport and logistics operations. The use of GPS tracking, automated dispatching, route optimization software, and electronic documentation has increased the transparency and efficiency of the entire delivery process. Real-time monitoring allows logistics managers to respond quickly to delays, accidents, or route changes, thus maintaining reliability.

Sustainability has also become a key focus. Green logistics aims to minimize the environmental footprint of transport activities by reducing fuel consumption, emissions, and empty runs. Transport companies are investing in eco-friendly vehicles, alternative fuels, and emission-reduction technologies to meet regulatory requirements and improve their public image.

In conclusion, transport is not just a physical movement of goods; it is a strategic element of logistics that affects the competitiveness, cost, and quality of services. A well-designed transport system improves the efficiency of the supply chain and supports national and global trade.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What role does transport play in modern logistics systems?
2. What are the main modes of transport used in logistics?
3. Why is road transport considered flexible?
4. What is the difference between multimodal and intermodal transport?
5. How has technology improved transport operations?
6. What are the environmental concerns related to transport in logistics?

II. True or False?

1. Rail transport is most suitable for short-distance shipments.

2. Air transport is used primarily for cheap bulk goods.
3. GPS tracking helps improve logistics efficiency.
4. Transport has no impact on inventory levels.
5. Green logistics includes using alternative fuels.

III. Fill in the gaps using the words from the box below:

logistics, emissions, container, multimodal, transport, GPS, flexibility, warehouse, efficiency, sustainability

1. Road ______ is often used for door-to-door deliveries.
2. ______ tracking allows real-time vehicle monitoring.
3. One goal of green logistics is to reduce carbon ______.
4. ______ transport uses more than one mode under a single contract.
5. A ______ is used to carry goods without unloading them during modal changes.
6. Transport improves overall supply chain ______.
7. High ______ makes road transport convenient.
8. Goods can be stored in a ______ before final delivery.
9. Advanced software contributes to transport ______.
10. ______ has become a growing concern in logistics planning.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Сучасна логістика вимагає ефективних транспортних рішень.
2. Залізничний транспорт підходить для перевезення вантажів на великі відстані.
3. Важливо зменшити вплив транспорту на навколишнє середовище.
4. Вантаж має залишатися в контейнері під час перевезення.
5. Електронна документація спрощує логістичні операції.
6. Визначте переваги мультимодального транспорту.

7. Транспорт – це не тільки рух товарів, а й стратегічна функція.

B. Translate from English into Ukrainian:

1. Air transport is essential for time-sensitive deliveries.
2. Logistics managers use tracking systems to avoid delays.
3. The environmental impact of freight must be minimized.
4. The transport system affects the efficiency of the entire supply chain.
5. Sustainability is a major focus in transport development.
6. Ports play a key role in global logistics.

TEXT 2: KEY COMPONENTS OF A LOGISTICS SYSTEM

A logistics system is a structured network that facilitates the movement, storage, and flow of goods, information, and services from the point of origin to the final customer. It encompasses a range of interconnected elements, each of which plays a vital role in achieving efficiency, reliability, and customer satisfaction. Understanding the components of a logistics system is essential for future transport professionals, as every element influences cost, time, and quality.

The fundamental components of a logistics system include transportation, warehousing, inventory management, order processing, packaging, material handling, and information flow. Each of these components must work in harmony to meet logistical goals.

Transportation is often considered the backbone of the system. It is responsible for physically moving goods between locations, whether between manufacturers and warehouses, or warehouses and end users. The choice of transport mode (road, rail, air, sea) depends on factors such as distance, cost, cargo type, and urgency. For example, refrigerated goods require specialized vehicles, while bulk materials are more economically shipped by rail or sea.

Warehousing provides storage space for goods at various stages of the supply chain. Warehouses may serve multiple purposes: consolidating shipments, protecting goods, managing seasonal inventory, or enabling cross-docking. Advanced warehousing systems incorporate automated retrieval systems and real-time inventory tracking for maximum efficiency.

Inventory management ensures that the right amount of goods is available when and where needed. Poor inventory control can result in stockouts or excess inventory, both of which harm business operations. Techniques like Economic Order Quantity (EOQ), ABC analysis, and Just-In-Time (JIT) are used to optimize inventory levels.

Order processing involves receiving, checking, and fulfilling customer orders. It is a time-sensitive activity that must be accurate and efficient. Delays or errors in this component often lead to customer dissatisfaction. Modern logistics companies use ERP (Enterprise Resource Planning) systems to automate order handling and track progress.

Packaging is not only about protecting goods during transit; it also plays a role in branding and compliance with regulations. Packaging must be suited to the transport mode, product sensitivity, and legal requirements (e.g., labeling hazardous materials). Eco-friendly packaging has become a trend, reducing waste and enhancing the sustainability profile of a company.

Material handling refers to the movement of goods within warehouses or terminals. It includes the use of forklifts, conveyors, pallets, and cranes. Efficient material handling improves speed and safety and reduces the risk of product damage.

Information flow is the invisible but crucial component that connects all others. It includes documentation, communication, data exchange, and tracking. With the rise of digital logistics, companies rely heavily on systems that provide real-time information, enabling proactive decision-making and accurate forecasting.

In conclusion, a logistics system is much more than just transport. It is a dynamic, interconnected structure where each component has specific functions and responsibilities. A failure or delay in one area can affect the entire chain, making it essential to manage each element with precision. For professionals in transport and logistics, mastering the interplay between these components is key to achieving success in a globalized and fast-moving environment.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What are the key components of a logistics system?
2. Why is transportation called the backbone of logistics?
3. How does warehousing support the logistics process?
4. What can poor inventory management lead to?
5. What role does packaging play in modern logistics?
6. Why is information flow considered essential?

II. True or False?

1. Transportation is the only important part of a logistics system.
2. Cross-docking is related to warehousing.
3. Packaging has no influence on legal compliance.
4. ERP systems help automate order processing.
5. Material handling happens outside the warehouse.

III. Fill in the gaps using the words from the box below:

inventory, transport, warehousing, packaging, forklift, order, documentation, processing, conveyor, branding

1. A logistics system consists of many parts, including ______ and information flow.
2. ______ errors can lead to customer complaints.
3. Modern ______ systems use real-time tracking.
4. Eco-friendly ______ helps reduce waste.

5. A ______ is used to lift and move pallets.
6. Proper ______ reduces the risk of product damage.
7. ______ helps customers recognize products.
8. Goods move within a warehouse on a ______ belt.
9. ______ like invoices and receipts are vital.
10. Managing ______ levels prevents stockouts.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Успішна логістична система складається з багатьох компонентів.
2. Транспорт впливає на швидкість і витрати доставки.
3. Склад зберігає товари до моменту відправки.
4. Неправильне управління запасами призводить до втрат.
5. Екологічна упаковка стає стандартом в логістиці.
6. Підйомники та крани – це частина внутрішньої логістики.

B. Translate from English into Ukrainian:

1. Packaging must meet transport and legal standards.
2. The ERP system tracks every order in real time.
3. Material handling improves safety and efficiency.
4. A warehouse may serve several purposes at once.
5. Accurate information flow prevents delays.
6. Logistics professionals must understand system integration.

TEXT 3: THE EVOLUTION OF LOGISTICS: FROM TRANSPORTATION TO INTEGRATED SYSTEMS

Logistics as a concept has undergone significant transformation over the last century. Originally, logistics was synonymous with transportation – the simple act of moving goods from one place to another. However, due to globalization, technological advancement, and changing customer expectations, logistics has evolved into a highly complex and integrated system that encompasses much more than just transport.

In the early 20th century, logistics primarily referred to military operations, where the supply and movement of troops, ammunition, and equipment had to be meticulously organized. After World War II, the principles of military logistics were gradually adopted by commercial industries, especially with the rise of mass production and international trade. Transportation remained the main focus, but businesses began to realize that managing inventory, warehousing, and information flow could lead to major cost savings and improved service.

By the 1970s, the concept of *physical distribution* emerged. It emphasized not only transport, but also the coordination of storage, packaging, and order fulfillment. Companies began to set up distribution centers near major markets, shifting from manufacturer-led to customer-led supply chains. Logistics was no longer just a support function — it became a critical component of business strategy.

In the 1980s and 1990s, *logistics management* became a recognized discipline. It incorporated new technologies such as barcodes, scanners, and early enterprise software. These tools allowed for better inventory control, real-time tracking, and more efficient routing. The focus shifted from simply delivering products to delivering value. Customer satisfaction, speed, and cost-efficiency became the three main objectives of logistics departments.

The 2000s introduced the idea of *supply chain management (SCM)*, a broader concept that integrates not just internal logistics activities, but the entire flow of goods, services, and information across multiple organizations – from raw material suppliers to end consumers. SCM requires coordination between manufacturers, wholesalers, retailers, and logistics service providers, often across different countries and continents.

Today, logistics is driven by digitalization, data analytics, and automation. Companies use transportation management systems (TMS), warehouse management systems (WMS), and supply chain analytics to optimize performance. Artificial intelligence, machine learning, and blockchain are being introduced to enhance forecasting, reduce fraud, and improve decision-making. Drones and autonomous vehicles are being tested for deliveries, while real-time visibility and sustainability reporting are becoming industry standards.

Moreover, the COVID-19 pandemic revealed the critical importance of resilient and agile logistics systems. Supply chain disruptions led many companies to reassess their logistics networks, invest in local sourcing, and build safety stocks. Flexibility and speed are now as important as cost-efficiency.

In summary, logistics has transformed from a narrow transport function into a multidimensional, technology-driven system that connects global economies. Professionals in this field must now possess a deep understanding of operations, digital tools, customer service, and strategic planning. The evolution of logistics is a testament to how vital this function has become in the modern world.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. How did logistics originate and what was its initial focus?
2. What was the role of military logistics in shaping commercial logistics?
3. What is the difference between physical distribution and logistics management?
4. How did technology impact logistics in the 1980s and 1990s?
5. What distinguishes supply chain management from logistics?
6. How has the COVID-19 pandemic influenced logistics strategy?

II. True or False?

1. Logistics was originally used in commercial business only.
2. The focus of logistics shifted to customer value in the 1980s.

3. SCM includes coordination only within a single company.
4. AI and blockchain are modern tools in logistics.
5. The pandemic reduced the importance of local sourcing.

III. Fill in the gaps using the words from the box below:

distribution, SCM, pandemic, automation, barcodes, inventory, real-time, efficiency, disruption, forecasting

1. Military ______ influenced early commercial logistics practices.
2. The use of ______ in the 1980s improved inventory control.
3. ______ helps companies predict demand and plan ahead.
4. ______ systems allow for faster and more accurate deliveries.
5. The COVID-19 ______ caused major supply chain issues.
6. Modern logistics relies on ______ data for decision-making.
7. Physical ______ became a key term in the 1970s.
8. ______ is a broader concept that includes all supply chain stages.
9. Companies aim to improve speed, service, and ______.
10. Technology has minimized human error through ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Логістика починалась як транспортна функція.
2. Масове виробництво вимагало кращого управління складом.
3. Постачальницькі ланцюги сьогодні охоплюють цілі континенти.
4. Новітні технології, такі як блокчейн, змінюють логістику.
5. Пандемія виявила слабкі місця у логістичних системах.
6. Компанії інвестують у цифрові рішення для оптимізації процесів.

B. Translate from English into Ukrainian:

1. Logistics evolved from military operations to a global business function.
2. Digitalization and AI help companies plan smarter.
3. Physical distribution focuses on moving goods efficiently.
4. The goal is to deliver not just products, but also value.
5. Automation has become essential in warehousing.
6. Global trade depends on reliable logistics systems.

TEXT 4: TYPES OF TRANSPORT IN LOGISTICS AND THEIR FUNCTIONS

Transport is a foundational pillar of logistics and supply chain operations. It enables the physical movement of goods between different stages of production and distribution. Depending on the type of cargo, distance, urgency, and geographical conditions, various types of transport are used in modern logistics. Understanding the functions, advantages, and limitations of each mode of transport is crucial for designing effective logistics strategies.

There are five primary modes of transport in logistics: **road, rail, air, maritime,** and **pipeline**. Each mode serves a unique purpose and fits specific types of shipments.

Road Transport

Road transport is one of the most flexible and commonly used forms. It offers door-to-door delivery and is ideal for short to medium distances. Trucks and vans can reach urban, suburban, and rural areas with minimal infrastructure requirements. Road transport is widely used for consumer goods, perishable items, and parcels. Its main advantages include speed, adaptability, and accessibility. However, it is affected by traffic congestion, fuel costs, road conditions, and weather disruptions.

Rail Transport

Rail transport is especially suited for heavy and bulk cargo, such as coal, metals, chemicals, and agricultural products. Trains are efficient over long distances and provide better fuel efficiency per ton-kilometer compared to road transport. Rail is often used for shipments between industrial zones, ports, and inland terminals. The limitations include less flexibility in routing, longer transit times compared to road, and dependence on rail infrastructure.

Air Transport

Air transport is the fastest mode of delivery, making it essential for urgent, time-sensitive, or high-value goods. Electronics, pharmaceuticals, and luxury items are commonly shipped by air. It is ideal for international shipping with strict delivery deadlines. However, air freight is the most expensive option and has limited capacity for heavy or bulky cargo. It also requires significant infrastructure, including airports, customs clearance, and specialized handling facilities.

Maritime Transport

Maritime transport is the backbone of global trade. Over 80% of international goods are moved by sea. Container ships, bulk carriers, and tankers transport massive volumes of raw materials, machinery, and consumer products across continents. Maritime shipping is cost-effective for large, non-urgent shipments. However, it has long transit times, is susceptible to port delays, and depends heavily on weather and geopolitical conditions.

Pipeline Transport

Pipeline transport is used primarily for liquids and gases such as crude oil, natural gas, and chemicals. It is highly efficient, safe, and reliable for continuous flow over long distances. While not suitable for general cargo, it plays a critical role in energy logistics. Pipelines have high initial infrastructure costs and require complex monitoring systems, but they offer low operational costs over time.

Multimodal and Intermodal Transport

Modern logistics often combines two or more transport modes to benefit from their respective strengths. In *intermodal transport*, goods remain in the same loading unit (e.g., a container) while switching between modes. In *multimodal transport*, the shipment is handled under a single contract but may involve different types of transport (e.g., truck → ship → train). These systems aim to optimize cost, reduce emissions, and shorten transit times.

In summary, the choice of transport depends on the cargo type, delivery deadlines, cost, and infrastructure. A good logistics manager understands how to balance these factors to ensure timely, safe, and cost-efficient delivery. The integration of different transport modes offers a strategic advantage in managing complex logistics flows in a globalized economy.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What are the five primary modes of transport in logistics?
2. What are the main advantages of road transport?
3. When is rail transport most commonly used?
4. What makes air transport suitable for urgent deliveries?
5. Why is maritime transport important for global trade?
6. How do intermodal and multimodal transport differ?

II. True or False?

1. Road transport is the cheapest mode for long distances.
2. Rail transport is ideal for delivering documents and parcels.
3. Air freight is often used for luxury goods.
4. Sea transport moves the majority of international goods.
5. Pipelines can be used for general cargo.

III. Fill in the gaps using the words from the box below:

maritime, flexible, container, urgent, fuel, rail, pipeline, weather, delivery, high-value

1. ______ transport is used for global shipping.
2. Road transport is ______ and accessible.
3. Air transport is ideal for ______ shipments.
4. Trains use less ______ per ton-kilometer than trucks.
5. ______ is used to carry liquids like oil.
6. A ______ is used in intermodal transport to avoid reloading.
7. Rail transport is efficient but not suitable for door-to-door ______.
8. Air transport is preferred for ______ items like electronics.
9. Maritime shipping is affected by ______ conditions.
10. ______ transport has long transit times but low cost per unit.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Залізничний транспорт підходить для важких і об'ємних вантажів.
2. Повітряний транспорт використовується для термінових і дорогих товарів.
3. Морський транспорт – основа міжнародної торгівлі.
4. Трубопроводи транспортують рідини на великі відстані.
5. Вибір транспорту залежить від типу вантажу та термінів доставки.
6. Інтермодальні перевезення знижують витрати та скорочують час доставки.

B. Translate from English into Ukrainian:

1. Road transport provides door-to-door delivery services.
2. Rail is a cost-effective mode for long-distance freight.
3. Air transport offers speed but is expensive.
4. Most cargo in global trade moves by sea.
5. Pipelines require high investments but operate efficiently.
6. Multimodal transport combines various modes under one contract.

TEXT 5: THE STRUCTURE AND FUNCTIONS OF LOGISTICS SERVICE PROVIDERS (LSPS)

In today's global economy, logistics operations are often outsourced to specialized companies known as **logistics service providers (LSPs)**. These companies offer a range of services designed to manage and optimize the flow of goods, information, and resources across the supply chain. Depending on the level of responsibility and integration, LSPs are categorized into different types: 1PL, 2PL, 3PL, 4PL, and even 5PL.

1PL and 2PL

A **first-party logistics provider (1PL)** is a company that manages its own transport and logistics operations. For example, a manufacturer that owns its own fleet and warehouses is operating as a 1PL. This is common in industries where control over delivery is essential.

A **second-party logistics provider (2PL)** offers basic transportation or warehousing services. These companies own physical assets such as trucks, ships, or storage facilities, and provide capacity to other businesses without managing broader logistics functions. Examples include freight forwarders or regional trucking companies.

3PL: Third-Party Logistics

Third-party logistics (3PL) providers offer integrated services that go beyond just transportation or storage. A 3PL company may handle order processing, inventory management, packaging, cross-docking, distribution, and even returns. 3PLs are widely used by retailers and manufacturers who want to focus on core business activities while outsourcing operational logistics. These providers typically use advanced IT systems, including warehouse management systems (WMS) and transportation management systems (TMS), to monitor and optimize performance.

4PL and Lead Logistics

Fourth-party logistics (4PL) providers manage entire logistics networks on behalf of a client. Unlike 3PLs, they do not usually own transportation or storage assets but coordinate the work of multiple service providers. A 4PL acts as a **lead logistics provider**, offering strategic planning, consulting, and complete supply chain management solutions. They take a holistic view of the supply chain, focusing on efficiency, visibility, and continuous improvement.

5PL and Digital Logistics

Fifth-party logistics (5PL) represents the most advanced level. These companies operate entirely in digital space, coordinating complex e-commerce and omnichannel logistics networks. They rely on cloud-based platforms, big data, and artificial intelligence to integrate multiple supply chains, optimize routing, and automate decision-making. 5PL providers are often used by large global brands and online retailers to manage high-volume, high-speed deliveries across continents.

Key Functions of LSPs

Logistics service providers perform a variety of essential tasks:

- **Transport and distribution:** Selecting carriers, planning routes, and managing delivery schedules.
- **Warehousing:** Storing goods in temperature-controlled, secure, or automated facilities.
- **Inventory management:** Balancing supply and demand using forecasting tools.
- **Customs clearance:** Managing import/export documentation and compliance.
- **Returns management:** Handling reverse logistics and product recalls.
- **IT integration:** Offering real-time tracking, digital documentation, and analytics.

LSPs may specialize in certain industries (pharma, automotive, fashion) or operate across multiple sectors. Their performance is often measured using **KPIs** (Key Performance Indicators) such as on-time delivery rate, order accuracy, and cost per shipment.

Outsourcing to LSPs allows companies to reduce costs, access new markets, and improve customer service. However, it also requires strong partnership management, clear service-level agreements (SLAs), and mutual trust. A poorly performing LSP can damage a company's reputation and disrupt the supply chain.

In conclusion, logistics service providers are critical partners in today's supply chains. From simple transport services to fully managed digital platforms, they help companies compete in dynamic and demanding global markets. Understanding their structure and functions is essential for future logistics professionals.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What is a logistics service provider (LSP)?
2. How does a 2PL differ from a 3PL?
3. What services can a 3PL company offer?
4. Why are 4PLs considered lead logistics providers?
5. What technologies are commonly used by 5PL companies?
6. What are some typical KPIs for LSP performance?

II. True or False?

1. A 1PL company outsources all logistics operations.
2. 3PL providers only offer transport services.
3. 4PLs coordinate multiple logistics providers.
4. 5PLs operate mainly through physical assets.
5. Reverse logistics is a function of LSPs.

III. Fill in the gaps using the words from the box below:

provider, outsourcing, warehousing, visibility, 3PL, supply chain, platforms, transport, integration, returns

1. A logistics service ______ offers support for goods movement.
2. ______ allows companies to focus on core operations.
3. A ______ company may manage distribution and order fulfillment.
4. 4PLs improve ______ across all logistics activities.
5. Advanced digital ______ help 5PLs manage operations.
6. ______ is a key function including storage and inventory tracking.
7. Handling product ______ is part of reverse logistics.
8. Effective ______ is crucial between transport and storage systems.
9. LSPs must ensure smooth flow across the ______.
10. ______ planning is one of the main responsibilities of LSPs.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Логістичні провайдери допомагають компаніям оптимізувати доставку.
2. 3PL-провайдери можуть обробляти замовлення та управляти запасами.
3. 4PL надає стратегічне управління логістичною мережею.
4. 5PL використовують хмарні платформи для управління ланцюгами постачання.
5. Погано обраний партнер може негативно вплинути на бізнес.
6. Провайдер повинен дотримуватись угоди про рівень обслуговування.

B. Translate from English into Ukrainian:

1. A 2PL owns assets but provides limited logistics services.
2. 4PLs coordinate different transport companies on behalf of a client.
3. KPIs measure the efficiency and reliability of logistics operations.
4. Modern LSPs use integrated IT systems.
5. Outsourcing can reduce operational complexity.
6. 5PLs often work with e-commerce platforms.

LEXICAL EXERCISES

Exercise 1. Match the term with its definition:

TERM	DEFINITION
1) Freight	a) The process of storing goods before distribution
2) Intermodal transport	b) Goods transported in bulk
3) Warehousing	c) Combining different modes of transport using the same container
4) Inventory	d) The stock of goods held for sale or distribution
5) Logistics service provider	e) A company that performs supply chain functions on behalf of clients

Exercise 2. Choose the correct word:

1. The company uses **(multimodal / local / motor)** transport to deliver goods across the EU.
2. A good **(visibility / forecast / platform)** is essential for tracking deliveries in real time.
3. 5PLs rely heavily on **(manual / digital / printed)** logistics systems.
4. Cross-docking minimizes the need for **(warehousing / railways / customs)**.
5. Temperature-controlled **(containers / platforms / shipments)** are used for food and medicine.

Exercise 3. Complete the sentences using the correct form of the word:

integrate, manage, store, deliver, outsource

1. Many companies choose to ______ their logistics to 3PL providers.
2. We need to ______ raw materials in a dry, cool environment.
3. A TMS helps to ______ routes and shipments more effectively.
4. Our company aims to ______ goods within 24 hours.

5. Modern supply chains ______ different systems using software.

Exercise 4. Fill in the blanks with appropriate words from the list:

inventory, tracking, warehouse, container, efficiency

1. The company installed a new ______ system to monitor deliveries.
2. Goods are kept in the ______ before final distribution.
3. Accurate ______ records reduce stockouts.
4. A standard shipping ______ can be moved by truck, ship, or train.
5. Automation improves operational ______.

Exercise 5. Word Formation. Use the correct form (noun, verb, adjective):

1. The ______ center handles 10,000 packages per day. (distribute)
2. The ______ network was disrupted by strikes. (transport)
3. GPS helps improve delivery ______. (efficient)
4. Good route ______ saves time and money. (plan)
5. Inventory ______ is done via ERP systems. (manage)

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Translation**
Air transport	Повітряний транспорт
Automation	Автоматизація
Cargo	Вантаж (особл. комерційний)
Cold chain	Холодовий ланцюг
Container	Контейнер
Cross-docking	Крос-докінг (перевалка без складування)
Customs clearance	Митне оформлення

English Term	Ukrainian Translation
Delay	Затримка
Delivery	Доставка
Distribution	Розподіл, дистрибуція
Efficiency	Ефективність
Fifth-party logistics (5PL)	Логістика п'ятого рівня
Fourth-party logistics (4PL)	Логістика четвертого рівня
Freight	Вантаж
Information flow	Потік інформації
Intermodal transport	Інтермодальні перевезення
Inventory	Запаси, інвентар
Inventory management	Управління запасами
Lead time	Час виконання замовлення
Logistics service provider (LSP)	Постачальник логістичних послуг
Logistics system	Логістична система
Maritime transport	Морський транспорт
Material handling	Вантажно-розвантажувальні операції
Multimodal transport	Мультимодальні перевезення
Order processing	Обробка замовлень
Outsourcing	Аутсорсинг
Packaging	Упаковка
Performance indicators (KPIs)	Показники ефективності
Pipeline	Трубопровід
Rail transport	Залізничний транспорт
Real-time tracking	Відстеження в реальному часі

English Term	Ukrainian Translation
Reverse logistics	Зворотна логістика
Route optimization	Оптимізація маршруту
Supply chain	Ланцюг постачання
Sustainability	Сталий розвиток / екологічність
Third-party logistics (3PL)	Логістика третіх сторін
Transportation	Транспортування, перевезення
Transportation Management System (TMS)	Система управління транспортом
Truck	Вантажівка
Warehouse	Склад
Warehouse Management System (WMS)	Система управління складом
Warehousing	Складування, зберігання

GRAMMAR FOCUS: PRESENT SIMPLE & PRESENT CONTINUOUS

I. Present Simple Tense

Формула:

- **Ствердження:** I/You/We/They **work**; He/She/It **works**
- **Заперечення:** I/You/We/They **do not (don't) work**; He/She/It **does not (doesn't) work.**
- **Питання: Do** I/you/we/they **work**? **Does** he/she/it **work**?

Вживання:

- Регулярні дії або звички
- Загальні факти
- Опис постійних процесів

Приклади:

- Trucks **deliver** goods every day. *Вантажівки доставляють товари щодня.*
- The system **includes** inventory control. *Система включає контроль запасів.*
- **Does** the company **use** rail transport? *Компанія використовує залізничний транспорт?*

II. Present Continuous Tense

Формула:

- **Ствердження:** I **am working**, He/She/It **is working**, We/You/They **are working**
- **Заперечення:** I **am not working**, He/She/It **is not working**, etc.
- **Питання: Am** I **working**? **Is** he/she/it **working**?

Вживання:

- Дії, що відбуваються зараз
- Тимчасові процеси
- Теперішні зміни

Приклади:

- We **are processing** an urgent order. *Ми обробляємо термінове замовлення.*
- The manager **is checking** the shipment. *Менеджер перевіряє вантаж.*
- **Are** they **installing** a new system? *Вони встановлюють нову систему?*

GRAMMAR EXERCISES

Exercise 1. Choose the correct tense (Present Simple or Present Continuous):

1. The driver usually (checks / is checking) the cargo list before departure.
2. Our warehouse (operates / is operating) 24/7.
3. At the moment, we (ship / are shipping) electronic devices to Germany.
4. The company (invests / is investing) in green logistics solutions right now.
5. The truck (arrives / is arriving) at 9:00 every morning.

6. I (don’t know / am not knowing) the exact number of pallets.
7. The logistics team (prepares / is preparing) the monthly report now.
8. Rail transport (offers / is offering) better fuel efficiency.
9. We (move / are moving) to a larger distribution center these days.
10. The system (doesn’t work / isn’t working) properly today.

Exercise 2. Open the brackets using Present Simple or Present Continuous:

1. Our manager usually (check) ______ orders before dispatch.
2. Right now, the driver (load) ______ the truck.
3. Warehouses (store) ______ goods for further distribution.
4. At the moment, we (not process) ______ any urgent shipments.
5. The company (ship) ______ products to five countries every month.
6. The customer (wait) ______ for his parcel now.
7. We often (use) ______ containers for export.
8. I (talk) ______ to the transport coordinator right now.
9. He (not know) ______ the exact delivery time.
10. Look! The system (not work) ______ again.

Exercise 3. Translate from English into Ukrainian:

1. The company delivers orders every Tuesday.
2. We are organizing a large shipment at the moment.
3. They don’t use air transport for regular deliveries.
4. I’m checking the cargo list right now.
5. Our warehouse handles more than 2000 units per day.
6. Are they working with a 3PL provider now?
7. She doesn’t understand the customs process.
8. The manager is speaking to the carrier on the phone.
9. We are not storing hazardous materials.
10. Does the system work automatically?

Exercise 4. Translate from Ukrainian into English:

1. Водій зараз перевіряє вантаж.
2. Ми щодня відправляємо товари до Польщі.
3. Вони не працюють з аутсорсинговою компанією.
4. Зараз я розмовляю з клієнтом.
5. Чи компанія використовує мультимодальні перевезення?
6. Менеджер не обробляє замовлення в цей момент.
7. Ми зазвичай зберігаємо товари на складі 3 дні.
8. Вони зараз не використовують вантажівку.
9. Логістика включає транспортування, упаковку та складування.
10. Чи працює система правильно зараз?

Exercise 5. Choose the correct option:

1. The delivery truck (arrives / is arriving) every morning at 8:00.
2. We (are using / use) a digital platform for inventory control now.
3. The system (doesn't work / isn't working) properly today.
4. Logistics providers (offer / are offering) real-time tracking solutions.
5. He (is waiting / waits) for the customs documents.
6. Our company (ships / is shipping) a container this week.
7. I (don't check / am not checking) emails at the moment.
8. They usually (store / are storing) goods in a central warehouse.
9. She (talks / is talking) to the supplier now.
10. We (deliver / are delivering) electronics every Friday.

Exercise 6. Make questions:

1. They deliver goods on Mondays. → When ____________?
2. We are updating the software. → What ____________?
3. He works in the warehouse. → Where ____________?
4. She is checking the cargo list now. → Who ____________?

5. The truck arrives at 10. → What time ____________?
6. They are loading the container. → What ____________?
7. Our system doesn't work properly. → Why ____________?
8. The company uses intermodal transport. → What kind of transport ____________?
9. I'm talking to the manager. → Who ____________?
10. He doesn't understand the delivery schedule. → What ____________?

SPEAKING TASKS

Task 1. Personal Experience Discussion

Topic: *My Experience with Transport and Logistics*

Instructions: *Speak about your own experience related to transportation or logistics. This could be delivering an order, traveling, working in a warehouse, etc.*

Questions to support the story:

- What type of transport was involved?
- Was it efficient? Why or why not?
- Did any problems occur?
- How was the delivery/service organized?

Task 2. Pair Interview

Topic: *Your Ideal Logistics System*

Instructions: *Work in pairs. One student is the interviewer, the other is the logistician. Then switch roles.*

Sample questions:

- What transport modes would your ideal system include?
- Would you use outsourcing or in-house logistics?
- How would you ensure customer satisfaction?
- What technologies would you integrate?

Task 3. Mini-Presentation (2–3 minutes)

Topic Options:

- The importance of transport in the supply chain
- Green logistics: trends and benefits
- How warehouses support efficient logistics
- From local delivery to global shipping: an overview

Instructions: *Get ready with a short oral presentation with 3–5 main points and examples.*

Task 4. Problem-Solving in Groups

Scenario: *You are a team of logistics managers. Your company is facing a delay in shipment due to a truck breakdown. You must decide how to deliver the goods on time.*

Discuss:

- What are the possible solutions?
- Which mode of transport can be used as a backup?
- How will you inform the client?
- What steps will you take to avoid such problems in the future?

Task 5. Debate

Topic: *Outsourcing logistics is better than managing it in-house.*
Instructions: *Divide into "For" and "Against" groups. Each group must give arguments and examples and refute the position of their opponents.*

UNIT 2: FREIGHT TRANSPORT – TYPES AND CHARACTERISTICS

TEXT 1: CLASSIFICATION OF FREIGHT TRANSPORT AND ITS IMPORTANCE IN LOGISTICS

Freight transport is the backbone of all logistics systems. It refers to the movement of goods, cargo, and commodities by various means of transport. Depending on the cargo type, volume, delivery time, and destination, logistics professionals choose specific freight transport solutions to ensure efficiency, reliability, and cost-effectiveness.

Freight is generally classified by mode of transport: **road freight**, **rail freight**, **maritime freight**, **air freight**, and **pipeline freight**. Each type has its distinct characteristics, advantages, and limitations.

Road Freight

Road freight is the most commonly used form of freight transport, especially within countries or for short- and medium-distance deliveries. It includes the transportation of goods using trucks, vans, and lorries. Road freight is flexible, can provide door-to-door delivery, and requires less infrastructure than rail or air. However, it is subject to road conditions, traffic congestion, and vehicle regulations.

Rail Freight

Rail freight is ideal for transporting heavy and bulky goods such as minerals, steel, coal, chemicals, and agricultural produce. It offers high capacity and is cost-effective over long distances. Rail networks connect major industrial areas, ports, and logistics hubs. Although rail transport is reliable, it lacks the flexibility of road transport and may require additional handling at terminals.

Maritime Freight

Over 80% of global trade is carried out by sea. Maritime freight is the most economical method for transporting large volumes of goods internationally. It uses container ships, bulk carriers, and tankers. Sea freight is used for crude oil, machinery, vehicles, and consumer products. However, shipping times are long and depend on weather, customs procedures, and port efficiency.

Air Freight

Air freight is the fastest method of transport. It is used for urgent, high-value, or perishable goods such as pharmaceuticals, electronics, and fashion items. Air cargo offers fast delivery times and global reach, but it is expensive and limited in terms of weight and volume. Airports also require high-level infrastructure and strict security procedures.

Pipeline Freight

Pipeline transport is used for liquids and gases. Oil, natural gas, and chemical products are moved through underground or overground pipelines. This type of freight is not visible to the public but is highly efficient and operates 24/7. It has low operational costs once installed, but very high setup expenses.

Freight Classification by Cargo Type

Freight is also classified based on cargo characteristics:

- **Dry bulk cargo** (e.g., coal, grain, sand)
- **Liquid bulk cargo** (e.g., oil, chemicals)
- **Containerized cargo** (e.g., electronics, textiles, mixed goods)
- **Perishable goods** (e.g., food, medicine)
- **Oversized or heavy cargo** (e.g., machinery, turbines)

Each type requires specific handling methods, equipment, and documentation. For instance, perishable goods often need **cold chain logistics**, while hazardous materials require **special permits** and safety measures.

Why Freight Transport Is Critical

Efficient freight transport:

- Ensures goods reach markets on time
- Supports industrial production and trade
- Reduces storage costs by enabling just-in-time delivery
- Links producers and consumers regionally and globally

In modern supply chains, freight transport is not just a physical movement – it is part of an integrated logistics strategy. Logistics professionals must analyze costs, transit times, environmental impact, and risk when choosing the optimal freight mode.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What are the main modes of freight transport?
2. Why is road freight considered flexible?
3. What kind of goods are usually moved by rail?
4. What makes maritime freight suitable for international trade?
5. What are the disadvantages of air freight?
6. How is freight classified by cargo type?

II. True or False?

1. Rail transport is used mostly for perishable goods.
2. Maritime transport handles more than half of global trade.
3. Pipelines are used for transporting electronics.
4. Road freight offers door-to-door delivery.
5. Containerized cargo can include clothes and electronics.

III. Fill in the gaps using the words from the box below:

perishable, transport, congestion, cargo, efficient, bulk, containerized, hazardous, cost-effective, pipeline

1. Air freight is used for ______ and urgent goods.
2. ______ cargo includes grain and coal.
3. A ______ is used to carry mixed goods safely.
4. Rail transport is ______ for long distances.

5. Oil and gas are moved via ______ systems.
6. Road freight may suffer from traffic ______.
7. ______ materials need special handling.
8. Maritime freight carries the largest volumes of ______.
9. Choosing the right mode of ______ improves logistics.
10. Cold chain systems are vital for ______ goods.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Морські перевезення — це найдешевший спосіб транспортування великих обсягів товарів.
2. Автомобільний транспорт забезпечує доставку від дверей до дверей.
3. Труби використовуються для транспортування рідин і газів.
4. Повітряні перевезення швидкі, але дорогі.
5. Насипні вантажі потребують спеціального обладнання.
6. Вибір типу транспорту залежить від вантажу та часу доставки.

B. Translate from English into Ukrainian:

1. Rail freight is ideal for agricultural products and chemicals.
2. The shipping process depends on port infrastructure and weather.
3. Pipelines transport goods without vehicles.
4. Perishable goods must be stored in temperature-controlled conditions.
5. Containerized freight simplifies cargo handling and reduces damage.
6. Air freight is not suitable for bulky goods.

TEXT 2: ROAD FREIGHT TRANSPORT – FLEXIBILITY, INTEGRATION, AND STRATEGIC ROLE IN LOGISTICS

Road freight transport occupies a central position in national and regional logistics systems, offering a unique combination of flexibility, accessibility, and adaptability. While other freight modes are confined to specific routes, infrastructure, or types of goods, road transport serves as the connective tissue of supply chains, enabling the seamless flow of goods between producers, warehouses, distribution centers, and final customers. Its strategic importance cannot be overstated, particularly in economies where timely delivery, last-mile access, and multi-stop distribution are essential.

Unlike maritime or rail transport, road freight offers a direct, point-to-point service. Trucks can reach rural farms, urban retailers, and construction sites without requiring loading docks, rail terminals, or seaports. This ability to deliver door-to-door makes it indispensable for e-commerce, retail distribution, small-batch manufacturing, and perishables. Furthermore, road freight complements other modes by forming part of multimodal and intermodal transport systems. Containers arriving by ship or train must often complete their journey on the road, making trucks an irreplaceable element of the final-mile logistics chain.

One of the core reasons companies choose road freight is its capacity to adapt. The variety of vehicle types available – from light vans to articulated lorries and specialized units such as refrigerated or flatbed trucks – allows for customization according to cargo volume, fragility, or urgency. For instance, cold chain logistics depend on temperature-controlled trucks to move pharmaceuticals or fresh produce, while heavy machinery might require low-bed trailers with escort vehicles. This operational diversity offers logistics managers a broad range of options for meeting customer needs and regulatory standards.

Road transport also plays a major role in enabling dynamic delivery models. Unlike rail or maritime services that follow fixed schedules and routes, road freight can be dispatched on demand, rerouted in real time, and rescheduled in response to delays or customer changes. The rise of just-in-time (JIT) and just-in-sequence (JIS) manufacturing, where components must arrive precisely when needed, would be impossible without the responsiveness of truck-based logistics. Additionally, road freight is essential for express and same-day deliveries, which are now standard in both B2B and B2C markets.

Technology has further transformed the road freight sector, embedding digital solutions into every layer of operations. Fleet management systems track driver hours, monitor vehicle health, and optimize delivery schedules. GPS-based route planning reduces idle time and fuel consumption, while digital proof-of-delivery (ePOD) platforms enhance accountability and transparency. Real-time tracking gives both companies and customers visibility into shipment progress, allowing for proactive response to delays or emergencies.

Yet road freight is not without its challenges. Traffic congestion, especially in metropolitan areas and industrial zones, can lead to delays and increased operating costs. Infrastructure quality varies greatly between countries or even regions, affecting delivery speed and vehicle maintenance. Moreover, the road freight sector faces rising environmental pressures. Diesel-powered trucks are significant contributors to greenhouse gas emissions and urban air pollution, leading many governments to impose stricter emissions standards and road access regulations.

Another concern is the growing shortage of qualified drivers. In many developed economies, the average age of truck drivers is increasing, while younger generations show declining interest in the profession. This shortage threatens the reliability of road freight and increases labor costs. Companies are responding with incentives, automation pilots, and investments in training programs, but the problem remains acute.

Despite these difficulties, road freight continues to evolve. The development of electric and hydrogen-powered trucks offers a pathway to cleaner, quieter transport, while autonomous vehicle technologies promise to improve safety and reduce dependence on human drivers. In parallel, logistics providers are redesigning urban delivery strategies to reduce emissions, for example by using cargo bikes and electric vans in last-mile zones.

In conclusion, road freight is more than a traditional delivery method – it is a dynamic, technology-driven sector that underpins modern supply chains. Its flexibility, responsiveness, and integration with other transport modes ensure its continued relevance, even as logistics systems become more complex and sustainability becomes a dominant concern. For logistics professionals, a deep understanding of road freight operations is essential for effective decision-making and strategic planning in the global transport landscape.

ASSIGNMENTS FOR REWRITTEN TEXT 2

I. Give full answers to the following questions:

1. Why is road freight considered essential for the final stage of delivery in multimodal logistics?
2. In what ways does vehicle diversity enhance the adaptability of road freight transport?
3. How does road freight support just-in-time and express delivery models?
4. What technologies are currently used to optimize road freight operations?
5. What are the main challenges facing the road freight sector today?
6. How are companies and governments responding to environmental concerns in road freight?

II. True or False?

1. Road freight can only be used for transporting small parcels.
2. Multimodal logistics systems rely on road transport for the last mile.
3. All freight vehicles require the same type of infrastructure.
4. Driver shortage is a growing issue in the road freight sector.
5. Digital tools have little impact on modern freight operations.

III. Fill in the gaps using the words from the box below:

congestion, autonomy, traceability, emissions, adaptability, JIT, intermodal, regulation, urban, dispatching

1. Road freight provides the ______ needed to serve both rural and ______ delivery points.
2. In a ______ system, goods are transferred seamlessly between modes.
3. Truck fleets are integrating technologies that enhance shipment ______ and customer visibility.
4. The growth of ______ delivery models has increased reliance on precise scheduling.
5. Traffic ______ significantly impacts delivery times and planning.
6. New policies aim to reduce carbon ______ from diesel vehicles.
7. ______ systems help logistics managers respond to route changes in real time.
8. Environmental ______ has become stricter in many urban areas.
9. The logistics industry is testing vehicles with increasing levels of ______.
10. Road freight remains essential in supporting ______-driven production cycles.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Автомобільні перевезення забезпечують гнучкість та доступність у будь-якому регіоні.
2. Сучасні логістичні компанії використовують GPS та цифрове підтвердження доставки.
3. У логістиці "остання миля" часто виконується автотранспортом.
4. Екологічні вимоги обмежують використання дизельних вантажівок у містах.
5. Автономні технології змінюють підхід до планування перевезень.

B. Translate from English into Ukrainian:

1. Road freight plays a strategic role in both stand-alone and intermodal supply chains.
2. Vehicle variety allows logistics managers to handle a wide range of cargo types.
3. Predictive software reduces costs by improving route planning and fuel use.
4. Electric vans and cargo bikes are used for sustainable last-mile deliveries.
5. The industry struggles to attract young drivers despite offering financial incentives.

TEXT 3: RAIL FREIGHT – EFFICIENCY, STRATEGY, AND ITS ROLE IN INDUSTRIAL SUPPLY CHAINS

Rail freight remains a key pillar of freight transportation systems worldwide, particularly in economies with expansive industrial sectors and long internal or transcontinental trade routes. While it does not offer the flexibility of road transport, rail excels in moving large volumes of heavy and bulk commodities efficiently, economically, and with comparatively lower environmental impact. As global logistics strategies evolve, rail freight is increasingly integrated into complex, multimodal networks that require dependable long-haul transport solutions.

The strength of rail transport lies in its capacity to carry immense quantities of goods over extended distances. Unlike road vehicles, which are limited by load regulations, urban access constraints, and driver fatigue, freight trains operate under conditions that allow continuous movement with minimal interruptions. For industries reliant on raw materials such as mining, agriculture, and construction, rail serves as a high-volume conveyor linking extraction points, production plants, and export terminals. Its ability to move thousands of tons of coal, ore, grain, or steel in a single trip reduces unit costs and supports stable supply flows, even in landlocked or infrastructure-intensive regions.

Cost-efficiency is one of the major reasons logistics operators turn to rail for long-distance shipping. The energy used per ton-kilometer is significantly lower than in road freight, especially when trains are powered by electricity rather than diesel. This translates into reduced operating expenses, particularly for large-scale shippers. In addition, rail tariffs are often more predictable than fluctuating fuel-based road charges, allowing companies to build reliable long-term freight contracts. Rail also benefits from economies of scale: the longer the distance and the heavier the load, the more economical rail transport becomes compared to alternatives.

Environmental sustainability further strengthens the case for rail freight. Amid global pressure to decarbonize logistics, rail is recognized for its low greenhouse gas emissions and capacity to support green corridors across continents. As governments adopt climate action frameworks, investment in rail infrastructure and technology is increasingly positioned not only as economic policy but as an environmental imperative. Electrification of rail lines, adoption of hybrid locomotives, and integration with low-emission intermodal terminals all contribute to this goal.

However, rail freight has its operational limitations. Unlike trucks, which can adjust to shifting demand and deliver door-to-door, trains are bound to fixed routes and scheduled departures. This lack of flexibility often necessitates additional transshipment processes – from rail to road – which introduces handling costs, potential delays, and infrastructure requirements such as dry ports or rail-access warehouses. As a result, the total lead time may increase if logistics operators do not optimize the multimodal interface.

To mitigate these challenges, modern rail freight systems have embraced digitalization and centralized coordination. Real-time tracking of cargo units, smart scheduling, automated loading systems, and electronic data interchange (EDI) allow shippers to monitor freight flows and respond to disruptions promptly. Moreover, the growing use of standardized containers facilitates smooth modal transitions, enabling goods to be transferred between train, ship, and truck with minimal physical interference. This intermodal compatibility has become a cornerstone of competitive logistics planning, especially in Europe, China, and North America, where high-capacity corridors connect inland production zones with global ports.

Logistics hubs and freight terminals serve as critical nodes in rail-based supply chains. These facilities not only manage cargo operations but also provide customs clearance, storage, value-added services, and connections to other transport networks. Their strategic location — often near industrial zones or export markets – enhances the efficiency of long-haul freight and supports broader economic development.

In conclusion, rail freight is far more than a legacy mode of transport; it is a strategic asset that combines efficiency, sustainability, and capacity in a way few other systems can match. As global trade volumes grow and environmental regulations tighten, rail will likely play an expanding role in the structural design of supply chains. For logistics professionals, understanding both the capabilities and constraints of rail freight is essential for building integrated, resilient, and forward-looking freight solutions.

ASSIGNMENTS FOR REWRITTEN TEXT 3

I. Give full answers to the following questions:

1. What factors make rail freight particularly suitable for industrial supply chains?
2. How does rail freight achieve cost efficiency over long distances?
3. In what ways does rail transport contribute to environmental sustainability?
4. What are the main logistical limitations of rail freight, and how are they addressed?
5. Why are intermodal solutions important in modern rail freight logistics?
6. What role do logistics hubs and terminals play in enhancing rail freight operations?

II. True or False?

1. Rail freight is ideal for transporting small and lightweight parcels.
2. Electrified rail systems contribute to more sustainable logistics.
3. Rail freight is fully flexible and can deliver door-to-door.

4. Logistics hubs improve the integration of rail with other transport modes.
5. Rail transport is gradually being replaced by faster road services.

III. Fill in the gaps using the words from the box below:

electrification, transshipment, resilience, emissions, volume, terminals, corridors, standardization, economies, constraints

1. Rail freight is ideal for high-________ transport over long distances.
2. Environmental goals have led to large-scale rail network ________.
3. To transfer cargo from rail to road, additional ________ operations are required.
4. The development of intermodal ________ has improved multimodal performance.
5. Large shippers benefit from ________ of scale when using rail.
6. Fixed schedules and routes are operational ________ in rail logistics.
7. Modern systems use container ________ to facilitate efficient transfer.
8. Green freight ________ are being promoted in Europe and Asia.
9. Investments in digital ________ help optimize freight hubs.
10. Lower carbon ________ make rail attractive for eco-conscious companies.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Залізничний транспорт дозволяє перевозити великі обсяги сировини на великі відстані.
2. Порівняно з автомобільними перевезеннями, залізничні мають нижчий рівень викидів на тонно-кілометр.
3. Слабким місцем залізниці є неможливість доставляти вантаж безпосередньо до дверей клієнта.
4. У багатьох країнах розвивають мультимодальні транспортні коридори.

5. Логістичні хаби забезпечують перехід вантажу між різними видами транспорту.
6. Автоматизовані системи дозволяють відстежувати вагони в режимі реального часу.

B. Translate from English into Ukrainian:

1. Rail freight offers both environmental and economic benefits for bulk transport.
2. Intermodal terminals are key to linking rail systems with road and maritime routes.
3. The fixed infrastructure of rail transport can be a disadvantage for flexible delivery models.
4. Digital scheduling tools reduce bottlenecks at freight terminals.
5. Large-scale electrification projects aim to lower the carbon footprint of logistics.
6. Standardized containers help reduce time and labor during cargo transfer.

TEXT 4: MARITIME FREIGHT – INFRASTRUCTURE, INTEGRATION, AND ITS STRATEGIC IMPORTANCE IN GLOBAL LOGISTICS

Maritime freight has long been the cornerstone of global commerce, serving as the primary means of transporting goods across continents. It supports the vast majority of international trade by volume and plays a fundamental role in enabling the movement of raw materials, manufactured goods, and energy resources between countries. Its importance lies not only in its capacity to carry enormous quantities of cargo but also in its ability to connect distant economies through a relatively energy-efficient and cost-effective system.

At the heart of maritime logistics is the concept of scalability. Ships are capable of transporting thousands of tons of cargo in a single voyage, often in standardized containers that facilitate rapid loading, unloading, and transfer between transport modes. This high-volume capability significantly lowers unit transportation costs, making sea freight the most economical option for global shipments. For companies trading in bulk commodities—such as crude oil, coal, iron ore, or grain – maritime freight is the only viable transport solution. It also enables the mass movement of consumer goods, including electronics, textiles, and vehicles, which rely on regular, containerized shipping cycles.

The widespread adoption of containerization in the mid-20th century transformed maritime logistics and set new standards for cargo handling and intermodal integration. Standardized containers allow goods to move seamlessly between ships, trains, and trucks, minimizing manual handling and damage. The predictability and compatibility of container systems also support supply chain optimization, especially for companies using just-in-time (JIT) or global sourcing strategies. Ports around the world have adapted to these changes by investing in specialized terminals, cranes, storage zones, and digital systems to manage container flows efficiently.

Modern seaports are no longer passive loading points but dynamic logistics hubs. Their operations involve customs clearance, security checks, warehousing, transshipment, and coordination with inland transport. These activities require sophisticated infrastructure, including container yards, reefer plug-in stations, fuel bunkering facilities, and access to hinterland corridors. To function effectively, ports must be tightly integrated with rail and road networks, enabling smooth onward movement of cargo into regional distribution systems. The most successful ports—such as Rotterdam, Singapore, and Shanghai – are those that serve as global gateways with strong intermodal connectivity and digital infrastructure.

Technology plays a critical role in enhancing maritime freight performance. Terminal Operating Systems (TOS), Port Community Systems (PCS), and automated cranes have improved scheduling, reduced congestion, and increased cargo throughput. The use of real-time tracking, digital documentation, and blockchain solutions adds transparency and trust to international shipments. These advancements allow shipping lines, port authorities, customs agents, and cargo owners to share data, make faster decisions, and reduce delays across borders.

Despite its strengths, maritime freight faces several persistent challenges. Weather disruptions, port congestion, and geopolitical instability can severely delay shipments and increase costs. Regulatory complexity is another issue, especially in relation to customs procedures, documentation standards, and trade agreements. Environmental concerns have become more prominent in recent years, as shipping contributes to greenhouse gas emissions and marine pollution. As a result, new international regulations – such as IMO 2020 sulfur limits – have pushed the industry to adopt cleaner fuels, improve engine technologies, and implement emissions monitoring systems.

Moreover, the rise in container ship sizes has led to a concentration of cargo in fewer, larger ports, creating pressure on infrastructure and increasing the risk of bottlenecks. The efficiency of a maritime supply chain increasingly depends on how well ports manage high-volume flows, and whether inland distribution can keep pace with the growing scale of maritime operations.

In the long term, maritime freight is expected to remain indispensable to global supply chains. However, its future will depend on sustainability innovations, resilient infrastructure, and enhanced digital coordination among stakeholders. As global trade patterns shift and environmental regulations intensify, logistics professionals must be equipped to design maritime transport strategies that are economically viable, technologically integrated, and ecologically responsible.

ASSIGNMENTS FOR REWRITTEN TEXT 4

I. Give full answers to the following questions:

1. What makes maritime freight the most cost-effective mode for global trade?
2. How did the introduction of containerization transform maritime logistics?
3. In what ways have modern ports evolved beyond basic cargo handling?

4. What technological tools are used to enhance port and shipment efficiency?
5. What are the main environmental and operational challenges facing maritime freight?
6. Why is intermodal connectivity crucial for the success of maritime logistics?

II. True or False?

1. Maritime freight is primarily used for short-distance shipments.
2. Containerized cargo can move seamlessly across transport modes.
3. Ports today are limited to loading and unloading operations.
4. Blockchain technologies are already integrated into global sea transport.
5. The increase in ship size has reduced the risk of congestion.

III. Fill in the gaps using the words from the box below:

containerization, congestion, terminals, customs, corridors, emissions, integration, transparency, disruption, scalability

1. The global adoption of _________ has revolutionized multimodal freight operations.
2. Modern ports manage _________ operations such as storage and inland transfer.
3. Trade _________ enable efficient movement between seaports and inland regions.
4. Digital systems improve _________ by providing real-time data access to stakeholders.
5. Environmental regulations aim to reduce harmful _________ from maritime engines.
6. Geopolitical instability often leads to serious supply chain _________.
7. Seaports require close _________ with rail and road networks.
8. Efficient _________ clearance is essential for international cargo flows.

9. Larger vessels have increased the importance of port infrastructure and _________.
10. The _________ of sea freight makes it ideal for large-volume shipments.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Контейнеризація дозволила значно зменшити витрати на обробку вантажів.
2. Сучасні порти виконують функції логістичних центрів, а не лише перевалки.
3. Використання цифрових платформ дозволяє покращити координацію між учасниками ланцюга постачання.
4. Нові екологічні вимоги стимулюють судноплавні компанії використовувати чистіші види пального.
5. Збільшення розмірів суден вимагає модернізації портової інфраструктури.
6. Успішна морська логістика неможлива без ефективного внутрішнього транспорту.

B. Translate from English into Ukrainian:

1. Maritime freight enables the global distribution of both raw materials and finished products.
2. Port authorities must balance efficiency, safety, and environmental responsibility.
3. Real-time tracking improves visibility and customer confidence.
4. Customs regulations can create significant delays if not managed properly.
5. Supply chain resilience depends on well-integrated seaport operations.
6. Digital platforms allow stakeholders to collaborate across different countries and time zones.

TEXT 5: AIR FREIGHT – HIGH-SPEED LOGISTICS FOR A TIME-CRITICAL GLOBAL ECONOMY

Air freight has emerged as one of the most specialized and strategically important modes of transport in modern logistics. Though it represents only a small percentage of global freight by volume, its significance lies in the high value, urgency, and critical nature of the goods it transports. In a world increasingly defined by speed, precision, and global connectivity, air freight enables time-sensitive supply chains and supports sectors where rapid delivery is not just preferable but essential.

The core value of air freight stems from its unmatched speed. Aircraft can move cargo between continents in a matter of hours, not weeks, making it the preferred option for industries such as pharmaceuticals, electronics, fashion, and high-tech manufacturing. These sectors often operate on just-in-time or lean inventory models, which depend on timely and reliable deliveries to avoid production stoppages or missed retail launches. Air transport also plays a vital role in humanitarian logistics, emergency medical supply chains, and critical infrastructure repairs, where every hour matters.

Air freight operations are organized through a highly coordinated network of airports, cargo carriers, and freight forwarders. Unlike maritime or rail freight, which rely heavily on long-haul carriers and centralized hubs, air freight requires synchronized global scheduling and precise ground handling. The process begins with cargo booking and preparation, continues with security inspections and customs clearance, and culminates in rapid loading, transit, and delivery. This entire sequence is governed by international aviation standards, customs protocols, and safety regulations, which demand specialized training and infrastructure.

Cargo is typically transported either in dedicated freighter aircraft or in the belly space of passenger planes. Freighters are designed exclusively for freight and can handle oversized or heavy items, while passenger aircraft carry cargo alongside luggage, maximizing operational efficiency. In both cases, goods are packed into standardized Unit Load Devices (ULDs), which simplify handling and ensure space optimization. Many global airlines operate hybrid fleets, combining scheduled passenger flights with dedicated cargo services to meet demand fluctuations.

Digitalization has been a driving force behind the evolution of air freight. The implementation of electronic air waybills (e-AWBs), real-time tracking systems, and AI-powered route planning tools has significantly improved the speed, accuracy, and visibility of shipments. These technologies allow logistics managers to predict delays, reroute flights, and manage inventory more effectively. In e-commerce, where customer expectations are shaped by 24–48 hour delivery windows, air freight serves as the backbone of international fulfillment networks.

However, the benefits of air freight come at a cost – both economic and environmental. Air transport is the most expensive freight option per kilogram, due to high fuel consumption, airport fees, and security costs. It is also one of the least environmentally sustainable, contributing disproportionately to carbon emissions relative to its cargo volume. In response, the aviation and logistics industries are investing in sustainable aviation fuels (SAF), lightweight aircraft design, and carbon offsetting programs. Some logistics providers are also experimenting with electric short-haul aircraft and cargo drones to reduce emissions in specific routes.

Operational limitations further affect the viability of air freight. Capacity constraints, especially during peak seasons or global crises (such as the COVID-19 pandemic), can disrupt supply chains and lead to soaring prices. Additionally, not all goods are suitable for air transport. Bulky, hazardous, or low-value items are typically excluded due to safety concerns or cost inefficiency. For these reasons, air freight is often used selectively, as part of a larger multimodal logistics strategy that balances speed, cost, and capacity.

Despite its limitations, the strategic importance of air freight is growing. In the era of digital marketplaces, global outsourcing, and pandemic-driven supply disruptions, the ability to move goods quickly and reliably has become a competitive advantage. As customers demand faster delivery and manufacturers adopt distributed production models, air freight offers the flexibility and reach to connect suppliers and consumers in real time.

In summary, air freight is not merely a fast mode of transport – it is a critical enabler of modern global commerce. Its speed, reliability, and technological sophistication make it indispensable in high-value, high-risk, and high-demand logistics scenarios. For logistics professionals, understanding the complex dynamics of air freight – from infrastructure and scheduling to regulation and sustainability – is essential for designing responsive and future-ready supply chains.

ASSIGNMENTS FOR REWRITTEN TEXT 5

I. Give full answers to the following questions:

1. Why does air freight play such a significant role despite representing a small volume of global cargo?
2. How does air freight support industries that rely on just-in-time and time-critical deliveries?
3. What technologies have improved the efficiency and transparency of air cargo operations?
4. What environmental challenges does air freight present, and how is the industry responding?
5. In what ways do freighter aircraft differ from passenger aircraft in terms of logistics function?
6. Why is air freight often used selectively within a multimodal transport strategy?

II. True or False?

1. Air freight is suitable for transporting large volumes of low-cost goods.
2. Unit Load Devices (ULDs) help improve handling and space use.
3. Most cargo transported by air travels exclusively on cargo-only aircraft.
4. Electronic air waybills (e-AWB) enhance the speed and accuracy of air freight.

5. Air freight is the most environmentally friendly transport option.

III. Fill in the gaps using the words from the box below:

visibility, urgency, freighter, digitalization, carbon, delays, pandemic, routing, drones, sustainability

1. The ______ of certain goods requires them to be delivered within strict time frames.
2. A dedicated ______ aircraft carries only cargo and no passengers.
3. ______ allows logistics teams to track and reroute shipments in real time.
4. The COVID-19 ______ caused global disruptions in air freight capacity.
5. One of the main criticisms of air freight is its high level of ______ emissions.
6. New AI systems optimize ______ based on weather and demand.
7. Logistics companies are investing in ______ to meet climate targets.
8. Air freight offers unmatched shipment speed and cargo ______.
9. The use of cargo ______ is being tested for short-distance deliveries.
10. Even with its cost, air freight is crucial in time-sensitive and emergency logistics.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Авіаційні вантажні перевезення є незамінними для медичних, електронних і термінових товарів.
2. Електронні накладні (e-AWB) пришвидшують обробку вантажу та зменшують паперову бюрократію.
3. Доставка повітрям є найдорожчою, але найшвидшою логістичною послугою.
4. Вантажні безпілотники використовуються для доставки в важкодоступні райони.

5. У часи глобальних криз авіаперевезення стикаються з нестачею потужностей.
6. Екологічні інновації, такі як SAF і електролітаки, стають пріоритетом галузі.

B. Translate from English into Ukrainian:

1. Air freight supports lean manufacturing by enabling just-in-time delivery across borders.
2. Cargo is often placed in Unit Load Devices to simplify handling and maximize efficiency.
3. Airports require advanced logistics coordination due to security and customs procedures.
4. Airlines are experimenting with hybrid electric aircraft to reduce emissions.
5. Despite high operating costs, air freight remains critical for high-value supply chains.
6. The combination of speed and global reach makes air cargo ideal for emergency logistics.

LEXICAL EXERCISES

Exercise 1. Match each term (1–10) with the correct definition (A–J):

Term	Definition
1) Unit Load Device (ULD)	A. A method of moving goods by air cargo only
2) Freighter	B. Transfer point between sea/rail/road transport
3) Port congestion	C. A specialized airport vehicle for cargo handling
4) Scalability	D. A standard container used in air freight
5) Dry bulk cargo	E. The capacity to increase volume efficiently
6) Intermodal terminal	F. Delay caused by infrastructure overload in ports

7) Reefer truck	G. A refrigerated truck used for perishable goods
8) Containerization	H. System of transporting goods in standard containers
9) Sustainable aviation fuel	I. Environmentally friendly fuel used in aircraft
10) Air freight	J. A cargo aircraft designed for freight only

Exercise 2. Choose the word that best completes each sentence:

1. Modern ______ terminals connect ports with inland rail and road systems.
   (a) customs (b) intermodal (c) postal
2. The rise of e-commerce has increased the demand for ______ deliveries.
   (a) bulk (b) last-mile (c) maritime
3. ______ is commonly used to ship oil, LNG, and chemicals overseas.
   (a) Liquid bulk (b) Container (c) Breakbulk
4. The use of ______ fuel in aviation is growing due to carbon targets.
   (a) biohazard (b) synthetic (c) sustainable
5. ______ are equipped with temperature controls for frozen goods.
   (a) Open trailers (b) Flatbeds (c) Reefers
6. Container ______ allows efficient transfer between trucks, trains, and ships.
   (a) packing (b) switching (c) standardization
7. Port ______ can cause days-long delays in global delivery schedules.
   (a) congestion (b) taxation (c) reloading
8. Dedicated ______ aircraft transport only cargo without passengers.
   (a) freighter (b) charter (c) liner
9. International shipments often require a detailed ______ declaration.
   (a) customs (b) safety (c) delivery
10. New automated cranes help increase port ______ and reduce labor costs.
   (a) emissions (b) throughput (c) licensing

Exercise 3. Use the correct form of the word in brackets:

1. The port authority has improved ______ at the container terminal. *(operate)*

2. Modern airports require full ______ for all goods entering or leaving. *(inspect)*
3. The ______ of container size helps speed up transfer operations. *(standard)*
4. Electronic systems have enhanced cargo ______. *(visible)*
5. Maritime transport is the most ______ mode per ton-kilometer. *(economy)*
6. New terminals are being designed with greater ______ in mind. *(flexible)*
7. Freight planners must consider route ______ when designing supply chains. *(reliable)*
8. ______ logistics can balance cost, speed, and environmental goals. *(multi-mode)*
9. The ______ of new eco-fuels supports green transport policies. *(adopt)*
10. Aircraft weight ______ is crucial in planning air cargo. *(limit)*

Exercise 4. Complete the sentence with provided vocabulary:

integration, perishables, routing, visibility, congestion, emissions, scalability, transparency, electrification, handling

1. The airport introduced new cargo ______ procedures to reduce delays.
2. The ______ of freight trains allows moving larger quantities at once.
3. Cold chain logistics ensures the safe transport of ______ like food and vaccines.
4. Transport ______ is optimized using AI-based planning tools.
5. Traffic ______ can significantly delay urban deliveries.
6. The port's digital system improves shipment ______ for all parties.
7. Carbon ______ from air freight are higher than from sea transport.
8. The ______ of port operations requires advanced terminal software.
9. Governments are investing in rail ______ to reduce fossil fuel use.
10. True supply chain ______ can only be achieved through shared data platforms.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Translation**
Air freight	Авіаційні вантажні перевезення
Bulk cargo	Насипний/наливний вантаж
Carbon footprint	Вуглецевий слід
Cargo handling	Обробка вантажів
Cold chain logistics	Логістика холодового ланцюга
Containerization	Контейнеризація
Containerized cargo	Контейнеризований вантаж
Customs clearance	Митне оформлення
Delivery window	Вікно доставки
Digitalization	Цифровізація
Electronic air waybill (e-AWB)	Електронна авіанакладна
Emissions	Викиди
Freight transport	Вантажні перевезення
Freighter aircraft	Вантажний літак
Fuel surcharge	Доплата за пальне
Intermodal terminal	Інтермодальний термінал
Intermodal transport	Інтермодальні перевезення
Last-mile delivery	Доставка останньої милі
Logistics hub	Логістичний вузол / хаб
Maritime freight	Морські вантажні перевезення
Multimodal logistics	Мультимодальна логістика
Perishables	Швидкопсувні товари
Port congestion	Перевантаження портів / затори у портах
Predictive routing	Прогнозована маршрутизація

English Term	Ukrainian Translation
Rail electrification	Електрифікація залізничного транспорту
Rail freight	Залізничні вантажні перевезення
Real-time tracking	Відстеження в реальному часі
Reefer truck	Рефрижераторна вантажівка
Road freight	Автомобільні вантажні перевезення
Scalability	Масштабованість
Standardization	Уніфікація / стандартизація
Sustainable aviation fuel (SAF)	Сталий авіаційний паливний ресурс
Throughput	Пропускна здатність
Unit Load Device (ULD)	Уніфікований вантажний блок (ULD)
Visibility	Видимість (у значенні «відстежуваність»)

GRAMMAR FOCUS: PAST SIMPLE vs PAST CONTINUOUS

I. Past Simple Tense

Формула:

- **Affirmative:** Subject + V2 / V-ed
- **Negative:** Subject + did not + V1
- **Question:** Did + subject + V1?

Вживання:

- Дія завершилася у минулому
- Подія відбулася в чіткий момент часу (вчора, у 2020, минулого тижня тощо)
- Послідовність подій у минулому

Приклади:

- The truck **arrived** at the warehouse yesterday.

Вантажівка прибула на склад вчора.

- They **did not ship** the order on time.

  Вони не відправили замовлення вчасно.
- **Did** the company **invest** in air freight infrastructure in 2010?

  Чи інвестувала компанія в авіа-інфраструктуру у 2010?

II. Past Continuous Tense

Формула:

- **Affirmative:** Subject + was/were + V-ing
- **Negative:** Subject + was/were not + V-ing
- **Question:** Was/Were + subject + V-ing?

Вживання:

- Дія відбувалася у певний момент у минулому
- Довга дія, перервана коротшою
- Паралельні дії у минулому

Приклади:

- The workers **were loading** the container when the storm started. *Працівники вантажили контейнер, коли почалася буря.*
- While the ship **was docking**, the crew **was preparing** documents.

  Поки судно швартувалося, команда готувала документи.
- **Was** he **driving** when the call came?

  Він був за кермом, коли пролунав дзвінок?

PAST SIMPLE vs PAST CONTINUOUS

Past Simple	Past Continuous
The ship **arrived** at 5:00.	The ship **was arriving** when the port closed.
They **completed** the loading process.	They **were completing** the documents all evening.

Past Simple	Past Continuous
I **checked** the delivery list.	I **was checking** the list when the driver called.

GRAMMAR EXERCISES

Exercise 1. Open the brackets using the correct tense (Past Simple or Past Continuous):

1. While the cargo team (unload) ______ the truck, the manager (inspect) ______ the goods.
2. The container ship (arrive) ______ in port two hours late.
3. We (not receive) ______ the customs documents yesterday.
4. When I (check) ______ the schedule, the driver (call) ______ me.
5. They (prepare) ______ the shipment when the storm (begin) ______.
6. The logistics team (work) ______ overtime last night.
7. A technician (repair) ______ the crane while another (supervise) ______ the process.
8. She (not finish) ______ the report before the client arrived.
9. The airport staff (load) ______ the plane when the delay was announced.
10. I (hear) ______ about the problem after the cargo (leave) ______ the warehouse.

Exercise 2. Choose the correct option (Past Simple or Past Continuous):

1. The vessel (docked / was docking) when a strike began.
2. While the supervisor (explained / was explaining) the process, the power went out.
3. We (used / were using) reefers for perishable goods last season.
4. The driver (checked / was checking) the cargo when he found damage.
5. They (not finish / were not finishing) the delivery before the storm hit.

6. The system (updated / was updating) all shipping records at midnight.
7. He (spoke / was speaking) to customs when I arrived.
8. What (caused / was causing) the unexpected delay?
9. While the trucks (waited / were waiting), the containers were being unloaded.
10. The manager (reviewed / was reviewing) the invoices yesterday afternoon.

Exercise 3. Translate from English into Ukrainian:

1. While we were unloading the ship, it started to rain.
2. The truck arrived at the terminal at exactly 5 a.m.
3. He wasn't checking the inventory when the alarm went off.
4. Were you working with that logistics company last year?
5. The system was updating the schedule when it crashed.
6. The forklift operator dropped a pallet during the inspection.
7. They were discussing the shipment details while I printed the documents.
8. The ship did not reach the port on time.
9. Were you watching the fuel consumption during the test run?
10. The client complained while we were packing his order.

Exercise 4. Translate from Ukrainian into English:

1. Поки вантажівку розвантажували, водій заповнював документи.
2. Минулого тижня ми не отримали сертифікати якості.
3. Ти працював над новим маршрутом, коли я дзвонив?
4. Коли працівники перевіряли упаковку, менеджер прибув на склад.
5. Ми готували відправлення, коли система дала збій.
6. Хто контролював процес, поки йшло завантаження?
7. Усі документи були підписані до прибуття вантажу.
8. Я не бачив ніяких повідомлень, поки перевіряв відправлення.
9. Чи ти працював у порту у 2021 році?
10. У той час як транспорт стояв у заторі, клієнт чекав поставку.

Exercise 5. Make questions to the words in bold type:

1. The truck **arrived at 6:30 a.m.** → What time ______?
2. We **were preparing the air waybill** when you called. → What ______?
3. **She** checked the delivery report. → Who ______?
4. They were discussing the damage **with the inspector**. → With whom ______?
5. The cargo **wasn't ready** on Monday. → What ______?
6. **He** was supervising the team during the audit. → Who ______?
7. The terminal **closed** due to bad weather. → Why ______?
8. The manager was speaking **to the customs officer**. → To whom ______?
9. **They were still unloading the containers** at 8 p.m. → What ______?
10. The ship **departed last night**. → When ______?

Exercise 6. Find and correct the mistake:

1. We was delivering the goods when the system failed.
2. They didn't received the final invoice yesterday.
3. While the containers unloaded, the crew waited.
4. Was she worked on the shipment report?
5. The truck was stopped when he saw the signal.
6. We was preparing the documents all evening.
7. The captain didn't knew about the schedule change.
8. They loading the cargo when the crane broke.
9. What did he doing when the delay happened?
10. The logistics team was complete the order overnight.

SPEAKING TASKS

Task 1. Personal Experience Discussion

Topic: *A Past Transport or Delivery Experience*
Instructions: *Describe a situation with cargo, delivery, or transportation that occurred in the past. Use Past Simple and Past Continuous tenses.*

Suggested prompts:

- What were you transporting?
- What happened during the delivery?
- Were there any problems or delays?
- How did you or your team handle the situation?

Task 2. Pair Interview

Topic: *Your Company's Freight Operations Last Year*
Instructions: *One student plays the role of a logistics manager, another plays a journalist. Make up a mini-interview about the company's activities over the past year.*

Sample questions:

- What types of freight transport did your company use?
- Did your team face any logistical challenges?
- Were you using digital systems at that time?
- What was the most difficult shipment you coordinated?

Task 3. Mini-Presentation (3–4 minutes)

Topic Options:

- The evolution of freight transport in your country
- A case study: how a shipment was delivered (Past Tense focus)
- An international transport incident: causes and consequences
- Freight technologies used in the past vs. now

Instructions: *Get ready with a short presentation with 3-4 main points, examples, and conclusions. Be sure to use past simple and past continuous tenses.*

Task 4. Group Problem-Solving

Scenario: *Last month, your freight company experienced a major disruption due to a blocked railway line. Your group must explain what happened and design a backup solution.*

Discussion points:

- What exactly was happening when the issue occurred?
- What was the team doing during the disruption?
- How did you solve the problem?
- What would you do differently next time?

Task 5. Debate

Topic: *Air freight is the future of urgent cargo delivery*

Instructions: *One side of the team supports the thesis, the other opposes it. Be sure to use examples from the past situations (real or imaginary) and use the past tenses.*

Arguments may include:

- Examples of delays or success in air cargo
- Comparisons with other transport modes
- Costs, risks, and environmental impacts
- Industry trends over the last few years

UNIT 3: WAREHOUSING AND INVENTORY MANAGEMENT

TEXT 1: THE STRATEGIC ROLE OF WAREHOUSING IN MODERN SUPPLY CHAINS

In the evolving landscape of global logistics, warehousing has transformed from a passive storage function into a strategic component of supply chain optimization. While traditionally associated with keeping goods in stock, modern warehousing plays a proactive role in inventory control, order fulfillment, customer service, and overall value creation. Companies across sectors have increasingly recognized that well-managed warehouse systems can improve supply chain responsiveness, reduce operational costs, and enhance competitiveness in a globalized marketplace.

Over the past two decades, warehousing has undergone significant changes in function and perception. Previously, storage facilities were considered cost centers – necessary but inefficient spaces filled with static goods awaiting further distribution. However, with the rise of just-in-time (JIT) production, omni-channel retailing, and global sourcing, warehouses have been redefined as dynamic, multifunctional hubs. They have become vital for managing demand fluctuations, supporting rapid delivery models, and integrating supply chain flows across multiple regions.

Modern warehouses are not only places of storage but also centers of flow coordination. They act as buffers between production and consumption, absorbing variability in lead times and demand patterns. A strategically located warehouse allows businesses to consolidate shipments, postpone final assembly or packaging, and maintain proximity to customer zones—all of which contribute to greater flexibility and reduced delivery times. For example, regional distribution centers (RDCs) have been introduced to serve densely populated areas with faster fulfillment, while cross-docking terminals reduce the need for long-term storage by transferring goods directly between inbound and outbound transportation.

The shift in warehouse strategy has been supported by a wide range of technological innovations. Warehouse Management Systems (WMS) have become central to warehouse operations, allowing real-time tracking of inventory, automated replenishment, and data-driven decision-making. These systems are often integrated with Enterprise Resource Planning (ERP) and Transportation Management Systems (TMS), enabling full visibility and synchronization across the supply chain. In highly automated facilities, robotics, conveyors, drones, and smart shelving systems have replaced manual labor in many tasks, significantly boosting productivity and reducing human error.

One of the most pressing challenges in warehousing is inventory management. Effective inventory control requires balancing stock availability with minimal holding costs. Companies that carry excess inventory tie up capital and increase the risk of obsolescence, while those that understock may face lost sales and production delays. Techniques such as ABC classification, demand forecasting, cycle counting, and safety stock calculation are used to maintain optimal inventory levels. In recent years, many firms have adopted predictive analytics and machine learning to improve accuracy in forecasting and replenishment.

Another key concept in inventory strategy is the balance between **Just-in-Time (JIT)** and **Just-in-Case (JIC)** models. While JIT aims to reduce inventory to a minimum and deliver goods exactly when needed, the COVID-19 pandemic exposed the vulnerability of such lean systems to global disruptions. As a result, many businesses have revised their warehousing strategies to include greater resilience through safety stock, multi-sourcing, and nearshoring. This shift has reinforced the importance of warehouses not only as distribution centers but also as risk management tools.

Warehouse design and layout also contribute to performance. Efficient space utilization, logical flow of goods, and accessibility of fast-moving items are all crucial in optimizing picking, packing, and dispatch processes. Depending on the industry, warehouses may be climate-controlled, bonded (for customs purposes), specialized for e-commerce, or tailored to bulk commodities. The choice of warehouse type and layout depends on factors such as product characteristics, order frequency, customer expectations, and regulatory requirements.

Labor remains a significant factor in warehouse operations, particularly in facilities that have not yet fully automated. Managing labor productivity, safety, and training requires constant attention, especially during seasonal peaks. Moreover, labor shortages in some regions have pushed companies to invest more heavily in automation and workforce retention programs. In this context, the role of warehouse managers has evolved from supervision to strategic oversight of performance metrics, resource allocation, and continuous improvement initiatives.

In conclusion, warehousing has moved far beyond its original function as a passive storage environment. It now represents a dynamic interface between supply and demand, enhanced by digitalization, automation, and strategic planning. As supply chains become more complex and customer expectations more demanding, the role of warehousing will continue to expand, making it an essential focus for logistics professionals aiming to build resilient, responsive, and efficient networks.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. How has the perception of warehousing changed over the past two decades?
2. In what ways do warehouses serve as dynamic hubs in modern logistics systems?
3. How does the location of a warehouse influence delivery speed and flexibility?
4. What technological solutions support warehouse operations today?
5. What challenges are involved in managing inventory effectively?
6. How do JIT and JIC inventory strategies differ, and why did businesses revise them after the COVID-19 pandemic?

7. What are some ways warehouses contribute to risk management and supply chain resilience?
8. How does warehouse layout affect operational efficiency?
9. What are the roles of warehouse managers in contemporary logistics operations?
10. Why is warehousing considered a strategic asset in supply chain management today?

II. True or False?

1. Warehousing is still mainly used for long-term static storage.
2. Cross-docking terminals help avoid the need for long-term storage.
3. Modern warehouses are rarely integrated with other digital systems.
4. The JIT model always guarantees resilience during global disruptions.
5. Warehouse automation can reduce operational errors and increase productivity.
6. Safety stock is used in both JIT and JIC strategies.
7. ABC classification is a tool for organizing warehouse layouts.
8. Labor management is no longer relevant in automated warehouses.
9. Warehouse design has no effect on order-picking efficiency.
10. Digitalization plays a central role in modern warehousing.

III. Fill in the gaps using the words from the box below:

buffering, synchronization, replenishment, safety stock, real-time, automation, obsolescence, capital, demand fluctuations, layout

1. A well-placed warehouse provides ______ between production and consumption.
2. Effective inventory management minimizes both stockouts and ______.
3. WMS supports ______ inventory tracking and decision-making.

4. Companies maintain ______ to prepare for unexpected supply chain risks.
5. Warehouses absorb seasonal and unpredictable ______.
6. Poor inventory practices can result in tied-up ______ and high storage costs.
7. Forecasting tools are used to improve inventory ______ accuracy.
8. Warehouse ______ directly influences speed and efficiency of operations.
9. Digital systems ensure full ______ across logistics platforms.
10. Investments in ______ technologies are increasing due to labor shortages.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Сучасні склади відіграють стратегічну роль у глобальних ланцюгах постачання.
2. Системи управління складами дозволяють відстежувати запаси в реальному часі.
3. Крос-докінг зменшує потребу в тривалому зберіганні товарів.
4. Надмірні запаси можуть призвести до заморожування капіталу та втрат через застарівання.
5. Після пандемії багато компаній змінили підхід до управління запасами.
6. Автоматизація допомагає підвищити продуктивність та зменшити людські помилки.

B. Translate from English into Ukrainian:

1. Warehouses act as flexible buffers that balance production schedules and customer demand.
2. Predictive analytics tools help companies reduce inventory risks.
3. Inventory strategies today must balance efficiency with resilience.
4. Warehouse layout impacts picking speed, order accuracy, and space utilization.
5. Labor shortages have accelerated the adoption of warehouse automation.

6. Real-time integration between WMS and ERP ensures full visibility across the supply chain.

TEXT 2: INVENTORY CONTROL SYSTEMS – TECHNOLOGIES, STRATEGIES, AND PERFORMANCE IMPLICATIONS

In contemporary supply chains, inventory is more than a collection of stored goods – it is a critical asset that must be managed with precision, strategy, and advanced technology. The shift from manual tracking to automated, data-driven inventory control systems has significantly changed how businesses monitor, plan, and execute their warehousing operations. Companies that excel at inventory control do not merely keep count of products; they continuously evaluate stock performance, reduce inefficiencies, and align inventory levels with fluctuating demand patterns and production cycles.

At the heart of modern inventory control is the principle of balance – ensuring the availability of sufficient stock to meet customer requirements while avoiding excessive accumulation that ties up capital and space. Achieving this equilibrium requires accurate forecasting, responsive replenishment, and robust monitoring mechanisms. Inventory control systems help logistics managers identify optimal reorder points, calculate safety stock levels, and anticipate seasonal or regional variations in supply and demand. These systems also offer visibility into fast-moving, slow-moving, and obsolete items, helping reduce waste and improve stock rotation.

Warehouse Management Systems (WMS) and Enterprise Resource Planning (ERP) platforms now serve as the foundation of inventory control. These digital solutions are often integrated into broader logistics networks, enabling centralized control and visibility across multiple locations. Through barcode scanning, RFID tagging, and cloud-based dashboards, businesses can track inventory in real time, detect discrepancies, and monitor product life cycles. The adoption of such systems has proven especially valuable in industries with high product turnover, perishable goods, or strict traceability requirements, such as food distribution, pharmaceuticals, and automotive manufacturing.

Inventory control also supports more strategic decision-making. Businesses use data generated by WMS and ERP to optimize order quantities, evaluate supplier performance, and redesign warehouse layouts. Predictive analytics tools use historical trends, sales data, and external variables (such as weather patterns or market events) to adjust stock levels automatically. For example, a company that once overstocked winter gear may now use algorithmic forecasting to maintain optimal quantities without risk of excess. This transition from reactive to proactive inventory planning improves responsiveness and supports just-in-time (JIT) or just-in-sequence (JIS) strategies, which are critical in high-velocity logistics.

The structure of inventory control is often based on classification systems. ABC analysis divides inventory into three categories: A-items (high-value, low-frequency), B-items (moderate value and frequency), and C-items (low value, high frequency). This classification allows warehouses to prioritize resources and storage space more efficiently. In some organizations, XYZ analysis (based on consumption variability) is combined with ABC to create multi-dimensional control models. These tools help organizations allocate attention and resources proportionally to the financial and operational importance of different stock types.

Despite technological advancements, inventory control faces persistent challenges. Forecasting errors, supply chain disruptions, poor data quality, and lack of employee training can lead to either stockouts or overstocking. Furthermore, inventory policies must be continually revised to reflect changing customer expectations, economic trends, and technological developments. For example, in e-commerce, the pressure to offer same-day delivery has prompted many companies to adopt more granular, location-based stock segmentation and to invest in distributed micro-fulfillment centers that rely on advanced inventory algorithms.

Sustainability is also influencing inventory management. Overstocking contributes to material waste and environmental impact, especially in fast fashion and consumer electronics. On the other hand, insufficient inventory may lead to inefficient emergency shipments or the destruction of perishable goods. As a result, many companies are incorporating sustainability metrics into their inventory performance evaluations, such as waste reduction, shelf life optimization, and return minimization. These initiatives require closer collaboration between inventory managers, suppliers, and sustainability teams.

In summary, inventory control systems are not merely operational tools – they are strategic platforms that affect every aspect of supply chain performance. From improving financial health to reducing carbon footprints, inventory management is now a cornerstone of responsible and competitive logistics. As digital technologies evolve and consumer expectations rise, companies must continue to refine their inventory control strategies to ensure agility, accuracy, and long-term resilience.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. How has the role of inventory evolved in modern supply chains?
2. What are the main functions of an inventory control system?
3. How do WMS and ERP platforms contribute to inventory accuracy?
4. What benefits do predictive analytics tools offer in inventory planning?
5. How does ABC classification help optimize warehouse operations?
6. Why is overstocking considered both a financial and environmental issue?
7. What are the risks of poor forecasting and how can they be mitigated?
8. How are companies adapting inventory policies to the rise of e-commerce?
9. In what ways does inventory management impact customer satisfaction?
10. Why is inventory control now viewed as a strategic rather than operational activity?

II. True or False?

1. Inventory control is only important for physical counting.
2. RFID tags and barcodes help track inventory in real time.
3. Predictive analytics tools are used only for financial forecasting.
4. ABC classification focuses on the monetary value of stock items.
5. Poor data quality can lead to inventory imbalances.
6. Sustainability is rarely connected to inventory performance.
7. Over-reliance on JIT systems guarantees zero waste.
8. Inventory segmentation helps improve warehouse design.
9. ERP systems are only used in manufacturing.
10. Inventory policies must remain static to ensure stability.

III. Fill in the gaps using the words from the box below:

classification, forecasting, automation, replenishment, disruptions, obsolescence, segmentation, algorithms, real-time, sustainability

1. Modern inventory systems rely on ______ data for fast decision-making.
2. Machine learning ______ help calculate optimal stock levels.
3. Effective ______ improves order accuracy and customer satisfaction.
4. Inventory ______ allows companies to focus on high-impact items.
5. Predictive ______ reduces the risk of both shortages and excess.
6. Natural disasters or strikes may cause unexpected ______ in inventory flows.
7. Accurate systems prevent product ______ in slow-moving categories.
8. Warehouse ______ by item type can improve picking speed.
9. Automated ______ triggers ensure shelves are never empty.
10. Eco-conscious companies include ______ targets in their inventory KPIs.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Системи контролю запасів дозволяють уникати як дефіциту, так і надлишку товарів.
2. ERP-системи забезпечують інтеграцію складу з іншими бізнес-процесами.
3. Технології прогнозування попиту допомагають мінімізувати втрати.
4. Аналіз ABC допомагає розставити пріоритети серед складських товарів.
5. Надмірне накопичення товару призводить до фінансових і екологічних проблем.
6. Електронна ідентифікація товарів дозволяє відстежувати запаси в реальному часі.

B. Translate from English into Ukrainian:

1. Inventory control systems are essential for reducing supply chain waste.
2. Predictive algorithms can automatically adjust order quantities.
3. Companies now use sustainability indicators in evaluating stock performance.
4. Obsolete inventory ties up capital and occupies valuable space.
5. Disruptions in supply chains must be reflected in inventory policies.
6. Segmentation of inventory allows targeted storage and faster access.

TEXT 3: WAREHOUSE AUTOMATION AND THE TECHNOLOGICAL TRANSFORMATION OF LOGISTICS OPERATIONS

The digital revolution has significantly reshaped the structure and function of warehouses, giving rise to a new era of automation-driven logistics. No longer confined to manual labor and paper-based processes, modern warehouses increasingly operate as technologically advanced environments, where data, robotics, and intelligent systems interact in real time. The shift toward automation has not only improved speed and efficiency but has also changed the roles of human workers and redefined the strategic significance of warehousing within the broader supply chain.

Warehouse automation refers to the use of machines, software, and integrated technologies to perform warehouse tasks with minimal human intervention. These tasks include picking, packing, storing, replenishing, sorting, transporting, and inventory tracking. While early automation focused on conveyors and barcode scanners, today's systems incorporate autonomous mobile robots (AMRs), automated guided vehicles (AGVs), robotic arms, drones, and artificial intelligence. The objective is to reduce labor costs, increase accuracy, accelerate throughput, and improve overall process control.

One of the major drivers behind automation adoption has been the growing complexity and velocity of global logistics. The rise of e-commerce, with its high order volumes, shorter delivery windows, and SKU diversity, has placed enormous pressure on warehouses to process orders faster and with greater precision. At the same time, labor shortages in many logistics markets have made automation not only an efficiency tool but a necessity. In this context, warehouse automation is no longer viewed as optional – it is becoming a competitive requirement.

Modern automated warehouses are often managed by sophisticated Warehouse Control Systems (WCS) that coordinate all physical movement, and Warehouse Execution Systems (WES) that optimize the sequencing of warehouse tasks. These systems are typically integrated with Warehouse Management Systems (WMS), ERP platforms, and predictive analytics tools. Such integration ensures end-to-end visibility and data consistency, enabling real-time performance tracking, dynamic slotting, and automated replenishment. For instance, if a product is selling faster than expected, the system can automatically reposition inventory and notify replenishment teams or robotic pickers.

The benefits of automation are particularly evident in high-volume and high-precision environments. Automated storage and retrieval systems (AS/RS), for example, can handle thousands of pallets or bins with speed and accuracy unmatched by manual labor. These systems are especially effective in vertical storage layouts, where space optimization is critical. Additionally, goods-to-person (GTP) technologies bring inventory directly to human operators, reducing walking time and increasing productivity in order-picking zones.

However, the implementation of automation also presents challenges. Initial investment costs can be substantial, especially for small or medium-sized enterprises. The return on investment (ROI) depends on throughput levels, product variety, and order complexity. Furthermore, integration with existing systems and workflows requires careful planning and technical expertise. A poorly managed automation rollout can disrupt operations rather than enhance them. For this reason, many companies begin with partial automation in high-impact zones, such as picking or packing, before scaling up to full-system integration.

Another consideration is the impact of automation on workforce dynamics. While automation reduces reliance on manual labor, it also creates demand for higher-skilled roles in system maintenance, IT integration, and data analysis. Workers are no longer just pickers and movers; they must understand and collaborate with machines, interpret system feedback, and participate in continuous process improvement. As a result, training and change management are crucial components of any automation initiative.

Sustainability is also a factor in the push toward automation. Electric-powered AGVs and energy-efficient AS/RS systems contribute to greener logistics operations. Moreover, by reducing errors and returns, automation supports waste reduction and resource conservation. Some warehouses have integrated renewable energy sources, such as solar panels, into their infrastructure to power automated systems sustainably.

In conclusion, warehouse automation represents a paradigm shift in how logistics operations are conducted. Far from replacing warehousing, technology has elevated its role, transforming warehouses into data-driven, adaptive systems that enable companies to meet the growing demands of modern commerce. For logistics professionals, understanding and implementing warehouse automation is no longer a futuristic ambition – it is a current strategic priority.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. How has the concept of warehouse automation evolved over recent decades?
2. What are the primary functions automated in a modern warehouse?
3. How has the growth of e-commerce influenced the adoption of automation?
4. What are the roles of WMS, WCS, and WES in automated environments?
5. Why is goods-to-person technology considered efficient in order fulfillment?
6. What risks are associated with automation implementation?
7. How does warehouse automation affect workforce requirements?
8. In what ways does automation contribute to sustainability in logistics?
9. What challenges do small and medium enterprises face in adopting automation?
10. Why is automation becoming a strategic priority for logistics professionals?

II. True or False?

1. Warehouse automation eliminates the need for all human labor.
2. AMRs and AGVs are used to transport goods without human control.
3. WES and WMS are interchangeable systems.
4. Automation supports energy efficiency and waste reduction.
5. ROI on automation is guaranteed for all types of warehouses.
6. Integration with legacy systems can be a barrier to automation.
7. E-commerce has reduced the need for advanced warehouse systems.
8. Vertical storage solutions are often enhanced by automation.
9. Staff in automated warehouses require little technical training.
10. Automation is becoming a necessity rather than a luxury.

III. Fill in the gaps using the words from the box below:

throughput, sequencing, integration, visibility, AGVs, ROI, deployment, retraining, slotting, GTP

1. Modern warehouses use WES to optimize task ______ and reduce downtime.
2. Automated systems improve inventory ______ by tracking goods in real time.
3. ______ is calculated to determine the financial benefit of automation investments.
4. ______ solutions bring inventory to workers, improving picking speed.
5. High ______ environments benefit most from automation technologies.
6. Carefully planned ______ is essential for successful automation implementation.
7. Workers must undergo ______ to adapt to new roles in automated facilities.
8. ______ help move items across large warehouses without human intervention.
9. Automation allows for dynamic ______ based on product demand frequency.
10. The ______ of systems like WMS and ERP ensures a synchronized operation.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Автоматизовані склади дозволяють обробляти тисячі замовлень щогодини.
2. Інтеграція WMS з ERP забезпечує безперебійну роботу логістичного ланцюга.
3. Використання роботів скорочує витрати на працю та підвищує точність.
4. Автоматизовані системи зменшують кількість повернень і помилок.
5. Працівники повинні пройти перепідготовку для роботи з новими технологіями.
6. Висока вартість впровадження є основним бар’єром для малих компаній.

B. Translate from English into Ukrainian:

1. Warehouse execution systems optimize the order in which tasks are completed.
2. Predictive analytics can dynamically adjust inventory slotting in real time.
3. Goods-to-person systems reduce walking distances for human operators.
4. Training is critical to ensure successful human–machine collaboration.
5. Vertical automation allows better use of limited warehouse space.
6. Renewable energy is being used to power robotic equipment in modern facilities.

TEXT 4: TYPES OF WAREHOUSES AND THEIR FUNCTIONS IN MODERN LOGISTICS

In the complex structure of modern supply chains, not all warehouses serve the same purpose. While the fundamental role of storing goods remains unchanged, the type, design, and operation of a warehouse are increasingly specialized to meet the diverse requirements of industries, markets, and customers. From high-throughput fulfillment centers to temperature-controlled storage facilities, warehouse types have evolved to support differentiated logistics strategies. Understanding these categories is essential for logistics professionals aiming to optimize performance, reduce lead times, and ensure customer satisfaction.

Distribution centers (DCs) are among the most common types of modern warehouses. Unlike traditional storage facilities, DCs are designed for high-speed movement rather than long-term holding. Their primary function is to receive bulk shipments from manufacturers, break them into smaller lots, and dispatch them efficiently to retailers or end customers. Most DCs operate with fast inventory turnover and are strategically located near urban centers or transport hubs. They often feature automated sorting systems, cross-docking operations, and integrated Warehouse Management Systems (WMS) to coordinate inbound and outbound flows with precision.

Another essential facility in the e-commerce era is the fulfillment center. These warehouses are highly dynamic, processing thousands of small, individualized orders each day. Fulfillment centers are usually operated by retailers or third-party logistics providers (3PLs) and include sophisticated picking technologies, conveyor systems, and real-time inventory software. Their layouts prioritize accessibility, rapid packaging, and minimal error rates. In many cases, fulfillment centers operate 24/7, reflecting the speed and flexibility required by today's consumer-driven environment.

Cold storage warehouses are critical for handling temperature-sensitive products such as food, pharmaceuticals, and certain chemicals. These facilities maintain precise environmental conditions, including refrigeration or freezing, to preserve product integrity. Cold chain logistics requires specialized infrastructure, such as insulated docks, humidity control, backup power systems, and compliance with safety and health regulations. The complexity of managing cold storage – combined with high operational costs – makes it one of the most technically demanding segments in warehousing.

Bonded warehouses serve a specific legal and economic function in global trade. These facilities are authorized by customs authorities to store imported goods that are not yet cleared for domestic distribution. Businesses can delay duty payments until the goods are sold or re-exported, which provides a valuable cash flow advantage. Bonded warehouses are used for items such as alcohol, tobacco, luxury goods, and bulk raw materials awaiting reprocessing. They operate under strict documentation and inspection protocols, requiring close coordination with customs officials and regulatory bodies.

Bulk storage warehouses are used for raw materials and non-packaged goods, including grains, ores, and construction materials. These warehouses typically feature open layouts, silos, or bins, and may be co-located with manufacturing plants or ports. Bulk storage requires robust inventory tracking systems to prevent losses and ensure accurate accounting. In some industries, bulk warehouses support seasonal storage strategies, allowing producers to manage surpluses until market demand rises.

Specialized warehouses have emerged in response to industry-specific requirements. For example, hazardous materials warehouses must comply with strict fire protection, ventilation, and containment standards. Reverse logistics warehouses focus on managing returned goods, including inspection, repackaging, refurbishment, or recycling. High-security warehouses are used for valuable items such as artwork, electronics, and high-end fashion, often incorporating biometric access, surveillance systems, and climate control. These specialized facilities require tailored infrastructure, workflows, and training.

Some companies operate decentralized warehouse networks, relying on smaller facilities distributed across regions. These satellite warehouses or micro-fulfillment centers reduce last-mile delivery times and enable same-day shipping. While more expensive to maintain, such networks offer flexibility and speed in consumer markets with high service expectations. The rise of omnichannel retail has further encouraged hybrid warehouse models that serve both store replenishment and direct-to-consumer fulfillment from the same location.

In all cases, the choice of warehouse type must align with a company's logistics strategy, product characteristics, and service goals. Factors such as lead time requirements, order complexity, geographic reach, regulatory compliance, and total cost of ownership play a key role in determining the optimal warehousing mix. Companies that invest in the right combination of warehouse types can gain a significant competitive advantage, especially in fast-moving, globalized markets.

In summary, warehouses are no longer generic storage spaces – they are functionally distinct and strategically critical elements of modern logistics. Selecting and managing the appropriate type of warehouse is essential for operational efficiency, customer satisfaction, and long-term business growth. As supply chains grow more complex, the specialization of warehousing will continue to expand, offering more tailored solutions for every segment of the market.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. How do distribution centers differ from traditional storage facilities?
2. What specific logistics functions do fulfillment centers serve in e-commerce?
3. What are the infrastructure and compliance requirements for cold storage warehouses?
4. How do bonded warehouses support international trade and cash flow?
5. Why are bulk storage warehouses particularly useful for raw materials?
6. What are some examples of specialized warehouses, and what do they require?
7. How do satellite or micro-fulfillment centers improve delivery speed?
8. In what ways does warehouse specialization contribute to logistics strategy?
9. What factors should a company consider when choosing a warehouse type?
10. Why is warehousing no longer viewed as a "one-size-fits-all" function?

II. True or False?

1. Fulfillment centers typically store goods for long-term preservation.
2. Bonded warehouses allow companies to delay paying import duties.
3. Cold storage warehouses can operate without humidity control.
4. Distribution centers are usually located close to manufacturing sites.
5. Micro-fulfillment centers are designed for fast, last-mile delivery.
6. Specialized warehouses require standard layouts and workflows.
7. Reverse logistics warehouses handle damaged and returned products.
8. High-security warehouses are mainly used for construction materials.
9. The choice of warehouse type depends on logistics goals and product nature.
10. All warehouses can operate with the same WMS configuration.

III. Fill in the gaps using the words from the box below:

compliance, perishable, sorting, throughput, bonded, surplus, decentralized, packaging, inspection, layout

1. Fulfillment centers are optimized for fast ______ and order processing.
2. Cold warehouses are necessary to preserve ______ goods like food and vaccines.
3. Bonded warehouses require customs ______ before goods can be distributed.
4. Companies use ______ networks to reduce last-mile delivery times.
5. The ______ of each warehouse must match its operational function.
6. Bulk storage warehouses help manage seasonal ______ of raw materials.
7. Reverse logistics facilities handle return processing and ______.
8. High-security warehouses often include real-time video surveillance and biometric ______.
9. Cold chain facilities must follow strict regulatory ______.
10. Distribution centers are designed for maximum order ______, not long-term storage.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Центри виконання замовлень обробляють тисячі дрібних замовлень щодня.
2. Склад із температурним контролем потребує резервного енергопостачання.
3. Митні склади дозволяють відкласти сплату ввізного мита.
4. Спеціалізовані склади мають суворі вимоги до безпеки.
5. Децентралізована мережа складів допомагає скоротити час доставки клієнтам.

6. Вибір типу складу залежить від характеристик продукції та логістичної стратегії.

B. Translate from English into Ukrainian:

1. Distribution centers operate with high inventory turnover and minimal storage time.
2. Fulfillment centers must maintain fast picking and low error rates.
3. Bonded warehouses support international logistics by deferring tax payments.
4. Specialized warehouse functions include storing hazardous or luxury items.
5. Layout and infrastructure must match the specific function of each warehouse.
6. Satellite warehouses support same-day delivery in dense urban regions.

TEXT 5: INVENTORY STRATEGIES – JIT, JIC, AND HYBRID APPROACHES IN SUPPLY CHAIN RESILIENCE

Inventory strategy plays a fundamental role in determining the efficiency, risk exposure, and responsiveness of a supply chain. While storing goods is a basic logistical function, the decision of **how much**, **when**, and **why** to hold inventory defines a company's operational model and resilience against disruption. Two dominant inventory philosophies – **Just-in-Time (JIT)** and **Just-in-Case (JIC)** – have shaped global logistics for decades, each offering distinct benefits and trade-offs. Increasingly, organizations are adopting **hybrid approaches** to navigate a volatile global environment.

The **Just-in-Time** model was popularized by Japanese manufacturing, especially within the automotive industry, and later adopted globally as a method to reduce waste, minimize storage costs, and improve operational efficiency. Under JIT, companies aim to synchronize inventory arrival with production or demand needs, thereby reducing or eliminating the need to hold excess stock. The philosophy is based on precise forecasting, reliable suppliers, and tightly coordinated scheduling. When executed well, JIT leads to leaner operations, lower warehousing costs, and faster response to customer-specific orders.

However, the vulnerabilities of JIT became highly visible during the COVID-19 pandemic. Global transportation bottlenecks, factory shutdowns, and geopolitical tensions disrupted tightly synchronized supply chains, leaving many firms with no buffer stock to absorb delays. In sectors such as electronics, automotive, and retail, shortages in critical components resulted in production halts and lost revenue. These disruptions sparked a global reassessment of the JIT model's limitations in high-risk environments.

Conversely, the **Just-in-Case** approach builds buffers into the supply chain by holding additional stock to mitigate potential disruptions. JIC prioritizes security and continuity over efficiency. It is often used in industries where supply uncertainty is high, demand is unpredictable, or where the cost of a stockout is greater than the cost of holding extra inventory. Companies using JIC strategies typically maintain safety stock, work with multiple suppliers, and decentralize their warehouse networks. This model provides flexibility during crises but may increase storage costs and capital tie-up.

With rising geopolitical uncertainty, climate-related events, and fluctuating consumer behavior, many firms now seek **hybrid inventory strategies** that balance the strengths of both JIT and JIC. These models involve maintaining lean operations for high-velocity, predictable items while applying safety buffers to critical or high-risk products. For example, a consumer electronics firm might use JIT for accessories like phone cases while applying JIC to core components such as microchips. Such segmentation requires deep data analysis, risk assessment, and agile planning processes.

Advanced digital tools support hybrid inventory strategies by providing real-time insights, predictive analytics, and scenario modeling. Artificial intelligence (AI) can simulate different supply chain scenarios and recommend optimal stock levels across product categories. Supply Chain Control Towers – centralized platforms that monitor inventory, orders, and disruptions – allow companies to dynamically adjust between lean and buffered models depending on external factors. These systems enable logistics professionals to act quickly in response to demand surges, supplier issues, or transportation delays.

Warehouse operations must also adapt to these inventory strategies. JIT requires high inventory turnover, cross-docking, and tight integration with upstream suppliers. Warehouses in JIT systems are often designed for flow rather than storage, with emphasis on velocity, visibility, and precision. In contrast, JIC models rely on larger storage capacity, multi-zone layout planning, and advanced inventory control systems to manage safety stock without incurring losses through obsolescence.

Companies adopting hybrid strategies must ensure internal alignment between procurement, warehousing, production, and distribution teams. Without clear communication and shared performance metrics, hybrid models can lead to confusion and inefficiencies. Moreover, supplier relationships become more strategic: flexibility, reliability, and geographical diversification are now key selection criteria.

Ultimately, the choice of inventory strategy depends on a company's industry, risk profile, customer expectations, and market volatility. While JIT remains attractive for its efficiency, no modern supply chain can afford to ignore the need for resilience. The most successful logistics organizations are those that can **switch modes**, continuously reevaluate stock policies, and adjust to an increasingly uncertain world.

In conclusion, inventory strategies are no longer static choices but dynamic systems. The ability to combine the responsiveness of JIT with the preparedness of JIC allows firms to manage cost, service, and risk in a balanced manner. As global supply chains become more interconnected yet fragile, hybrid inventory models offer a pathway to sustained performance in a disrupted era.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What are the core principles of the Just-in-Time (JIT) inventory strategy?
2. Why did the COVID-19 pandemic expose weaknesses in the JIT model?
3. How does the Just-in-Case (JIC) strategy help mitigate supply chain risks?
4. What are the trade-offs between inventory efficiency and inventory security?
5. How do hybrid strategies combine elements of JIT and JIC?
6. What role does digital technology play in implementing hybrid models?
7. How must warehouse operations differ depending on the inventory strategy applied?
8. What organizational challenges may arise when transitioning to a hybrid model?
9. How do supplier relationships evolve in risk-sensitive inventory models?
10. Why are inventory strategies now considered dynamic rather than fixed?

II. True or False?

1. The goal of JIT is to store as much inventory as possible.
2. JIC is useful when the cost of running out of stock is very high.
3. Hybrid inventory models cannot use digital systems.
4. JIT systems require warehouses to focus on inventory flow, not long-term storage.
5. AI-based scenario modeling is not relevant to inventory planning.
6. Hybrid models require no communication between departments.
7. Microchips are more likely to be managed under a JIC model.
8. Predictability of demand influences which inventory strategy is chosen.
9. JIC completely eliminates supply chain risk.
10. Hybrid models allow firms to adjust based on external conditions.

III. Fill in the gaps using the words from the box below:

segmentation, buffers, forecasting, synchronization, agility, obsolescence, turnover, resilience, disruption, scenario

1. The pandemic caused widespread supply chain ______ and exposed vulnerabilities.
2. JIT models rely on precise timing and process ______.
3. JIC provides stock ______ to absorb unexpected demand spikes.
4. Inventory ______ allows companies to assign different strategies to different items.
5. Predictive ______ tools help manage hybrid inventory systems.
6. High inventory ______ is typical in JIT environments.
7. Safety stock must be managed carefully to avoid product ______.
8. Strong inventory ______ requires both visibility and planning.
9. Companies use digital systems to run what-if ______ analyses.
10. In volatile markets, ______ in inventory management is key to competitiveness.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Стратегія «точно вчасно» зменшує витрати на зберігання, але залежить від точного прогнозування.
2. Підхід «про всяк випадок» передбачає наявність буферних запасів на випадок перебоїв.
3. Гібридні моделі поєднують гнучкість із надійністю.
4. Під час пандемії багато компаній зазнали втрат через нестачу сировини.
5. Інтелектуальні системи допомагають адаптувати запаси до змін у попиті.
6. Складська інфраструктура повинна відповідати обраній стратегії запасів.

B. Translate from English into Ukrainian:

1. Just-in-Time reduces excess stock but increases exposure to delays.
2. Companies are shifting toward hybrid models to balance cost and risk.
3. Inventory segmentation enables strategy customization by product category.
4. Safety stock absorbs shocks but raises storage costs.
5. AI tools enhance decision-making in dynamic inventory environments.
6. Warehouses must support both flow-oriented and buffer-oriented operations.

LEXICAL EXERCISES

Exercise 1. Match the term with its definition:

1. Distribution center (DC)	**A.** Data analysis system for forecasting inventory levels and demand
2. Fulfillment center	**B.** The maximum number of items that a warehouse can process per unit of time
3. Cold storage	**C.** The process of inventory aging, leading to its obsolescence
4. Bonded warehouse	**D.** Additional stock to cover unforeseen disruptions
5. Safety stock	**E.** A warehouse where imported goods are stored before customs duties are paid
6. Warehouse automation	**F.** A temperature-controlled warehouse for food and pharmaceutical products
7. Just-in-Case (JIC)	**G.** A center focused on rapid packaging and shipping of individual orders
8. Predictive analytics	**H.** A distribution center with a large volume of cargo movement

9. Obsolescence	**I.** The use of robots, software, and machines to perform warehouse operations
10. Throughput	**J.** An approach to inventory with the accumulation of buffer volumes in case of disruptions

Exercise 2. Choose the correct option for every srntence:

1. A ______ breaks bulk shipments into smaller lots for fast onward delivery.
   a) fulfillment center
   b) distribution center
   c) bonded warehouse
2. ______ systems use robots, conveyors, and software to reduce manual labor.
   a) Warehouse automation
   b) Obsolescence
   c) Safety stock
3. In a ______ model, companies hold extra inventory to guard against shortages.
   a) JIT
   b) Hybrid
   c) JIC
4. ______ helps anticipate demand changes and optimize reorder points.
   a) Predictive analytics
   b) Turnover
   c) Throughput
5. Failure to sell stock before its shelf life expires leads to ______.
   a) obsolescence
   b) segmentation
   c) automation
6. Warehouse ______ measures how many orders are processed per hour.
   a) turnover

b) throughput

c) replenishment

7. ______ ensures critical items remain available during unexpected disruptions.

   a) Bonded warehouse

   b) Safety stock

   c) Cold storage

8. A ______ combines JIT efficiency with JIC reliability across product categories.

   a) fulfillment center

   b) hybrid inventory strategy

   c) distribution center

9. ______ refers to breaking inventory into categories by value or demand frequency.

   a) Segmentation

   b) Predictive analytics

   c) Obsolescence

10. ______ is the process of refilling stock when it falls below a set threshold.

    a) Replenishment

    b) Throughput

    c) Safety stock

Exercise 3. Word Formation: use the necessary form (noun, verb, adjective або adverb) from mini-glossary:

1. High warehouse _______ [automation] can significantly cut labor costs.
2. Accurate demand _______ [forecastive] supports optimal inventory levels.
3. Excess inventory increases the risk of product _______ [obsolete].
4. Companies track _______ [through] to evaluate warehouse performance.
5. Seasonality causes stock _______ [fluctuate], requiring flexible planning.
6. Safety stock acts as a _______ [buffer] against supply delays.

7. Modern WMS provides full _______ [visible] of goods in real time.
8. JIC strategies improve supply chain _______ [resilient].
9. Rapid order _______ [turn] is critical in fulfillment centers.
10. _______ [segmented] storage zones speed up picking operations.

Exercise 4. Complete the sentences with the words in the box:

replenishment, bonded, fulfillment, throughput, obsolescence, segmentation, automation, predictive analytics, safety stock, cold storage

1. Pharmaceutical products often require _______ to maintain efficacy.
2. A _______ warehouse allows deferment of import duties.
3. E-commerce businesses rely on _______ centers to meet next-day delivery promises.
4. Seasonal goods risk _______ if not sold promptly.
5. Retailers use _______ to categorize inventory by sales velocity.
6. Real-time _______ algorithms help optimize stock levels.
7. _______ processes ensure that items are restocked before running out.
8. Automated sorting lines increase order _______ in large DCs.
9. To avoid stockouts, companies maintain _______ for critical components.
10. Fresh produce is stored in specialized _______ facilities.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Translation**
Bonded warehouse	Митний склад
Buffer stock	Буферний запас
Cold storage	Холодне зберігання
Distribution center (DC)	Розподільчий центр
Fulfillment center	Центр виконання замовлень

English Term	Ukrainian Translation
Hybrid inventory strategy	Гібридна стратегія управління запасами
Inventory control	Контроль запасів
Just-in-Case (JIC)	Стратегія «про всяк випадок»
Just-in-Time (JIT)	Стратегія «точно вчасно»
Obsolescence	Застарівання запасів
Replenishment	Поповнення запасів
Safety stock	Страховий запас
Segmentation	Сегментація
Segmentation	Прогнозна аналітика
Stockout	Дефіцит запасів
Throughput	Пропускна здатність
Turnover	Оборотність
Warehouse automation	Автоматизація складу
Warehouse Management System (WMS)	Система управління складом
Warehousing	Складське зберігання

GRAMMAR FOCUS: PRESENT PERFECT & PRESENT PERFECT CONTINUOUS

I. Present Perfect Tense

Формула:

- **Affirmative:** Subject + have/has + V3
- **Negative:** Subject + haven't / hasn't + V3
- **Question:** Have / Has + subject + V3?

Вживання:

- Дія сталася у минулому, але має **результат у теперішньому**
- Досвід, зміни, новини, кількість разів

- Важливо **не коли**, а **що сталося**

Приклади з логістики:

- The company **has implemented** a new inventory system.
- We **have stored** over 10,000 items in the last month.
- **Have** you ever **visited** an automated warehouse?

II. Present Perfect Continuous Tense

Формула:

- **Affirmative:** Subject + have/has + been + V-ing
- **Negative:** Subject + haven't / hasn't + been + V-ing
- **Question:** Have / Has + subject + been + V-ing?

Вживання:

- Дія **почалась у минулому і триває донині**
- Фокус на **тривалості** дії або **недавньому впливі**
- Часто вживається з *how long*, *since*, *for*

Приклади:

- We **have been tracking** the shipment since Monday.
- The warehouse **has been operating** 24/7 this season.
- **How long have** you **been using** this software?

III. Порівняння

Present Perfect	Present Perfect Continuous
They **have installed** new scanners.	They **have been installing** them all morning.
The stock **has increased** recently.	The warehouse **has been filling up** for weeks.

GRAMMAR EXERCISES

Exercise 1. Open the brackets (Present Perfect or Present Perfect Continuous):

1. We (store) ______ thousands of items since January.
2. The warehouse (not implement) ______ the new software yet.
3. I (analyze) ______ sales data all morning.
4. They (install) ______ new shelves in the cold zone.
5. Our team (use) ______ barcode scanners for five years.
6. (You/ever/visit) ______ a fully automated facility?
7. The manager (not complete) ______ the report yet.
8. We (wait) ______ for the delivery for over two hours.
9. The forklifts (malfunction) ______ since last night.
10. She (train) ______ the new staff for two weeks.

Exercise 2. Choose the correct option:

1. Our company (has introduced / has been introducing) a new WMS.
2. They (have moved / have been moving) inventory since early morning.
3. The system (hasn't processed / hasn't been processing) the orders properly.
4. How long (have you worked / have you been working) at this warehouse?
5. We (have received / have been receiving) complaints all week.
6. I (have never visited / have never been visiting) a bonded warehouse.
7. He (has been packing / has packed) orders for three hours.
8. What (has happened / has been happening) with the stock levels lately?
9. The team (hasn't updated / hasn't been updating) the system recently.
10. They (have improved / have been improving) the inventory tracking tools.

Exercise 3. Translate from English into Ukrainian:

1. We have implemented a fully digital warehouse model.
2. The manager has been reviewing the inventory report for an hour.
3. Have you completed the packing list yet?
4. They haven't finished installing the racking system.
5. I have been scanning items all day.

6. This system has significantly reduced human error.
7. The team has been reorganizing storage zones since morning.
8. The software has already been updated.
9. We've been using predictive tools since last quarter.
10. She has never worked with robotic inventory before.

Exercise 4. Translate from Ukrainian into English:

1. Ми щойно завершили інвентаризацію.
2. Вони вже встановили нову систему зберігання.
3. Команда працює над автоматизацією складу вже кілька тижнів.
4. Ти коли-небудь бачив роботизовану систему відбору товарів?
5. Програма ще не була запущена.
6. Ми займаємося оновленням бази даних з самого ранку.
7. Клієнти надсилали скарги весь тиждень.
8. Ми ніколи не використовували цю систему до цього місяця.
9. Працівники ще не отримали інструкції.
10. Я аналізував звіт майже цілий день.

Exercise 5. Make questions:

1. You have improved the layout. → What ______?
2. She has been managing this process for a month. → How long ______?
3. They've installed the new racks. → Where ______?
4. The system hasn't been working well. → What ______?
5. We've been receiving large shipments. → What kind of shipments ______?
6. The report has already been submitted. → When ______?
7. You've been using RFID tags. → Since when ______?
8. He's updated the dashboard twice. → How many times ______?
9. The warehouse has been expanding. → Why ______?
10. The workers have started using new scanners. → What ______?

Exercise 6. Find and correct the mistakes:

1. I have been use this app since April.
2. She have updated the software twice this week.
3. We has been packing the goods since morning.
4. Has you ever visited an automated terminal?
5. The scanner has not work properly lately.
6. They been improving warehouse layout.
7. He hasn't never tracked shipments in real time.
8. How long you have been storing this stock?
9. We have waiting for the supplier since Monday.
10. The company have developed a new robot.

SPEAKING TASKS

Task 1. Personal Experience Discussion

Topic: *Your experience with warehouse systems or inventory handling*

Instructions:

Describe a real or imaginary situation in which you:

- Worked in or observed the functioning of a warehouse
- Interacted with automated systems
- Dealt with a shortage or surplus of goods

Suggested prompts:

- What kind of warehouse was it?
- What systems were used (WMS, barcode scanning, etc.)?
- Were there any problems with inventory?
- What solutions were implemented?

Task 2. Pair Interview:

Scenario: *One student is a warehouse manager. The other is an external logistics consultant.*
Goal: *Learn what inventory management strategies are used and how automation works.*
Sample questions:

- What inventory strategy does your company follow: JIT, JIC, or hybrid?
- How do you track stock levels in real time?
- Have you implemented automation? What kind?
- What are your biggest warehousing challenges?

Task 3. Mini-Presentation (3–4 minutes):
Topic Options:

1. The impact of automation on modern warehouses
2. Advantages and disadvantages of cold storage facilities
3. How hybrid inventory models work in practice
4. Types of warehouses and their use in different industries

Instructions: *The student prepares a presentation with three main points, examples from logistics (real or simulated), and brief conclusions. Be sure to use vocabulary related to the topic (e.g., replenishment, buffer stock, WMS, segmentation, etc.).*

Task 4. Group Problem-Solving:
Scenario: *Your company has been experiencing delays in order processing. You must investigate if the cause is in warehouse layout, automation failure, or poor stock segmentation.*
Discussion Questions:

- What tools or systems would you use to analyze warehouse performance?
- What signs indicate that the warehouse layout is inefficient?
- How could predictive analytics help?
- Should the company move from JIT to a hybrid model?

Task 5. Debate:

Statement: *"Warehouse automation improves efficiency but reduces workforce opportunity."*

Instructions: *Divide the group into two camps:* ***for*** *and* ***against****. Arguments should be based on:*

- The impact of automation on productivity
- Issues of safety, accuracy, and cost
- Social and labor aspects
- Examples from logistics practice (AMRs, WMS, AGVs)

UNIT 4: TRANSPORTATION INFRASTRUCTURE AND LOGISTICS HUBS

TEXT 1: THE ROLE OF INFRASTRUCTURE IN FREIGHT TRANSPORT EFFICIENCY

Transportation infrastructure is one of the most critical foundations of any logistics system. Roads, railways, seaports, airports, bridges, tunnels, and terminals are not simply static constructions – they are dynamic enablers of trade, connectivity, and supply chain performance. High-quality infrastructure reduces transport costs, shortens delivery times, increases reliability, and enhances a country's competitiveness in global markets. Conversely, poor or underdeveloped infrastructure remains one of the most persistent barriers to economic growth and efficient logistics.

The efficiency of freight transport is largely determined by the quality, availability, and integration of infrastructure. A well-designed road network allows trucks to move swiftly between industrial zones, urban centers, and ports. Modern highways with weight tolerance and bypass lanes reduce congestion and support high-volume, heavy-goods movement. Similarly, electrified and double-tracked railways can significantly lower costs for long-distance or bulk freight by improving speed and capacity. Infrastructure planning must also consider the importance of bridges, tunnels, and border crossings as key nodes where delays often occur.

Seaports are among the most vital components of the global logistics system. Ports with deep-water access, container terminals, and intermodal rail connections function as international trade gateways. Their efficiency depends on berth availability, crane speed, cargo handling systems, and hinterland connectivity. Congested or outdated port infrastructure can create ripple effects across global supply chains, causing vessel delays, demurrage fees, and inventory shortages. Countries like the Netherlands, Singapore, and the UAE have invested heavily in port infrastructure, turning their terminals into global logistics hubs.

Airports, while less dominant in terms of cargo volume, are crucial for time-sensitive, high-value freight. Airport infrastructure includes specialized cargo terminals, customs facilities, refrigeration systems, and aircraft loading technologies. The proximity of airports to logistics parks, highways, and rail lines determines their efficiency as freight gateways. Airports such as Frankfurt, Hong Kong, and Memphis have become major air cargo hubs due to their integrated infrastructure and strategic location within air corridors.

Dry ports and inland terminals have become increasingly important in recent decades. These facilities allow containers and bulk freight to be processed and cleared far from congested seaports. By relocating logistics operations inland, dry ports reduce pressure on maritime terminals, promote regional economic development, and improve environmental performance. Inland terminals typically combine rail and road access, warehouse space, customs services, and digital infrastructure to support seamless cargo transfer. This intermodal integration is essential to the success of landlocked countries and land-based logistics corridors.

The concept of **logistics corridors** links infrastructure development with economic policy. A corridor is a geographic area where freight flows are concentrated, supported by multi-modal infrastructure and logistics services. Examples include the North Sea–Baltic Corridor in the EU, the Belt and Road Initiative in Asia, and the Trans-European Transport Network (TEN-T). These corridors often involve public-private partnerships and cross-border cooperation. Governments invest in infrastructure, while private logistics companies build terminals, operate fleets, and manage cargo flows.

Infrastructure development is not limited to physical assets. Increasingly, **smart infrastructure** includes digital platforms, Internet of Things (IoT) sensors, automated tolling, GPS-based tracking, and infrastructure monitoring systems. These technologies improve the visibility, safety, and efficiency of freight transport. For instance, digital twin technology allows operators to simulate infrastructure usage, optimize traffic flows, and plan maintenance more effectively. In addition, smart corridors help monitor emissions, reduce fuel consumption, and integrate sustainable transport practices.

Financing and maintaining transport infrastructure require long-term strategic planning. Infrastructure investments are expensive and have long payback periods. Governments must prioritize based on traffic forecasts, trade patterns, and economic objectives. International institutions, such as the World Bank and regional development banks, often support infrastructure upgrades through loans and grants. At the same time, PPP (public-private partnership) models have gained popularity, especially in developing countries, to distribute risk and ensure operational efficiency.

In conclusion, transportation infrastructure is not only a prerequisite for logistics – it is a key driver of supply chain performance, trade competitiveness, and regional integration. Countries that invest in modern, connected, and resilient infrastructure will benefit from lower costs, faster delivery, and stronger economic links. As global trade patterns evolve and supply chains become more digital and time-sensitive, the role of smart, multi-modal, and sustainable infrastructure will become even more decisive in shaping the future of logistics.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. How does high-quality infrastructure impact freight transport performance?
2. What types of infrastructure are critical for road and rail freight efficiency?
3. Why are seaports considered vital nodes in global logistics?
4. What features make an airport efficient for freight movement?
5. How do dry ports and inland terminals contribute to decongesting maritime ports?
6. What is the concept of a logistics corridor, and what examples were mentioned?
7. How does smart infrastructure improve transport systems?
8. What is the role of public-private partnerships in infrastructure development?
9. Why is intermodal connectivity so important in modern logistics planning?
10. What challenges do governments face when financing infrastructure projects?

II. True or False?

1. Modern highways are irrelevant for logistics performance.
2. Rail electrification increases freight capacity and reduces delays.
3. Airports handle the highest volume of cargo globally.
4. Dry ports help improve logistics in landlocked regions.
5. Logistics corridors exist only within a single country.
6. Seaport congestion can disrupt global supply chains.
7. Public-private partnerships are rare in infrastructure projects.
8. Smart infrastructure includes digital monitoring tools.
9. Customs clearance is never performed at inland terminals.
10. Investment in transport infrastructure has no effect on trade competitiveness.

III. Fill in the gaps using the words from the box below:

throughput, congestion, inland terminals, interoperability, gateway, simulation, multimodal, corridors, customs, IoT

1. Seaports function as international ______ for imports and exports.
2. Dry ports and ______ help reduce pressure on coastal terminals.
3. ______ logistics combines road, rail, sea, and air transport efficiently.
4. Outdated port equipment often causes ______ and delays.
5. ______ infrastructure includes sensors, real-time tracking, and automated tolls.
6. A logistics ______ is a trade-focused region supported by infrastructure.
7. Integrated ______ systems allow different transport modes to work together.
8. Automated ______ clearance improves efficiency in freight handling.
9. Infrastructure ______ helps governments plan upgrades and traffic control.
10. High ______ capacity ensures faster processing of freight.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Інфраструктура є ключовим чинником ефективності ланцюгів постачання.
2. Морські порти з контейнерними терміналами стають логістичними хабами світового рівня.
3. Аеропорти обслуговують швидкі вантажі з високою доданою вартістю.
4. Внутрішні термінали допомагають уникнути заторів у морських портах.
5. Цифрові платформи покращують видимість і управління трафіком.
6. Багато інфраструктурних проєктів реалізуються через державно-приватне партнерство.

B. Translate from English into Ukrainian:

1. Efficient infrastructure shortens lead times and improves service reliability.
2. Inland terminals enable customs clearance far from the seaport.
3. Intermodal transport requires seamless infrastructure integration.
4. Logistics corridors promote trade and regional connectivity.
5. Smart systems track freight and detect delays in real time.
6. Governments need to prioritize investments based on economic goals.

TEXT 2: LOGISTICS HUBS – FUNCTIONS, CLASSIFICATIONS, AND STRATEGIC VALUE

Logistics hubs are specialized geographic locations where large volumes of goods are consolidated, processed, and redistributed within national or international supply chains. These hubs serve as high-capacity nodes in the logistics network, enabling coordination between various modes of transport and optimizing the movement of freight. Their strategic value lies in their ability to reduce costs, improve service speed, and support economic development across regions.

At their core, logistics hubs combine infrastructure, technology, and services to manage the flow of goods. They are typically equipped with intermodal terminals, warehouses, customs facilities, and cargo-handling equipment. Hubs also provide value-added services such as packaging, labeling, assembly, or quality control. Their purpose is not only to facilitate physical movement but also to support operational efficiency, inventory control, and logistics visibility for companies operating in complex global markets.

There are several types of logistics hubs, classified based on their function, location, and modal focus. **Port-based hubs** are located at major seaports and handle high volumes of containerized and bulk cargo. These hubs connect maritime transport with road, rail, or inland waterway networks. Rotterdam, Singapore, and Shanghai are leading examples of global port logistics hubs, equipped with advanced container terminals, customs integration, and real-time cargo tracking.

Airport-based hubs specialize in high-value, time-sensitive cargo. They are designed for rapid handling of air freight, often including express courier operations, temperature-controlled storage, and direct access to aircraft stands. Airports such as Dubai (DXB), Incheon (ICN), and Memphis (MEM) serve as global air logistics hubs with 24/7 operations and sophisticated cargo infrastructure.

Rail and inland hubs connect hinterland production zones to ports and consumption centers. These hubs play a central role in intermodal freight transport, enabling smooth transitions between rail and road or rail and barge systems. Inland hubs help reduce congestion at seaports and allow for customs clearance, cargo consolidation, and distribution closer to the point of origin or destination. Examples include Zaragoza (Spain), Duisburg (Germany), and Khorgos (Kazakhstan).

In addition to modal classification, logistics hubs are also categorized by their operational model. **National hubs** serve domestic distribution networks, acting as regional consolidation centers. **Gateway hubs** connect international flows to local markets. **Transit hubs** manage cargo flows that pass through en route to other destinations. Some hubs serve multiple functions simultaneously and are integrated into **logistics corridors** that align infrastructure investment with trade facilitation.

The location of a logistics hub is critical to its performance. Key factors include proximity to industrial zones, access to multimodal infrastructure, connectivity to key markets, labor availability, and supportive government policy. Hubs located at transport intersections or within free trade zones (FTZs) often enjoy tax advantages, simplified customs procedures, and strategic access to regional and global trade routes.

Digitalization has become a defining feature of modern logistics hubs. Integrated IT systems allow cargo to be tracked across borders and transport modes, enhancing coordination and reducing lead times. Some hubs operate centralized **logistics control towers**, which provide real-time visibility over all inbound and outbound shipments, warehouse activity, and transport scheduling. The use of artificial intelligence (AI), blockchain, and big data analytics further enhances operational efficiency and risk management.

Logistics hubs also serve as **economic catalysts**. By clustering transport services, manufacturing, and distribution activities in one area, they stimulate job creation, attract foreign investment, and enable regional supply chain integration. Governments often incorporate hub development into national logistics strategies, aiming to position their countries as regional or global trade facilitators. Public-private partnerships are commonly used to fund and operate such large-scale facilities.

In the context of increasing supply chain complexity, logistics hubs offer solutions to congestion, fragmentation, and inefficiency. By providing centralized control, scalable infrastructure, and seamless modal integration, they enable companies to meet rising customer expectations and respond more flexibly to market shifts. As global trade becomes more digitized, decentralized, and demand-driven, the strategic role of logistics hubs will only grow stronger.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What are logistics hubs, and what key functions do they serve?
2. How do logistics hubs contribute to supply chain optimization?
3. What distinguishes port-based hubs from airport-based hubs?
4. What advantages do rail and inland hubs offer in intermodal transport?
5. How are logistics hubs classified based on their operational model?
6. Why is location so important for the performance of a logistics hub?
7. What role does digitalization play in modern logistics hubs?
8. How do logistics control towers improve visibility and decision-making?
9. In what ways do logistics hubs stimulate economic growth?
10. Why is the importance of logistics hubs increasing in the current global context?

II. True or False?

1. Logistics hubs are only used for storing goods.
2. Airport-based hubs handle mostly low-value, bulk cargo.
3. Rail and inland hubs support customs clearance far from seaports.
4. All logistics hubs serve only one transportation mode.
5. Gateway hubs link international cargo flows to domestic markets.
6. Free trade zones usually reduce customs complexity.
7. Digital systems are not essential in modern logistics hubs.
8. AI and blockchain are now used in hub operations.
9. Logistics hubs have no direct effect on job creation.
10. Logistics hubs are often part of larger corridor strategies.

III. Fill in the gaps using the words from the box below:

inland, consolidation, FTZs, intermodal, digitalization,
cargo, hub, customs, corridors, visibility

1. Logistics hubs enable ______ of shipments for more efficient distribution.

2. Rail-based ______ terminals support cargo transfer away from ports.
3. Many global hubs are located in or near ______ for tax and legal benefits.
4. A logistics ______ integrates warehousing, transport, and value-added services.
5. Air ______ requires specialized infrastructure and fast processing.
6. ______ freight systems combine two or more transport modes.
7. One benefit of hub-based operations is improved shipment ______.
8. Governments often develop logistics hubs as part of trade ______.
9. Advanced ______ tools allow real-time tracking of inventory and transport.
10. Efficient ______ clearance reduces delays at ports and borders.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Логістичні хаби забезпечують концентрацію вантажопотоків у стратегічних точках.
2. Морські, авіаційні та залізничні хаби обслуговують різні типи вантажів.
3. Хаби у вільних економічних зонах мають спрощені митні процедури.
4. Цифрові системи керування покращують координацію ланцюгів постачання.
5. Деякі хаби одночасно виконують роль воріт, транзитних зон та національних розподільників.
6. Хаби сприяють економічному розвитку та створенню робочих місць.

B. Translate from English into Ukrainian:

1. Logistics hubs offer value-added services like packaging and labeling.
2. Port-based hubs link maritime transport to land-based networks.
3. Airport-based hubs are essential for time-critical deliveries.
4. Inland hubs help avoid congestion at coastal terminals.
5. Control towers provide real-time oversight of all freight activity.

6. Government support is crucial for the long-term success of logistics hubs.

TEXT 3: INTERMODAL HUBS AND LOGISTICS CORRIDORS IN MODERN FREIGHT SYSTEMS

The integration of different transport modes is at the core of efficient, sustainable, and flexible logistics systems. As global supply chains expand and diversify, **intermodal hubs** and **logistics corridors** have become critical components in enabling seamless cargo movement across geographic and modal boundaries. Their function goes beyond infrastructure – they represent the architecture of coordination, capacity, and economic connectivity.

An **intermodal hub** is a location where freight is transferred between at least two different modes of transport – such as from rail to truck, ship to rail, or air to truck – without handling the cargo itself. The goal is to minimize delays, reduce handling costs, and increase overall system efficiency. These hubs are equipped with specialized infrastructure including cranes, rail sidings, container stacking zones, road access, and digital interfaces that manage scheduling and inventory data. Major intermodal terminals are often located at the intersection of national highways and railway networks or near seaports and airports.

Intermodal hubs support **containerization**, which allows goods to move in standardized units through multiple transport modes without repacking. This improves cargo security, reduces damage, and simplifies customs processes. In addition to container terminals, some intermodal hubs handle bulk commodities, liquids, or temperature-controlled freight using specialized equipment and transfer platforms.

Logistics corridors, also known as freight corridors or trade corridors, refer to designated routes that concentrate cargo flows and link major production, consumption, and distribution zones. These corridors are underpinned by coordinated infrastructure investment, regulatory harmonization, and digital systems. They include multiple logistics hubs, modal interfaces, customs facilities, and border crossings along a continuous, multimodal path.

A good example is the **Trans-European Transport Network (TEN-T)** in the EU, which connects northern seaports like Rotterdam and Hamburg to inland economic centers in central and eastern Europe. Another is China's **Belt and Road Initiative**, which connects Asia to Europe via overland rail corridors through Central Asia. In North America, the **NAFTA corridor** enables trade between Canada, the U.S., and Mexico through integrated highways, rail networks, and customs harmonization.

These corridors are not only transport routes – they are strategic economic assets. They attract industrial development, enable export growth, and encourage investment in logistics infrastructure. Governments and private investors often collaborate through **public-private partnerships (PPPs)** to finance and manage corridor projects. Corridors also foster regional integration and cross-border trade facilitation, especially in landlocked or developing countries.

A key challenge in intermodal corridor development is **interoperability** – the technical and regulatory compatibility between different systems, such as track gauges, IT platforms, customs requirements, and transport standards. Delays at modal transfer points or borders can undermine the benefits of corridor investment. To overcome this, many corridors adopt **digital corridor management systems**, which integrate data from all nodes along the route and allow real-time tracking, incident reporting, and dynamic rerouting.

The environmental impact of long-haul transport is another driver for corridor development. Moving freight via rail or barge is more fuel-efficient than road transport, reducing emissions and traffic congestion. Many intermodal hubs include electrified rail access, eco-efficient cranes, and green-certified warehouses. Corridors are increasingly aligned with **sustainable transport policies**, incorporating environmental metrics into infrastructure design and performance evaluation.

Digitalization continues to transform corridor performance. Advanced **Transport Management Systems (TMS)** and **Control Towers** enable stakeholders to optimize routes, predict delays, and coordinate with upstream and downstream partners. These tools rely on big data, AI, and IoT devices to monitor vehicle location, cargo conditions, border activity, and infrastructure usage in real time.

In summary, intermodal hubs and logistics corridors are the backbone of global freight mobility. They support cargo flows across complex geographies, streamline modal transitions, and promote international trade. As logistics becomes more time-sensitive, resource-conscious, and digitally connected, the strategic development of integrated corridors and intermodal facilities will shape the next generation of supply chain networks.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What is the primary purpose of an intermodal hub?
2. How does containerization support efficient intermodal freight movement?
3. What infrastructure is typically found at intermodal terminals?
4. What is a logistics corridor, and how does it differ from a simple transport route?
5. How do corridors contribute to economic development and regional integration?
6. What role do public-private partnerships play in corridor development?
7. Why is interoperability important in logistics corridors?
8. How do digital corridor management systems enhance cargo movement?
9. What are the environmental benefits of intermodal and corridor-based transport?
10. How does digitalization support real-time decision-making along freight corridors?

II. True or False ?

1. Intermodal hubs always require manual unloading of cargo.
2. Logistics corridors include infrastructure, customs, and digital tools.
3. Containerized freight must be repacked during modal transfers.
4. The Belt and Road Initiative is a European-only logistics project.
5. Interoperability is a challenge for corridor performance.
6. TMS systems are used to optimize route planning and coordination.
7. Corridors have no influence on trade growth or investment attraction.
8. Electrified rail access at hubs helps reduce emissions.
9. Environmental metrics are rarely considered in corridor design.
10. Data integration is critical for dynamic rerouting and real-time tracking.

III. Fill in the gaps using the words from the box below:

interoperability, containerization, multimodal, rerouting, corridors, public-private partnerships, Control Tower, electrification, trade facilitation, infrastructure

1. ______ allows goods to move through multiple transport modes in standard units.
2. Governments often rely on ______ to fund large logistics projects.
3. Seamless ______ transport requires compatibility between rail, road, and maritime systems.
4. Logistics ______ help connect production centers with markets across borders.
5. Border integration supports ______ by reducing customs delays.
6. ______ between countries can be hindered by incompatible regulations or technologies.
7. Digital ______ platforms enable real-time freight visibility across a corridor.

8. Corridor ______ is essential to support growing cargo volumes efficiently.
9. ______ rail systems reduce CO_2 emissions and operating costs.
10. Dynamic ______ helps manage delays and maintain delivery schedules.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Інтермодальні вузли поєднують щонайменше два види транспорту без перевантаження вантажу.
2. Контейнеризація дозволяє переміщати товари ефективно та без пошкоджень.
3. Логістичні коридори включають інфраструктуру, сервіси, митні зони та IT-системи.
4. Ініціативи, як TEN-T чи Belt and Road, стимулюють економічне зростання.
5. Цифрові платформи допомагають прогнозувати затримки та координувати дії партнерів.
6. Електрифіковані залізничні гілки сприяють сталому транспортуванню.

B. Translate from English into Ukrainian:

1. Intermodal hubs reduce cargo handling time and increase efficiency.
2. A corridor is more than a route – it is a coordinated logistics system.
3. Lack of interoperability can delay freight and increase costs.
4. Control Towers integrate data from multiple logistics nodes.
5. Rail and barge transport help decrease carbon emissions.
6. Real-time tracking enables proactive decision-making in cargo management.

TEXT 4: SMART INFRASTRUCTURE AND DIGITAL INNOVATION IN FREIGHT TRANSPORT

As logistics becomes more dynamic, global, and customer-driven, the infrastructure supporting freight transport is also undergoing transformation. Traditional physical assets – roads, railways, terminals – are increasingly integrated with digital technologies, giving rise to what is known as **smart infrastructure**. This fusion of hardware and software enhances visibility, efficiency, security, and sustainability across the entire transport ecosystem.

Smart infrastructure refers to transport systems embedded with sensors, data platforms, communication technologies, and automation tools that allow real-time monitoring, management, and optimization of freight flows. These systems collect and transmit data from vehicles, roads, terminals, and cargo units, enabling logistics operators to make faster and more informed decisions. The integration of **Internet of Things (IoT)** devices, **GPS**, **RFID tags**, and **automated gates** creates a responsive logistics network that can adapt to disruption and changing conditions.

One major application of smart infrastructure is in **real-time tracking and route optimization**. Trucks equipped with GPS and telematics can be monitored for location, speed, and fuel consumption. Traffic congestion, weather conditions, and road incidents are detected instantly and integrated into **Transport Management Systems (TMS)**, allowing dispatchers to reroute shipments proactively. Similarly, port and terminal operators use smart yard systems to manage container placement, crane operations, and berth scheduling more efficiently.

Smart logistics systems also include **predictive maintenance** of transport infrastructure. Embedded sensors in bridges, rail tracks, and pavement detect wear, stress, or damage, alerting authorities before breakdowns occur. This reduces downtime, avoids costly repairs, and enhances freight safety. Infrastructure managers are increasingly using **digital twins** – virtual replicas of assets that simulate performance under different conditions – to optimize usage and plan maintenance.

Another key component is **automated freight handling**. Warehouses, terminals, and ports increasingly rely on autonomous vehicles, robotic cranes, and conveyor systems to move, stack, and load cargo with minimal human intervention. These systems increase precision, reduce accidents, and operate 24/7. For example, fully automated terminals like Rotterdam's Maasvlakte II or Shanghai's Yangshan port use automated guided vehicles (AGVs) and AI-powered logistics platforms.

Smart customs systems are another crucial development. Automated customs clearance platforms allow for pre-arrival document submission, automated risk analysis, and fast-track processing. This reduces clearance times at borders and minimizes human error or corruption. In many countries, these systems are connected to **single-window trade platforms**, which consolidate all import/export procedures into one digital interface.

Sustainability is closely linked to smart infrastructure. Real-time emission monitoring, electric vehicle (EV) charging stations for trucks, and smart grid integration reduce the environmental impact of logistics operations. Urban freight delivery systems in smart cities use low-emission zones, cargo bikes, and dynamic routing to decrease congestion and pollution. Data analytics tools help logistics providers calculate carbon footprints and optimize delivery models accordingly.

Blockchain technology is also making inroads into logistics infrastructure. It enables secure and transparent sharing of data among stakeholders – carriers, ports, shippers, customs authorities – by recording transactions in tamper-proof ledgers. Blockchain supports cargo visibility, fraud prevention, and traceability across complex supply chains, especially in industries such as pharmaceuticals and high-value goods.

Despite these advances, the shift to smart infrastructure presents challenges. High initial investment costs, cybersecurity risks, system interoperability, and lack of standardization are common concerns. Logistics operators must train staff, upgrade legacy systems, and ensure compliance with data privacy regulations. In developing regions, limited internet access and digital literacy can hinder adoption.

Nevertheless, the long-term benefits of smart infrastructure are transformative. Enhanced visibility leads to better inventory management. Real-time data reduces delays and waste. Automated systems boost capacity and reliability. And predictive analytics supports resilience against disruption. For governments, investing in smart logistics infrastructure improves trade competitiveness and economic productivity.

In conclusion, smart infrastructure is no longer a futuristic concept – it is an essential pillar of modern freight transport. As global supply chains become faster, more digitized, and more sustainability-focused, the integration of physical and digital systems will define the next generation of infrastructure development in logistics.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What is smart infrastructure, and how does it differ from traditional infrastructure?
2. How do IoT devices improve the efficiency of freight transport?
3. In what ways is real-time tracking used in smart logistics systems?
4. What are digital twins, and how do they benefit infrastructure management?
5. How do autonomous systems contribute to freight handling?
6. What role do smart customs platforms play in international logistics?
7. How does smart infrastructure support sustainability goals?
8. What are the advantages of using blockchain in logistics?
9. What are some barriers to adopting smart infrastructure globally?
10. Why is smart infrastructure considered essential for future logistics networks?

II. True or False?

1. Smart infrastructure includes automated cranes, sensors, and data platforms.
2. Digital twins are physical models of logistics terminals.
3. RFID tags are used for container security, not tracking.

4. AGVs are used for cargo handling with minimal human input.
5. Real-time emissions tracking helps reduce logistics-related pollution.
6. Smart customs clearance increases corruption risks.
7. Blockchain allows for tamper-proof, shared logistics records.
8. Cybersecurity is not a concern for logistics infrastructure.
9. Initial setup costs for smart systems are low.
10. Predictive analytics can help avoid transport disruptions.

III. Fill in the gaps using the words from the box below:

predictive, blockchain, IoT, congestion, automation, customs, digital twin, AGVs, sustainability, emissions

1. Ports equipped with ______ systems can operate cranes and vehicles automatically.
2. A ______ creates a virtual replica of infrastructure for monitoring and planning.
3. ______ sensors in roads and trucks enable real-time cargo tracking.
4. Modern terminals use ______ to move containers without drivers.
5. Smart ______ platforms allow early document submission and risk scanning.
6. Data from ______ devices help manage routes, fuel use, and vehicle status.
7. ______ platforms prevent fraud and ensure secure cargo traceability.
8. Urban logistics systems aim to reduce ______ and CO_2 output.
9. ______ monitoring helps companies reach environmental targets.
10. ______ maintenance prevents costly breakdowns in infrastructure.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Розумна інфраструктура поєднує фізичні активи з цифровими технологіями.

2. Автоматизовані системи обробки вантажів зменшують потребу в ручній праці.
3. Системи митного оформлення з попереднім декларуванням пришвидшують транзит.
4. Блокчейн забезпечує прозорість і безпеку в логістиці високої вартості.
5. Смарт-термінали допомагають знизити шкідливі викиди та затори.
6. Основні виклики включають високу вартість, кібезагрози та нестачу стандартів.

B. Translate from English into Ukrainian:

1. Smart infrastructure improves visibility, automation, and data-driven logistics.
2. IoT-enabled trucks can transmit cargo location and temperature in real time.
3. Predictive analytics tools reduce risks and increase resilience.
4. AGVs operate continuously in smart terminals with minimal supervision.
5. Blockchain reduces errors in document processing and cargo handovers.
6. Developing countries may face obstacles in digital infrastructure adoption.

TEXT 5: INFRASTRUCTURE INVESTMENT AND PUBLIC-PRIVATE PARTNERSHIPS IN LOGISTICS DEVELOPMENT

Developing and maintaining efficient transportation infrastructure requires substantial and sustained investment. Whether it involves building a new port terminal, expanding a railway line, or digitalizing customs operations, logistics infrastructure projects are complex, capital-intensive, and long-term in nature. As supply chains become increasingly globalized and data-driven, the financial and strategic approach to infrastructure development must also evolve. This is where **public-private partnerships (PPPs)** have emerged as a powerful tool in bridging infrastructure gaps, improving efficiency, and sharing risks between sectors.

Governments are traditionally responsible for infrastructure planning, land allocation, and core financing. However, limited public budgets, rising urbanization, and growing trade volumes have created infrastructure deficits in many countries – especially in the developing world. The private sector brings much-needed expertise, innovation, and financing capacity. Through PPPs, governments can attract private investment to design, build, finance, and even operate logistics infrastructure while retaining regulatory oversight and public interest.

PPPs take many forms, from **build-operate-transfer (BOT)** agreements and long-term leases to joint ventures and service contracts. The specific model depends on the type of infrastructure, the project scale, and the risk-sharing preferences of the parties involved. In ports, for example, private terminal operators often invest in cranes, container yards, and IT systems, while public port authorities provide land access, maritime infrastructure, and customs services. In rail projects, private operators may manage freight corridors or rolling stock maintenance, while the government remains responsible for track infrastructure and safety regulation.

Successful PPPs require clear contractual frameworks, performance benchmarks, and dispute resolution mechanisms. Transparent procurement processes, stakeholder consultations, and environmental impact assessments are also essential to maintain public trust and project sustainability. International institutions like the World Bank, the Asian Development Bank (ADB), and the European Investment Bank (EIB) often support PPP initiatives with technical advice, guarantees, and blended finance instruments.

Strategically, infrastructure investment must align with national and regional development plans. Governments often prioritize transport corridors that connect industrial zones, border crossings, and export hubs. Infrastructure masterplans include not just physical projects but also digital platforms, logistics services, and sustainability targets. Investment planning considers freight volumes, congestion hotspots, future trade flows, and climate resilience. In many cases, logistics infrastructure is bundled with special economic zones (SEZs) or free trade zones (FTZs) to stimulate industrial growth and attract foreign investment.

In developed countries, infrastructure investment focuses on **modernization and digitalization**—such as upgrading legacy systems, electrifying rail lines, implementing smart mobility technologies, and integrating digital twins. In contrast, developing economies often focus on **capacity expansion and access**, seeking to connect rural areas, build basic road or rail networks, and improve cross-border trade infrastructure. Here, PPPs help mobilize capital and accelerate project delivery.

Risk management is a critical aspect of infrastructure finance. Projects must account for operational risk (delays, cost overruns), market risk (fluctuating demand), and political risk (regulatory change). PPP contracts typically include clauses that address cost recovery through user fees, government guarantees, or availability payments. Well-structured PPPs can improve project bankability and attract institutional investors such as pension funds, sovereign wealth funds, and infrastructure banks.

One of the most promising trends is the rise of **green and sustainable infrastructure investment**. Governments and investors are increasingly applying ESG (Environmental, Social, Governance) criteria to infrastructure projects. This includes using renewable energy in terminals, reducing construction emissions, supporting multimodal and low-emission transport, and ensuring equitable access. Many international donors now require sustainability metrics as a condition for financing.

In conclusion, the future of logistics infrastructure depends not only on engineering and technology but also on innovative investment models and cross-sector collaboration. Public-private partnerships enable countries to scale up infrastructure, access expertise, and deliver modern logistics systems that meet the demands of global trade. When well-structured and transparent, these partnerships can transform infrastructure from a bottleneck into a powerful driver of development, competitiveness, and sustainability.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. Why are infrastructure projects considered complex and capital-intensive?
2. What are public-private partnerships (PPPs), and how do they benefit logistics development?
3. What roles do public and private sectors typically play in port and rail infrastructure projects?
4. What conditions are necessary for successful PPP implementation?
5. How do international institutions support infrastructure investment?
6. What factors are considered when aligning infrastructure projects with national plans?
7. How do investment priorities differ between developed and developing countries?
8. What types of risks must be managed in infrastructure finance?
9. What are ESG criteria, and how do they influence infrastructure projects?
10. Why is collaboration between sectors essential for modern logistics infrastructure?

II. True or False?

1. PPPs allow governments to fully avoid responsibility for infrastructure projects.
2. BOT agreements are one form of public-private partnership.
3. The private sector always provides land for infrastructure projects.
4. Special economic zones are often linked to infrastructure development.
5. Developing countries focus mainly on digital modernization.
6. PPPs can help attract pension funds and long-term investors.
7. Environmental impact is irrelevant in infrastructure finance today.
8. Transparent contracts are key to building public trust in PPPs.

9. Infrastructure masterplans focus only on road construction.
10. PPPs can transform logistics infrastructure into a development driver.

III. Fill in the gaps using the words from the box below:

PPPs, modernization, resilience, ESG, investment, stakeholders, guarantees, SEZs, procurement, infrastructure

1. Governments use ______ to combine public oversight with private expertise.
2. International banks often provide financial ______ to reduce project risks.
3. Transparent ______ processes ensure fairness in selecting private partners.
4. Many logistics parks are located within ______ to promote trade and industry.
5. Developed countries prioritize digital ______ of transport systems.
6. Freight corridors must be built with climate ______ in mind.
7. Applying ______ criteria helps ensure projects are environmentally responsible.
8. Successful PPPs require consultation with local ______ and communities.
9. Effective ______ planning includes both physical assets and digital services.
10. Long-term ______ in infrastructure supports economic growth and trade.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Інфраструктурні проєкти потребують значних інвестицій і довгострокового планування.
2. Публічно-приватні партнерства дозволяють поділити ризики між урядом і бізнесом.
3. Успішні контракти включають чіткі показники ефективності та вирішення спорів.
4. У країнах, що розвиваються, інвестиції спрямовані на розширення доступу та потужностей.

5. Зелені інвестиції стають важливою складовою логістичних проєктів.
6. Інфраструктурні плани повинні враховувати обсяги вантажів, зміни клімату та цифровізацію.

B. Translate from English into Ukrainian:

1. PPPs are used to fund and manage large-scale logistics infrastructure.
2. Joint ventures and long-term leases are common PPP formats.
3. Infrastructure in SEZs attracts investment and supports exports.
4. Political, market, and operational risks must be considered in contracts.
5. ESG metrics evaluate environmental and social responsibility.
6. Public-private collaboration drives competitiveness in global logistics.

LEXICAL EXERCISES

Exercise 1. Match the term with its definition:

TERM	DEFINITION
1) Freight corridor	**a)** An inland logistics terminal that allows cargo to be handled far from the port
2) Intermodal hub	**b)** A center where cargo is transferred between different modes of transport
3) Customs clearance	**c)** An automated process for customs clearance of goods
4) Public-private partnership	**d)** A system where cargo is transported in standardized containers
5) Smart infrastructure	**e)** Selection of the most efficient delivery route, taking into account time, cost, and traffic
6) Containerization	**f)** A virtual copy of an infrastructure object that allows it to be monitored and simulated

7) Route optimization	**g)** Infrastructure equipped with sensors, IT systems, and data transmission
8) Dry port	**h)** A transport network connecting production and consumption centers
9) Digital twin	**i)** Cooperation between the public and private sectors to implement infrastructure projects
10) Control tower	**j)** A centralized system that tracks the movement of cargo and transport

Exercise 2. Complete the sentence with the correct word:

multimodal, electrified rail, sustainability, automation, logistics hub, digital twin, risk sharing, inland terminal, containerization, TMS

1. ______ allows freight to be moved efficiently between trucks, ships, and trains.
2. ______ improves energy efficiency and reduces emissions in rail transport.
3. ______ is used to improve operational efficiency by simulating terminal behavior.
4. A ______ manages storage, sorting, and distribution near consumption zones.
5. Modern ports invest heavily in ______ to operate cranes and gates without manual input.
6. ______ refers to reducing environmental impact while maintaining logistics performance.
7. A good PPP model should include clear mechanisms for ______.
8. A(n) ______ allows container handling away from overcrowded seaports.
9. ______ made global supply chains faster and more standardized.
10. A ______ system helps coordinate fleet scheduling, delays, and tracking.

Exercise 3. Translate into Ukrainian:

1. Smart infrastructure enables real-time monitoring of cargo and vehicles.

2. Public-private partnerships are widely used to finance large logistics hubs.
3. Electrified rail improves sustainability by cutting fossil fuel use.
4. Control towers help logistics managers track all freight movements.
5. Intermodal hubs reduce cargo handling and improve efficiency.
6. The corridor is supported by digital customs and single-window systems.
7. Containerization revolutionized global trade efficiency.
8. The inland terminal connects regional production zones with the port.
9. The government included sustainability indicators in the investment plan.
10. The terminal uses automation to operate 24/7 with minimal staff.

Exercise 4. Translate into English:

1. Мультимодальні перевезення зменшують витрати і підвищують гнучкість логістики.
2. Цифрові двійники допомагають прогнозувати зношування інфраструктури.
3. Портовий термінал обслуговує як міжнародні, так і внутрішні вантажі.
4. Оптимізація маршрутів дозволяє уникати заторів і затримок.
5. Сталий розвиток враховує економічну, екологічну та соціальну складову.
6. Інтермодальний вузол дозволяє швидко перевантажити вантаж з поїзда на вантажівку.
7. Успішні публічно-приватні партнерства базуються на прозорих договорах.
8. Електрифіковані залізниці поступово замінюють дизельні потяги.
9. Митне оформлення відбувається ще до прибуття товару.
10. Інвестиції в інфраструктуру підтримуються міжнародними банками.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Translation

Automation	Автоматизація
Containerization	Контейнеризація
Control tower	Логістична диспетчерська (система централізованого моніторингу)
Customs clearance	Митне оформлення
Digital twin	Цифровий двійник
Dry port / Inland terminal	Сухий порт / Внутрішній термінал
Electrified rail	Електрифікована залізниця
Freight corridor	Вантажний коридор
Infrastructure planning	Планування інфраструктури
Intermodal hub	Інтермодальний вузол
Logistics hub	Логістичний вузол
Multimodal transport	Багатомодальні перевезення
Port terminal	Портовий термінал
Public-private partnership (PPP)	Публічно-приватне партнерство
Risk sharing	Розподіл ризиків
Route optimization	Оптимізація маршруту
Single-window system	Єдине вікно (для митних та імпортно-експортних операцій)
Smart infrastructure	Розумна інфраструктура
Sustainability	Сталий розвиток
Transport Management System (TMS)	Система управління транспортом

GRAMMAR FOCUS: FUTURE FORMS IN LOGISTICS PLANNING

I. Future Simple (will)

Формула:

- **Affirmative:** will + V

- **Negative:** will not (won't) + V
- **Question:** Will + subject + V?

Вживання:

- Спонтанні рішення, прогнози без доказів, обіцянки
- Загальні припущення про майбутнє

Приклади:

- The government **will invest** in new rail terminals next year.
- Logistics hubs **won't operate** during national holidays.
- **Will** they **launch** the digital customs system in 2026?

II. Be going to

Формула:

- **Affirmative:** am/is/are + going to + V
- **Negative:** am not / isn't / aren't + going to + V
- **Question:** Am / Is / Are + subject + going to + V?

Вживання:

- Намір або план
- Передбачення на основі доказів / поточної ситуації

Приклади:

- They **are going to open** a new inland terminal near the border.
- We **aren't going to upgrade** the port this year.
- **Is** your company **going to join** the public-private initiative?

III. Present Continuous for future

Формула:

- am/is/are + V-ing (але контекст — **майбутнє**)
- Використовується з конкретним часом або датою

Вживання:

- Заздалегідь узгоджені дії або графіки

Приклади:

- We **are launching** a green corridor pilot **next month**.
- The Minister **is visiting** the logistics hub **on Friday**.
- **Are** they **signing** the PPP agreement **this week**?

GRAMMAR EXERCISES

Exercise 1. Choose the correct future form:

1. The company (will build / is building / is going to build) a new distribution center next year.
2. I think the corridor project (will succeed / is succeeding / is going to succeed).
3. We (are meeting / will meet / meet) with port authorities on Monday.
4. The government (won't allow / isn't allowing / doesn't allow) unregistered transport operators.
5. They (are going to implement / will implement / implement) blockchain tracking based on recent tests.
6. Logistics firms (won't invest / are not investing / didn't invest) without customs reforms.
7. Are you (launching / will launch / going to launch) the new platform this quarter?
8. The new terminal (is opening / will open / opened) on September 10.
9. He (thinks / is thinking / is going to think) automation will increase throughput.
10. We (aren't going to attend / won't attend / are attending) the PPP forum.

Exercise 2. Open the brackets using the correct future form:

1. They (sign) ______ the agreement with the railway operator on Tuesday.
2. I think the government (provide) ______ funding for the new corridor.
3. The contractor (not complete) ______ the work before winter.
4. Look at the plans! They (build) ______ an intermodal yard here.

5. We (launch) ______ a real-time monitoring system in early 2026.
6. He (not participate) ______ in the bidding process.
7. I’m sure digital twins (become) ______ standard in logistics design.
8. They (not reduce) ______ tariffs unless efficiency improves.
9. Are you (visit) ______ the logistics hub next week?
10. We (move) ______ customs functions inland by 2025.

Exercise 3. Translate from English into Ukrainian:

1. The World Bank will support this infrastructure upgrade.
2. Are they going to install emission sensors in all freight trucks?
3. We are signing the PPP agreement on Thursday.
4. I believe blockchain will transform freight visibility.
5. The company is not going to continue operations at that port.
6. Are you launching the new logistics system next quarter?
7. They will reduce delays with the help of automation.
8. The EU is developing new multimodal corridors.
9. I think this corridor won’t be profitable.
10. They are visiting the inland terminal next week.

Exercise 4. Translate from Ukrainian into English:

1. Наступного року вони модернізують портовий термінал.
2. Чи ви підписуєте угоду в п’ятницю?
3. Ми не будемо фінансувати цей проєкт без гарантій.
4. Уряд збирається запустити цифрову митну платформу.
5. Вони відкривають новий логістичний центр через два тижні.
6. Я думаю, що ці інвестиції принесуть прибуток.
7. Вони не збираються будувати нову залізничну гілку.
8. Чи приїде міністр до терміналу наступного місяця?
9. Компанія планує скоротити викиди в 2026 році.

10. Ми не будемо переносити вантажі вручну — буде автоматизація.

SPEAKING TASKS

Task 1. Personal Reflection

Topic: *Future of logistics infrastructure in your country*

Instructions: *Describe what will change in the logistics infrastructure in your region or country.*

Prompts:

- Will there be new terminals, roads, or hubs?
- Are any modernization or PPP projects being discussed?
- What kind of smart infrastructure are they going to implement?
- How will it affect local logistics or trade?

Task 2. Pair Interview

Scenario: *One student is a government advisor, the other – a private logistics investor*

Goal: *Discuss a potential PPP project: a new intermodal hub or logistics corridor.*

Sample questions:

- What are you planning to build, and where?
- Who will operate the facility after construction?
- Are you going to involve international donors?
- What risks are you expecting?

Task 3. Mini-Presentation (3–4 minutes)

Topic options:

1. The rise of smart ports and their role in future trade
2. Intermodal freight: the future of efficient logistics
3. How PPPs are shaping logistics development
4. Future trends in global transport corridors

Instructions: *Prepare a short presentation with 3 key points, examples, and conclusions. Use* ***Future Simple, be going to, Present Continuous*** *for planned events, and as much vocabulary related to the topic as possible.*

Task 4. Group Problem-Solving:

Scenario: *Your region has severe port congestion and outdated infrastructure. A major logistics company is willing to invest via a PPP.*

Goal: How will your group:

- assess priorities for the investor
- plan the implementation stages
- anticipate problems (environmental, customs, legal)
- develop a future vision for the infrastructure (What will change? What are you going to build?)

Task 5. Debate

Statement: *"Public-private partnerships are the most effective way to develop transport infrastructure."*

Instructions: *Divide into two groups –* ***for*** *and* ***against****. Argue your position based on:*

- Efficiency, transparency, investment risks
- Examples from ports, railways, logistics hubs
- Long-term benefits for the state and business
- Use future forms to discuss possible scenarios

UNIT 5: SUSTAINABILITY IN TRANSPORT AND LOGISTICS: FROM FUELS TO DIGITAL SOLUTIONS

TEXT 1: ENVIRONMENTAL CHALLENGES IN TRANSPORT AND THE MOVE TOWARDS SUSTAINABLE LOGISTICS

The transport and logistics sector is a vital enabler of global trade and economic growth. However, it is also one of the largest contributors to environmental degradation. Freight transport – whether by road, air, sea, or rail – consumes massive amounts of fossil fuels, emits greenhouse gases (GHGs), and causes noise, air, and water pollution. As global supply chains grow more complex and delivery expectations increase, the environmental footprint of logistics operations becomes a major issue for governments, businesses, and society at large.

According to the International Transport Forum, freight transport accounts for around 8–10% of global CO_2 emissions, and this share is expected to grow in the coming decades. Road freight, which dominates inland transport in most regions, is responsible for the highest emissions due to its reliance on diesel-powered trucks and congestion-prone infrastructure. Aviation, while carrying a smaller share of global freight by volume, contributes disproportionately to carbon emissions due to the energy intensity of air cargo. Maritime transport, although more fuel-efficient per ton-kilometer, emits sulfur oxides and nitrogen oxides that contribute to acid rain and health hazards in port cities.

Environmental challenges in transport are not limited to emissions. Logistics activities contribute to urban noise, solid waste from packaging, soil degradation through infrastructure sprawl, and biodiversity loss due to habitat fragmentation. These impacts are particularly acute in high-traffic areas such as seaports, airports, and border crossings, where freight terminals are located near residential zones or ecologically sensitive areas.

The concept of **sustainable logistics** has emerged as a response to these environmental pressures. It refers to the design, planning, and execution of logistics operations in ways that reduce ecological harm while maintaining service efficiency and economic viability. Sustainable logistics is not a single solution but a framework involving multiple strategies across transport modes, infrastructure design, technology adoption, and regulatory policy.

One of the key pillars of sustainable logistics is **emissions reduction**. Companies and governments are setting targets to cut CO_2 and other pollutants through a combination of technical, operational, and behavioral measures. This includes upgrading fleets to low-emission or electric vehicles, shifting freight to cleaner modes such as rail and inland waterways, and optimizing routes to reduce fuel consumption. Technologies such as telematics, predictive analytics, and AI-powered routing systems support these goals by improving real-time visibility and minimizing empty runs.

Alternative fuels play an increasingly important role in decarbonizing freight transport. Electric vehicles (EVs) are suitable for short-haul deliveries in urban areas, while biofuels, hydrogen, and liquefied natural gas (LNG) are being tested for longer distances and heavier cargo. Ports and logistics terminals are also adopting green infrastructure, such as shore power systems for vessels, solar-powered warehouses, and electrified cargo-handling equipment.

Modal shift is another widely promoted strategy. Governments encourage a shift from road to rail or barge transport, which has lower emissions per ton-kilometer. In the European Union, for example, policy frameworks like the Green Deal and the Sustainable and Smart Mobility Strategy aim to increase the share of rail freight and create “green corridors” that integrate cleaner modes and efficient terminals.

The concept of **urban logistics sustainability** is also gaining traction. With the rise of e-commerce and last-mile deliveries, cities face growing challenges in balancing accessibility with livability. Measures such as delivery time windows, low-emission zones, cargo bike programs, and smart loading bays are being implemented to manage freight activity in dense urban environments.

However, sustainability in logistics also involves trade-offs and challenges. Alternative fuels and clean vehicles require high capital investment and infrastructure upgrades. Rail and waterway networks may lack flexibility and coverage in certain regions. Data systems must be interoperable and secure to support real-time optimization. Furthermore, supply chain actors must align on sustainability goals, which is difficult when partners operate under different regulations, priorities, and capabilities.

Regulation plays a critical role in driving sustainability forward. Emission standards, carbon taxes, fuel subsidies, and environmental reporting obligations push firms to innovate and reduce their impact. At the same time, industry-led initiatives, such as the Global Logistics Emissions Council (GLEC) framework, provide tools for measuring and benchmarking emissions across logistics chains.

In conclusion, the environmental impact of freight transport is one of the key challenges of modern logistics. Achieving sustainability requires coordinated action from public authorities, private operators, and infrastructure planners. It demands technological innovation, modal integration, regulatory support, and a shift in industry mindset. While the transition is complex and costly, sustainable logistics offers long-term benefits for climate stability, public health, and the resilience of global supply chains.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What environmental issues are caused by different modes of freight transport?
2. Why is road freight considered the most polluting transport mode?
3. What is sustainable logistics, and what are its key goals?
4. How can emissions be reduced through logistics planning?
5. What are the benefits and limitations of alternative fuels in logistics?
6. What is a modal shift, and why is it encouraged in environmental strategies?
7. What urban challenges are associated with last-mile delivery?
8. What are the trade-offs involved in implementing sustainable logistics?

9. How do governments influence sustainability in logistics through regulation?
10. Why is cooperation between supply chain partners important for sustainability?

II. True or False?

1. All freight transport modes have equal environmental impact.
2. Sustainable logistics includes both technological and behavioral strategies.
3. Biofuels and hydrogen are common fuels for urban delivery.
4. Urban logistics has no effect on air quality or noise levels.
5. Rail freight has lower emissions per ton-kilometer than road transport.
6. Smart loading bays can help cities manage freight activity more sustainably.
7. Emission standards and carbon taxes are part of sustainability regulations.
8. The Global Logistics Emissions Council provides tools for emissions tracking.
9. Modal shift always improves logistics speed.
10. Electric trucks are suitable for short-distance, urban deliveries.

III. Fill in the gaps using the words from the box below:

emissions, modal shift, sustainability, congestion, alternative fuels, CO_2, low-emission zones, electrification, urban logistics, optimization

1. Road freight contributes heavily to ______ due to diesel consumption.
2. The logistics sector is adopting ______ such as LNG and biofuels.
3. ______ is a major problem in cities with high freight volumes.
4. Rail and barge transport are promoted through ______ policies.
5. ______ of routes and delivery schedules reduces energy waste.
6. ______ refers to environmental responsibility in supply chain management.
7. Many cities have introduced ______ to reduce vehicle pollution.
8. ______ like EVs and hydrogen trucks are key to decarbonization.

9. Logistics ______ involves managing last-mile delivery and traffic impact.
10. Port ______ helps reduce emissions during cargo handling.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Транспорт і логістика є значним джерелом викидів CO_2.
2. Устойчиві логістичні рішення спрямовані на зменшення екологічного впливу.
3. Біопаливо, водень і електротранспорт використовуються для зниження забруднення.
4. Перехід на залізничні та водні перевезення знижує рівень викидів.
5. У містах впроваджуються зони з низьким рівнем викидів і програми з доставки велосипедами.
6. Однак сталий розвиток вимагає значних фінансових інвестицій та співпраці між партнерами.

B. Translate from English into Ukrainian:

1. Road transport has the highest emissions due to fossil fuel dependence.
2. Maritime shipping affects port air quality through sulfur emissions.
3. Sustainable logistics includes fleet upgrades and route management.
4. Electric trucks are used in short-distance, urban freight networks.
5. Governments promote green corridors through modal integration.
6. Sustainability in logistics requires innovation and regulatory alignment.

TEXT 2: ALTERNATIVE FUELS AND GREEN INFRASTRUCTURE IN SUSTAINABLE LOGISTICS

As logistics organizations confront growing pressure to reduce their environmental impact, the development and implementation of alternative fuels and green infrastructure have become top priorities. Conventional fossil fuels, especially diesel and bunker oil, remain the dominant energy sources in freight transport. However, these fuels contribute significantly to greenhouse gas (GHG) emissions and air pollution. In response, the logistics industry is investing in cleaner energy solutions and redesigning infrastructure to support a more sustainable supply chain.

Alternative fuels are energy sources that produce fewer emissions than traditional fuels and can help decarbonize transport operations. Among the most widely adopted alternatives are **electricity, biofuels, hydrogen**, and **liquefied natural gas (LNG)**. Each of these has specific applications and limitations depending on vehicle type, route length, payload, and regional infrastructure availability.

Electric vehicles (EVs) are commonly used for short-haul and urban deliveries. Their advantages include zero tailpipe emissions, lower operating noise, and compatibility with urban sustainability goals. EV adoption is growing rapidly, especially in last-mile delivery fleets operated by retail and e-commerce companies. However, battery range and recharging infrastructure remain challenges, particularly for heavy-duty trucks and long-distance routes.

Biofuels – including biodiesel and ethanol – are produced from organic materials such as plant oils, waste grease, and agricultural residue. They can be used in modified diesel engines with relatively low investment. Biofuels are considered carbon-neutral over their lifecycle, although their sustainability depends on feedstock sources and land-use impacts. In some regions, blending mandates require fuel suppliers to include a certain percentage of biofuels in the logistics energy mix.

Hydrogen fuel is emerging as a promising solution for heavy-duty and long-haul transport. Hydrogen-powered vehicles emit only water vapor, and fuel cells offer higher energy density than batteries. However, the production of green hydrogen requires renewable electricity, and distribution infrastructure is still underdeveloped. Pilot projects are underway in several countries, especially in Europe and East Asia.

Liquefied natural gas (LNG) is a cleaner-burning fossil fuel used in long-haul trucking and maritime shipping. LNG reduces particulate matter, sulfur oxides, and CO_2 emissions compared to diesel or bunker fuel. Many major shipping companies are ordering LNG-powered vessels as part of their decarbonization strategy. Critics, however, point out that LNG is still a fossil fuel and may delay the transition to fully renewable alternatives.

Beyond fuels, **green infrastructure** refers to the physical assets and systems designed to minimize environmental harm. This includes **charging stations for EVs**, **hydrogen fueling points**, **shore power connections at ports**, **solar-powered warehouses**, **LED lighting**, and **energy-efficient cooling systems** in logistics facilities. Governments and private companies are also investing in **eco-industrial parks**, where logistics hubs are co-located with renewable energy sources and recycling centers.

Ports and terminals are at the forefront of green infrastructure innovation. "Cold ironing" or shore-to-ship power allows vessels to turn off engines while docked, reducing emissions. Green ports also install energy management systems, waste treatment plants, and real-time air quality monitors. Major ports such as Los Angeles, Rotterdam, and Singapore have set aggressive sustainability targets and are implementing multi-phase green infrastructure roadmaps.

Green corridors are another emerging concept. These are freight routes optimized for low-emission transport, combining clean vehicles, efficient infrastructure, and digital control systems. Green corridors often involve modal shift strategies, smart terminals, and emission monitoring. They may qualify for regulatory support or tax incentives, especially when aligned with regional climate policies.

Despite strong momentum, the shift toward alternative fuels and green logistics infrastructure faces barriers. These include high capital costs, uncertain return on investment, limited supply chains for new fuels, and a lack of technical expertise. Policy incentives such as tax credits, grants, and regulatory mandates play a critical role in accelerating adoption. Collaboration between public authorities, logistics providers, fuel suppliers, and infrastructure operators is essential.

In summary, alternative fuels and green infrastructure form the technological foundation of sustainable logistics. Their widespread adoption requires investment, innovation, supportive policy, and cross-sector cooperation. While no single fuel or solution is universally optimal, a diversified and flexible approach tailored to each supply chain segment can drive meaningful environmental progress.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. Why is the logistics sector shifting away from traditional fossil fuels?
2. What are the main benefits and limitations of electric vehicles in logistics?
3. How are biofuels produced, and what factors affect their sustainability?
4. In what types of transport is hydrogen fuel most applicable?
5. What is LNG, and how does it compare to other fuel types?
6. What kinds of infrastructure are considered "green" in logistics?
7. How do ports contribute to environmental sustainability through infrastructure?
8. What is a green corridor, and what elements does it include?
9. What are the major challenges to widespread adoption of alternative fuels?
10. What role do governments play in supporting green logistics innovation?

II. True or False?

1. Electric trucks are suitable for long-distance international shipping.
2. Hydrogen-powered vehicles emit only water vapor.
3. Biofuels can be made from agricultural waste and used cooking oil.
4. LNG is a renewable energy source with zero emissions.
5. Shore power reduces air pollution in port cities.
6. Green corridors combine digital systems and clean transport.
7. All green infrastructure requires expensive technological upgrades.
8. Solar panels and LED lighting are examples of green facility upgrades.
9. Government subsidies slow down innovation in green logistics.
10. Public-private cooperation is essential for successful fuel transitions.

III. Fill in the gaps using the words from the box below:

electrification, LNG, hydrogen, solar-powered, charging stations, cold ironing, terminals, green corridors, biofuels, emissions

1. ______ are installed in cities to support electric vehicle fleets.
2. Biodiesel and ethanol are types of ______ made from organic materials.
3. ______ vessels use cleaner-burning fuel for maritime transport.
4. Port ______ are being modernized to reduce environmental impact.
5. ______ is the process of using shore power instead of onboard engines.
6. ______ facilities use renewable energy and low-energy lighting systems.
7. The logistics sector is exploring ______ as a zero-emission fuel.
8. ______ routes support multimodal low-emission freight movement.
9. Upgrading engines helps reduce noise and harmful ______.
10. ______ of warehouses and cranes can dramatically cut CO_2 output.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Альтернативні види палива знижують рівень забруднення повітря.
2. Водень використовується як паливо для вантажного транспорту з великим пробігом.
3. Біопаливо можна виготовити з рослинної олії або харчових відходів.
4. Порти впроваджують систему shore power для зменшення викидів.
5. Зелені коридори поєднують чисті транспортні засоби та розумну інфраструктуру.
6. Сонячна енергія використовується для живлення складів і логістичних центрів.

B. Translate from English into Ukrainian:

1. Electric vehicles are ideal for low-emission last-mile delivery.
2. Hydrogen offers higher energy density than batteries.
3. LNG is used in both long-haul trucks and maritime fleets.
4. Shore power allows vessels to switch off engines in port.
5. Green corridors reduce emissions through route planning and modal shift.
6. Governments provide grants to support green fuel development.

TEXT 3: SUSTAINABLE URBAN LOGISTICS AND LAST-MILE DELIVERY SOLUTIONS

Urban freight transport is an essential component of modern logistics systems. It enables the movement of goods into, within, and out of cities to meet the demands of residents, businesses, and institutions. However, it also contributes significantly to urban pollution, congestion, noise, and carbon emissions. With rising e-commerce activity and growing expectations for fast, low-cost deliveries, cities are experiencing unprecedented pressure on their logistics infrastructure. This has led to the development of sustainable urban logistics strategies, particularly in the area of **last-mile delivery**.

The **last mile** refers to the final segment of the delivery journey, typically from a local distribution center or hub to the end customer. Although it represents a small portion of the entire supply chain, it is the most expensive and environmentally impactful stage. This is due to fragmented routes, low delivery density, vehicle idling, and repeated delivery attempts. In urban settings, delivery vehicles compete with passenger traffic, face access restrictions, and generate noise and air pollution in densely populated neighborhoods.

To address these issues, logistics operators and city governments are investing in **last-mile sustainability solutions**. One of the most effective approaches is the use of **cargo bikes** and **electric delivery vehicles** for short-range urban distribution. These vehicles are quiet, compact, and zero-emission, making them suitable for navigating narrow streets and low-emission zones. Many cities offer incentives for electric fleets, including access to priority lanes, tax exemptions, and free charging points.

Another strategy is the establishment of **urban consolidation centers (UCCs)**. These are logistics hubs located near city centers where goods from multiple suppliers are aggregated, sorted, and prepared for final delivery using low-emission vehicles. UCCs reduce the number of delivery trips, optimize vehicle capacity, and minimize the traffic impact of commercial freight. They also allow for better coordination and data-sharing between logistics providers and city planners.

Delivery time windows and **night-time deliveries** are being tested to spread freight traffic more evenly throughout the day. By scheduling deliveries during off-peak hours, cities can reduce congestion and improve the efficiency of road usage. However, night-time operations require low-noise equipment and compliance with residential noise regulations. Smart city technologies – such as sensor-based access control, curbside delivery booking apps, and real-time traffic data – support these practices.

Microhubs and **locker stations** are increasingly popular for e-commerce logistics. Microhubs are small, decentralized facilities used for final sorting and distribution within a limited urban radius. They are often located in repurposed containers, parking structures, or even retail stores. Locker stations, on the other hand, offer customers secure, self-service collection points for parcels, reducing the need for repeated delivery attempts and failed handovers.

Urban logistics sustainability also involves reducing **empty runs**, improving **load consolidation**, and using **digital routing tools**. AI-powered route optimization software helps companies reduce fuel usage, balance workloads, and improve delivery accuracy. In addition, some platforms allow crowd-sourced delivery using local couriers, which can reduce delivery distances and provide flexible labor solutions.

Municipal governments play a central role in creating supportive regulatory environments. **Low-emission zones (LEZs)**, **urban access restrictions**, and

sustainable urban mobility plans (SUMPs) are being implemented in many cities to guide logistics development in line with climate and livability goals. Policymakers also collaborate with private-sector stakeholders to pilot new technologies, monitor performance, and adjust infrastructure planning accordingly.

However, challenges remain. Many sustainable solutions require coordination among multiple actors, including retailers, logistics companies, urban authorities, and consumers. High initial investment costs, limited real estate for hubs, and fragmented regulation can slow down implementation. Furthermore, ensuring equity and affordability in last-mile innovations is critical to avoid creating gaps in access or service quality.

In conclusion, sustainable urban logistics and last-mile delivery strategies are vital for reducing environmental impact, improving air quality, and enhancing urban life. While there is no one-size-fits-all solution, combining clean vehicles, smart hubs, digital systems, and supportive policy frameworks can help cities meet the demands of growing e-commerce without compromising their sustainability goals.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. Why is last-mile delivery considered the most environmentally impactful stage of logistics?
2. What challenges do delivery vehicles face in urban environments?
3. How do cargo bikes and electric vehicles contribute to sustainable logistics?
4. What is the role of urban consolidation centers (UCCs) in last-mile delivery?
5. How do delivery time windows and night deliveries help reduce congestion?
6. What are microhubs and locker stations, and how do they work?
7. How can AI-based routing tools improve last-mile efficiency?
8. What policies are used by city governments to support sustainable logistics?
9. What challenges limit the implementation of urban logistics solutions?

10. How can urban last-mile logistics be made more equitable and accessible?

II. True or False?

1. The last mile is the cheapest stage of the delivery process.
2. Cargo bikes are well-suited for dense, low-emission zones.
3. UCCs help reduce the number of individual delivery trips.
4. Night-time deliveries are prohibited in all cities.
5. Microhubs are large, centralized logistics terminals.
6. Locker stations require direct handover between courier and customer.
7. Smart city tools can support sustainable delivery scheduling.
8. Low-emission zones restrict access for polluting vehicles.
9. AI route optimization increases fuel consumption.
10. Equity and affordability are not important in urban logistics planning.

III. Fill in the gaps using the words from the box below:

UCCs, locker stations, empty runs, microhubs, cargo bikes, smart city, LEZs, route optimization, night deliveries, last mile

1. The ______ is the final stage of delivery to the end customer.
2. ______ are local facilities for sorting goods before final drop-off.
3. ______ allow customers to pick up parcels at any time.
4. ______ are used to deliver goods quietly and sustainably in cities.
5. ______ help reduce failed delivery attempts and increase efficiency.
6. ______ can lower daytime traffic but must comply with noise regulations.
7. ______ tools balance driver loads and reduce fuel usage.
8. Urban ______ infrastructure includes traffic sensors and booking apps.
9. ______ help combine freight from multiple suppliers for efficient delivery.
10. Reducing ______ cuts emissions from unnecessary vehicle movement.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Остання миля є найдорожчим і найменш ефективним етапом доставки.
2. Велосипеди для вантажів зменшують шум та викиди в містах.
3. Консолідаційні центри скорочують кількість транспортних рейсів.
4. Розумні міста використовують цифрові рішення для управління доставкою.
5. Автоматичні шафки дозволяють клієнтам самостійно забирати посилки.
6. Міста впроваджують зони з низьким рівнем викидів для контролю транспорту.

B. Translate from English into Ukrainian:

1. Urban logistics requires coordination between many stakeholders.
2. Microhubs operate in small areas and reduce delivery distance.
3. Smart sensors help schedule deliveries in real time.
4. Night-time deliveries reduce congestion during peak hours.
5. Cities use LEZs to limit pollution from delivery fleets.
6. Equitable access must be considered in last-mile planning.

TEXT 4: DIGITAL TOOLS AND CARBON FOOTPRINT MANAGEMENT IN LOGISTICS

Modern logistics is undergoing a digital transformation that is reshaping how companies manage their environmental performance. With the growing demand for transparent, data-driven sustainability strategies, logistics providers are increasingly turning to **digital tools** to monitor, report, and reduce their **carbon footprint**. These tools not only enable compliance with environmental regulations but also help companies improve efficiency, cut costs, and meet the expectations of environmentally conscious customers and investors.

A **carbon footprint** in logistics refers to the total greenhouse gas emissions generated by transport, warehousing, and delivery activities. This includes emissions from vehicle fuel combustion, facility energy use, refrigeration systems, and packaging. Measuring and managing this footprint is essential for identifying inefficiencies, benchmarking performance, and setting realistic emissions reduction targets.

Digitalization plays a key role in carbon management. **Carbon accounting platforms** allow companies to calculate emissions across their entire supply chain using standardized methodologies such as the **Greenhouse Gas (GHG) Protocol** or the **Global Logistics Emissions Council (GLEC) Framework**. These platforms take into account factors like fuel type, distance traveled, vehicle class, load factor, and warehouse energy consumption. Some tools also track indirect emissions from upstream and downstream partners (Scope 3 emissions).

Transport Management Systems (TMS) and **Warehouse Management Systems (WMS)** are now being integrated with carbon monitoring modules. These systems collect real-time data on vehicle routes, idle time, fuel usage, warehouse lighting, and HVAC systems. By combining operational and environmental data, logistics managers can identify opportunities to reduce emissions—such as avoiding congested routes, using shared transportation, or optimizing facility energy usage.

AI and predictive analytics further enhance emissions planning. These tools can simulate delivery scenarios, forecast demand spikes, and recommend efficient transport combinations that reduce empty runs and fuel consumption. In addition, machine learning algorithms help analyze historical patterns and suggest behavioral adjustments for drivers, fleet operators, and warehouse staff.

Carbon dashboards are used to visualize and communicate performance. These platforms provide real-time emissions reports, progress toward sustainability goals, and customized KPIs (Key Performance Indicators). Dashboards can be shared with clients, investors, and regulators, supporting transparency and accountability.

Some logistics providers also offer carbon footprint reports to customers, enabling them to make greener shipping choices.

Blockchain technology supports carbon management by creating tamper-proof records of fuel purchases, route data, and emissions certificates. It ensures data integrity and enables verification of sustainability claims. This is especially relevant for ESG (Environmental, Social, and Governance) reporting and green procurement programs.

Digital twin technology is another emerging solution. A digital twin is a virtual replica of a logistics operation – such as a warehouse or delivery route – that can be used to test sustainability scenarios, identify inefficiencies, and simulate the impact of green investments before implementation.

Despite its benefits, digital carbon management has some challenges. Data quality, system interoperability, and cybersecurity must be addressed. Accurate emissions tracking depends on consistent data input, standardized formats, and cooperation across the supply chain. Small logistics providers may lack the resources to implement advanced systems, which can widen the digital divide.

Regulators are increasingly mandating carbon reporting. The European Union's **Corporate Sustainability Reporting Directive (CSRD)** and other international standards require companies to disclose their environmental performance, including logistics-related emissions. This legal pressure accelerates the adoption of digital tracking systems and creates a competitive advantage for early adopters.

In conclusion, digital tools are becoming indispensable for managing the carbon footprint of logistics operations. By integrating emissions tracking into daily decision-making, companies can align economic performance with environmental responsibility. As supply chains become more complex and data-driven, digital sustainability platforms will play a central role in building resilient and climate-smart logistics networks.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What is a carbon footprint in the context of logistics?
2. How do digital tools help companies track and reduce emissions?
3. What is the role of carbon accounting platforms, and which frameworks do they use?
4. How are TMS and WMS systems involved in emissions monitoring?
5. In what ways do AI and predictive analytics support carbon reduction?
6. How do carbon dashboards enhance transparency and communication?
7. What function does blockchain serve in carbon footprint management?
8. What is a digital twin, and how does it assist with sustainability planning?
9. What are the main barriers to adopting digital sustainability tools?
10. Why are governments and regulators pushing for mandatory carbon reporting?

II. True or False?

1. Scope 3 emissions come only from internal operations.
2. A carbon dashboard displays progress toward emission reduction goals.
3. TMS collects data only about financial logistics.
4. Digital twins are real-time simulations of logistics systems.
5. Carbon footprint tools require manual fuel logs only.
6. Blockchain helps verify environmental data integrity.
7. All logistics companies have equal access to advanced digital tools.
8. Emissions tracking is becoming a legal obligation in the EU.
9. Predictive analytics can suggest driver behavior improvements.
10. Carbon monitoring is irrelevant to supply chain transparency.

III. Fill in the gaps using the words from the box below:

GLEC, emissions, digital twin, dashboards, blockchain, carbon footprint, predictive analytics, Scope 3, TMS, ESG

1. A ______ is the total greenhouse gas output from logistics operations.
2. ______ includes emissions from suppliers and downstream activities.
3. ______ software can forecast fuel use and simulate transport scenarios.
4. ______ platforms help visualize sustainability progress and KPIs.
5. Companies use ______ frameworks to ensure standard reporting of logistics emissions.
6. ______ tools track transport activity and integrate carbon data.
7. The use of ______ allows verifiable and tamper-proof environmental reporting.
8. A ______ allows planners to test green investments in a simulated environment.
9. Transparency is essential for ______ reporting in global supply chains.
10. Companies aim to reduce CO_2 and other ______ across logistics operations.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Вуглецевий слід логістики включає викиди від транспорту, складів і упаковки.
2. Цифрові платформи допомагають компаніям контролювати екологічні показники в реальному часі.
3. Прогнозна аналітика оптимізує маршрути та скорочує витрати пального.
4. Цифровий двійник дозволяє моделювати вплив інвестицій до їх впровадження.
5. ЄС вимагає обов'язкової звітності щодо викидів компаній.
6. Блокчейн забезпечує достовірність екологічної звітності.

B. Translate from English into Ukrainian:

1. Transport Management Systems now include carbon tracking modules.
2. The GHG Protocol helps logistics providers standardize emissions data.
3. Scope 3 emissions are difficult to track but essential for full transparency.
4. Blockchain secures records of emissions certificates and route data.
5. Dashboards allow stakeholders to assess environmental performance.
6. Digital carbon management requires data integration and cross-sector collaboration.

TEXT 5: GLOBAL STRATEGIES AND POLICY FRAMEWORKS FOR GREENING LOGISTICS

The environmental impact of freight transport is no longer a peripheral issue – it is a central concern for national governments, international organizations, and corporate supply chains. The transition to **green logistics** requires more than isolated improvements in vehicle technology or facility upgrades. It demands coordinated strategies, long-term policy frameworks, and cross-sector collaboration to reshape how goods are moved, stored, and delivered across the world.

At the **global level**, several institutions are leading sustainability efforts in transport and logistics. The **International Transport Forum (ITF)** under the OECD conducts policy research and supports sustainable mobility frameworks. The **International Maritime Organization (IMO)** and the **International Civil Aviation Organization (ICAO)** have introduced mandatory emissions reporting and fuel efficiency standards. The **United Nations Framework Convention on Climate Change (UNFCCC)** has also recognized transport as a priority sector for decarbonization in national climate plans (NDCs).

Multilateral agreements and targets are shaping the future of logistics. The **Paris Agreement** calls for limiting global warming to well below 2°C, with a strong emphasis on reducing GHG emissions in all sectors. The **European Green Deal** includes transport-specific actions such as expanding rail infrastructure, promoting electric freight, and establishing low-emission corridors. The **Fit for 55 package** aims to cut EU GHG emissions by 55% by 2030 and includes carbon pricing mechanisms for road and maritime transport.

On the corporate side, many multinational logistics providers have adopted **science-based targets** to align with climate goals. These companies invest in carbon-neutral fleets, energy-efficient facilities, and carbon offsetting programs. They also work with clients and suppliers to integrate sustainability into procurement, packaging, and inventory planning. Global certification schemes, such as **ISO 14001** for environmental management and **EcoTransIT** for emissions assessment, provide credibility and benchmarking tools.

Policy instruments play a critical role in greening logistics. These include fuel taxes, tolls for polluting vehicles, emissions trading schemes, green procurement rules, and urban logistics regulations. In many countries, governments offer **financial incentives** for clean vehicle adoption, infrastructure upgrades, and digital innovation in supply chains. Public-private partnerships (PPPs) are used to scale up green corridor projects, intermodal facilities, and sustainable logistics zones.

Education and capacity building are increasingly seen as core elements of sustainable logistics transformation. Governments fund research and pilot projects, while universities and training centers develop programs in green supply chain management. International cooperation programs help low- and middle-income countries design climate-smart transport policies and adopt best practices from global leaders.

Monitoring, reporting, and verification (MRV) systems are essential to track progress and ensure accountability. Governments and logistics firms use MRV tools to measure emissions, evaluate policy impacts, and guide future planning. MRV data also supports ESG reporting and investor decision-making, linking sustainability performance to financial outcomes.

Despite the growing momentum, the transition to sustainable logistics remains complex. There are **regional disparities** in infrastructure, technological readiness, and regulatory enforcement. Some markets still lack access to clean fuels, electrification, or digital tools. Moreover, the cost of green logistics often remains higher than conventional practices, especially in developing economies. Without global solidarity and funding support, the risk of a two-speed logistics transition persists.

In response, international development banks, climate funds, and trade organizations are increasing investment in **inclusive green logistics**. Projects prioritize low-carbon freight systems in Africa, Asia, and Latin America, with a focus on port modernization, modal shift, and digital infrastructure. These efforts aim to ensure that climate action in logistics does not leave anyone behind.

In conclusion, greening global logistics is a shared responsibility. From emissions regulation and infrastructure investment to digital innovation and workforce training, every level of the logistics system must evolve. While progress varies by region, the direction is clear: only through coordinated policy, cross-border collaboration, and sustained investment can we build a logistics ecosystem that is environmentally responsible, economically resilient, and socially inclusive.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. Why is freight transport now a central concern in global environmental policy?
2. What role does the UNFCCC play in transport decarbonization?
3. What are some of the key features of the European Green Deal regarding logistics?
4. How do multinational logistics companies support sustainability goals?
5. What kinds of policy instruments are used to promote green logistics?
6. How do education and capacity-building programs support the transition?
7. What is MRV, and why is it important for sustainability accountability?
8. What are some barriers to implementing green logistics worldwide?

9. How do development banks and climate funds contribute to inclusive green logistics?
10. Why is coordinated global action essential for sustainable logistics?

II. True or False?

1. The Paris Agreement does not cover the logistics sector.
2. Carbon offsetting is used by some companies to meet climate targets.
3. Toll-free access is a common reward for high-emission trucks.
4. MRV systems are used to monitor progress and inform future planning.
5. ISO 14001 is a certification for financial management.
6. The EU's Fit for 55 targets include logistics-related emissions.
7. Digital innovation is irrelevant to sustainable supply chains.
8. PPPs are used to scale up sustainable infrastructure projects.
9. Regional inequality can hinder global sustainability efforts.
10. Green logistics requires joint effort from governments, companies, and NGOs.

III. Fill in the gaps using the words from the box below:

MRV, Fit for 55, ISO 14001, PPPs, UNFCCC, carbon offsetting, green corridors, EcoTransIT, global solidarity, fuel taxes

1. The ______ is a UN body supporting transport-related climate action.
2. ______ refers to projects that compensate for unavoidable emissions.
3. The ______ package sets EU-wide emissions targets across sectors.
4. ______ help measure and verify emissions reductions.
5. ______ are collaborative agreements between public and private sectors.
6. ______ supports environmental reporting with standardized methodology.
7. ______ and tolls are used to discourage polluting vehicles.
8. The ______ certification verifies environmental management practices.
9. Building ______ helps shift freight toward low-emission infrastructure.

10. Without ______, some regions may lag in the green logistics transition.

IV. Translation Tasks:

A. Translate from Ukrainian into English:

1. Паризька угода передбачає скорочення викидів у транспортному секторі.
2. Пакет «Fit for 55» охоплює заходи з декарбонізації логістики.
3. Партнерства державно-приватного сектору використовуються для створення зелених коридорів.
4. MRV-системи дозволяють оцінити ефективність екологічної політики.
5. Багатосторонні банки розвитку інвестують у сталу логістику в країнах, що розвиваються.
6. Глобальна співпраця є ключовою умовою переходу до зеленої логістики.

B. Translate from English into Ukrainian:

1. The European Green Deal aims to expand rail freight and reduce road emissions.
2. ISO 14001 helps companies manage environmental responsibilities.
3. Development funds support sustainable transport in the Global South.
4. Green corridors integrate clean infrastructure and digital tools.
5. Companies report emissions using MRV frameworks for transparency.
6. Policy coordination is essential for aligning international logistics goals.

LEXICAL EXERCISES

Exercise 1. Match the term with its definition:

Words	Definitions
1. Carbon footprint	a) The final stage of delivering a product to the end customer

2. Alternative fuels	b) Fuel types like hydrogen, LNG, or bioethanol
3. Green corridor	c) Virtual model of a warehouse or route used for simulation
4. Electrification	d) Restricted urban area to reduce vehicle-related pollution
5. Biofuels	e) Electricity-based energy system replacing fossil fuels
6. Last-mile delivery	f) Total GHG emissions generated by logistics activities
7. MRV	g) Route optimized for environmentally friendly transport
8. Public-private partnership (PPP)	h) Monitoring, reporting, and verifying emissions
9. Digital twin	i) Clean-burning fuel derived from organic sources
10. Low-emission zone (LEZ)	j) Collaboration between government and private sector

Exercise 2. Fill in the gaps with appropriate words from the list:

emissions, digital twin, carbon offsetting, locker stations, biofuels, electrification, MRV, LEZs, hydrogen, predictive analytics

1. Switching to ______ helps reduce fossil fuel dependency.
2. Companies use ______ tools to forecast demand and optimize fuel use.
3. ______ allow self-service parcel collection in urban areas.
4. Governments rely on ______ systems to ensure accurate climate reporting.
5. The port plans full ______ of cranes by 2027.
6. ______ technology simulates logistics networks to improve sustainability.

7. Urban planners are expanding ______ to reduce smog.
8. Firms use ______ to balance unavoidable emissions.
9. ______ trucks release only water vapor into the atmosphere.
10. Logistics operators aim to cut ______ by 50% by 2030.

Exercise 3. Translate into Ukrainian:

1. Alternative fuels like LNG and hydrogen are changing freight transport.
2. Last-mile delivery must become more energy-efficient.
3. The warehouse will be powered entirely by solar energy.
4. MRV systems support transparency in emissions reporting.
5. The logistics firm created a digital twin of its fleet routes.
6. Biofuels are blended into diesel to reduce lifecycle emissions.
7. Predictive analytics helps optimize last-mile delivery density.
8. A new green corridor will connect inland terminals with seaports.
9. Public-private partnerships fund electrification projects.
10. LEZs are becoming standard in European capitals.

Exercise 4. Translate into English:

1. Вуглецевий слід компанії скоротився на 20% завдяки цифровому моніторингу.
2. Альтернативні види палива дозволяють зменшити викиди CO_2.
3. Зелений коридор з’єднує місто з портом за допомогою електричних вантажівок.
4. Центри останньої милі використовують енергію з відновлюваних джерел.
5. Компанія створила цифровий двійник для симуляції сталих маршрутів.
6. Уряд фінансує LEZ у мегаполісах через державно-приватне партнерство.
7. Технології прогнозної аналітики скорочують пусті рейси.
8. Водневий транспорт не має шкідливих викидів.
9. MRV-системи є обов’язковими для міжнародних логістичних операторів.

10.Біопаливо виробляється з рослинної сировини або харчових відходів.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Translation
Alternative fuels	Альтернативні види палива
Biofuels	Альтернативні види палива
Carbon footprint	Вуглецевий слід
Carbon offsetting	Компенсація викидів
Digital twin	Цифровий двійник
EcoTransIT	Платформа оцінки екологічного впливу транспорту
Electrification	Електрифікація
Green corridor	Зелений коридор
Green infrastructure	Зелена інфраструктура
Greenhouse Gas Protocol (GHG Protocol)	Протокол парникових газів
Hydrogen-powered transport	Водневий транспорт
Last-mile delivery	Доставка останньої милі
Low-emission zone (LEZ)	Зона з низьким рівнем викидів
MRV (Monitoring, Reporting, Verification)	Моніторинг, звітність і верифікація
Predictive analytics	Прогнозна аналітика
Public-private partnership (PPP)	Публічно-приватне партнерство
Science-based targets	Науково обґрунтовані цілі зі скорочення викидів
Sustainable urban mobility plan (SUMP)	План сталої міської мобільності
Transport Management System (TMS)	Система управління транспортом
Urban consolidation center (UCC)	Центр міської консолідації

GRAMMAR FOCUS: FUTURE FORMS IN GREEN LOGISTICS CONTEXT

I. Future Simple (will)

Формула: will + V

Вживання:

- прогнози без доказів
- обіцянки, наміри, рішення в момент мовлення

Приклади:

- The government **will invest** in green freight corridors.
- New regulations **won't affect** small logistics firms.
- **Will** the port **switch** to electric equipment next year?

II. Be going to

Формула: am/is/are + going to + V

Вживання:

- заплановані дії
- передбачення на основі доказів

Приклади:

- They **are going to launch** a carbon tracking platform.
- We **aren't going to renew** the diesel fleet.
- **Is** your company **going to adopt** hydrogen fuel?

III. Present Continuous for Future

Формула: am/is/are + V-ing (із вказівкою часу в майбутньому)

Вживання:

- фіксовані домовленості, графіки

Приклади:

- We **are signing** the EcoTransIT partnership **on Friday**.

- The warehouse **is switching** to solar energy **next month**.
- **Are** they **installing** charging stations **this quarter**?

GRAMMAR EXERCISES

Exercise 1. Choose the correct form:

1. The city (will implement / is implementing / is going to implement) a new LEZ policy.
2. We (won't reach / aren't reaching / didn't reach) our emission goals without electrification.
3. Logistics firms (are joining / are going to join / join) the climate pact next quarter.
4. He thinks global trade (will demand / demands / is demanding) more sustainable transport.
5. We (are testing / will test / going to test) hydrogen trucks in July.
6. Are you (switching / will switch / going to switch) to biodegradable packaging soon?
7. The UN (is holding / will hold / holds) a logistics climate summit in November.
8. The team (won't use / isn't using / didn't use) diesel forklifts anymore.
9. Green logistics (will become / becomes / is becoming) the standard by 2030.
10. They (are going to launch / will launch / launching) an AI-powered emission tracker.

Exercise 2. Translate from Ukrainian into English:

1. Наступного року вони запровадять електромобілі для доставки останньої милі.
2. Уряд підписує нову кліматичну угоду в п'ятницю.
3. Чи збираєтеся ви встановити сонячні панелі на складі?
4. Вони не будуть використовувати паливо з високим вмістом сірки.

5. Компанія запускає платформу вуглецевого моніторингу наступного місяця.
6. Ми будемо інвестувати в зелену інфраструктуру до 2026 року.

Exercise 3. Complete the sentences:

1. Our port is going to...
2. By next year, logistics operators will...
3. Cities are introducing...
4. Will your company... ?
5. We aren't going to...

SPEAKING TASKS

Task 1. Personal Opinion

Topic: *How will logistics change to become more sustainable in your country?*

Prompts:

- Will companies adopt green fuels?
- Are cities going to expand low-emission zones?
- What kind of investments is the government planning?
- Will your city implement smart infrastructure or digital tracking?

Task 2. Pair Interview

Scenario: *You are the sustainability officer of a logistics company. Your partner is an environmental journalist.*

Goal: Discuss the company's environmental policy and plans for the future.

Sample questions:

- Are you going to replace your diesel fleet?
- What green infrastructure will you install in 2025?
- Will your company adopt digital carbon tracking systems?

- Are you partnering with any public institutions?

Task 3. Mini-Presentation (3–4 minutes)

Choose a topic:

1. Future of alternative fuels in logistics
2. Sustainable urban delivery: What will change by 2030?
3. Digital tools for cutting emissions in the supply chain
4. What green corridors are going to look like in the future?

Structure:

- Intro → 2–3 main points → examples → conclusion

Task 4. Group Problem-Solving

Scenario:

Your logistics company has been criticized for pollution and noise in city areas. You must create a **3-step sustainability plan** for the next year.

Goals:

- What will you invest in first?
- Are you going to test new fuels or electrify your fleet?
- Will you build a UCC or microhub?
- What kind of policy changes are you expecting?

Task 5. Debate

Statement: *Green logistics will never be truly affordable for small businesses.*

Instructions: Divide into "for" and "against" groups. Argue using:

- Government support
- Future technologies
- Scalable solutions (microhubs, cargo bikes)
- The cost of environmental inaction

UNIT 6: INNOVATIONS AND DIGITALIZATION IN LOGISTICS AND TRANSPORT

TEXT 1: THE ROLE OF INNOVATION AND DIGITAL TRANSFORMATION IN MODERN LOGISTICS

The logistics industry is undergoing a profound transformation driven by digital technologies and innovation. What was once a sector dependent on paperwork, manual labor, and fragmented systems is now becoming highly automated, intelligent, and interconnected. Digital transformation in logistics is not merely about using computers or automating processes – it involves a strategic shift in how data is collected, analyzed, and used to improve performance, responsiveness, and sustainability.

At the heart of this transformation is the integration of **digital tools and platforms** across the supply chain. From route planning to inventory tracking, and from customs clearance to last-mile delivery, virtually every function in logistics is being reshaped by technology. Cloud computing enables real-time access to transport management systems (TMS), warehouse management systems (WMS), and customer service platforms. These systems allow stakeholders to monitor operations, communicate, and collaborate in real time across different geographies.

One of the most visible innovations in logistics is the use of **automation and robotics**. In modern warehouses, automated guided vehicles (AGVs), robotic arms, and sorting machines are replacing repetitive manual tasks. These technologies reduce human error, improve productivity, and allow 24/7 operations. Automation also supports safer working environments by reducing heavy lifting, minimizing accidents, and maintaining hygiene standards – especially important in food and pharmaceutical logistics.

Another major trend is the use of **Artificial Intelligence (AI)** and **Machine Learning (ML)**. These technologies enable predictive analytics, demand forecasting, and decision support systems. For instance, AI-powered route optimization tools consider weather, traffic, delivery urgency, and fuel costs to determine the most efficient paths. Machine learning algorithms analyze historical shipping data to predict delays, recommend inventory levels, and optimize fleet utilization.

Internet of Things (IoT) is another driving force of innovation. IoT devices – including GPS trackers, temperature sensors, and RFID tags – are embedded into vehicles, containers, and products. These devices transmit real-time data about location, temperature, shock, and humidity, which is crucial for managing sensitive goods such as food, chemicals, or electronics. IoT allows for greater visibility, control, and traceability across the entire supply chain.

Blockchain is being tested in logistics to ensure transparency, trust, and data security. By recording every step of the supply chain in an immutable digital ledger, blockchain can verify the authenticity of goods, reduce fraud, and streamline administrative processes. Smart contracts – blockchain-based agreements triggered automatically – can authorize payments or shipments based on predefined conditions, eliminating the need for manual approvals.

Digital twins – virtual replicas of physical systems – allow companies to simulate logistics operations, warehouse layouts, or delivery flows. These simulations help decision-makers visualize the impact of changes, test innovations, and improve planning accuracy. For example, a digital twin of a warehouse can be used to evaluate how robotics will impact throughput or energy consumption before investing in real equipment.

In transportation, **autonomous vehicles and drones** are being piloted in many regions. Self-driving trucks can reduce driver shortages, while drones provide fast delivery in congested urban areas or remote locations. Although regulatory and safety concerns remain, many believe these technologies will play a vital role in the future of logistics.

Digitalization also changes the way companies manage relationships with customers. **Real-time shipment tracking**, automated notifications, digital customer portals, and AI-driven chatbots improve transparency and user experience. Clients can monitor orders, get updates, change preferences, and resolve issues online, without speaking to a human agent.

Despite its advantages, digital transformation in logistics comes with challenges. These include high implementation costs, cyber threats, data privacy concerns, and a shortage of skilled workers able to operate advanced systems. Small and medium-sized enterprises (SMEs) may struggle to adopt new tools due to limited budgets or technical knowledge. Moreover, digital fragmentation – the use of incompatible systems across partners – can hinder collaboration and reduce overall efficiency.

In conclusion, innovation and digitalization are revolutionizing logistics by making it faster, smarter, more transparent, and more resilient. Companies that invest strategically in technology gain a competitive edge, reduce environmental impact, and respond more effectively to market disruptions. While the path to full digital maturity is complex, the future of logistics is undoubtedly digital – and those who embrace innovation will lead the transformation.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. How has the logistics industry changed as a result of digital transformation?
2. What is the strategic value of cloud-based TMS and WMS platforms?
3. How do automation and robotics improve logistics performance?
4. What are the applications of AI and machine learning in logistics?
5. Why is IoT critical for visibility in the supply chain?
6. In what ways does blockchain increase transparency and security?
7. How are digital twins used in warehouse or delivery optimization?
8. What benefits and limitations are associated with autonomous vehicles and drones?
9. How has digitalization transformed the customer experience in logistics?

10. What barriers prevent companies from fully adopting digital solutions.

2. True or False?

1. Manual labor is still dominant in most digital warehouses.
2. Cloud platforms enable real-time collaboration across regions.
3. Robotic arms and AGVs are examples of warehouse automation.
4. AI can only be used for customer service in logistics.
5. IoT helps monitor temperature and shock during transport.
6. Blockchain data can be altered after recording.
7. Digital twins allow physical testing of warehouse equipment.
8. Drones are widely used for long-haul cargo delivery.
9. Real-time tracking improves customer satisfaction.
10. SMEs face difficulties adopting digital systems.

III. Fill in the gaps using the words from the box below:

IoT, digital twin, cloud computing, AGVs, predictive analytics, blockchain, automation, chatbots, drones, route optimization

1. ______ enables systems like TMS and WMS to work in real time.
2. ______ are used in warehouses to transport pallets without human input.
3. ______ allows companies to simulate warehouse layouts before changes.
4. Smart sensors and trackers are part of ______ networks.
5. ______ helps forecast demand and reduce empty miles.
6. ______ is used to prevent fraud and track goods securely.
7. ______ reduces human error and increases warehouse speed.
8. Self-service tracking and ______ improve client communication.
9. ______ are tested in last-mile deliveries for speed and access.
10. AI-based ______ chooses faster and cheaper delivery paths.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Інновації у логістиці базуються на цифрових технологіях та автоматизації.
2. Хмарні платформи дозволяють керувати складом і транспортом в режимі реального часу.
3. Роботизовані комплекси підвищують продуктивність і знижують витрати.
4. Інтернет речей забезпечує контроль за температурою, вологою та переміщенням вантажів.
5. Блокчейн забезпечує прозорість, незмінність та безпечний обмін даними.
6. Цифровий двійник дає змогу протестувати зміни до їх впровадження.

B. Translate from English into Ukrainian:

1. AI improves delivery speed and inventory forecasting.
2. Digital platforms connect warehouses, carriers, and customers globally.
3. Automation minimizes human error and improves safety.
4. IoT devices send data about cargo conditions during transit.
5. Blockchain smart contracts approve transactions without human input.
6. Digital transformation requires investment, training, and system integration.

TEXT 2: ARTIFICIAL INTELLIGENCE, PREDICTIVE ANALYTICS, AND BIG DATA IN SMART LOGISTICS

As logistics systems become more complex and dynamic, the ability to make fast, informed, and data-driven decisions is essential. **Artificial Intelligence (AI)**, **predictive analytics**, and **big data** are revolutionizing the way logistics providers manage operations, forecast demand, reduce risks, and increase customer satisfaction. These technologies are no longer futuristic concepts – they are actively shaping modern supply chains in real time.

Big data in logistics refers to the massive volumes of structured and unstructured data generated throughout the supply chain. This includes vehicle GPS data, warehouse sensor logs, delivery records, driver behavior patterns, traffic conditions, customer feedback, weather forecasts, and supplier updates. By collecting and integrating this data, logistics companies gain a holistic view of operations and customer needs.

However, data is only useful if it can be interpreted and applied. That's where **AI** and **machine learning (ML)** come into play. AI algorithms process enormous data sets to recognize patterns, detect anomalies, and generate recommendations. In logistics, AI is used for **route optimization**, **inventory management**, **capacity planning**, and **exception handling**. For example, an AI system can suggest the best delivery schedule based on real-time traffic and weather, or adjust inventory levels based on purchase behavior.

Predictive analytics focuses on using past and current data to forecast future events. It helps companies anticipate demand peaks, identify maintenance needs, and plan for disruptions. In warehouse operations, predictive tools analyze product turnover rates to recommend ideal storage layouts. In fleet management, sensors collect data about vehicle health to predict potential breakdowns and schedule preventive maintenance – avoiding costly downtime.

One major application of AI is **dynamic routing**. Instead of relying on fixed schedules, AI-powered systems continuously recalculate delivery routes based on changing variables – road conditions, delivery windows, fuel prices, and driver availability. This leads to faster, more reliable deliveries and lower fuel consumption.

Chatbots and virtual assistants are another AI application in customer service. These tools handle inquiries, provide real-time updates, and resolve issues without the need for human agents. As AI learns from previous interactions, it becomes more accurate and capable of answering complex queries, improving user experience and reducing response time.

In procurement and supplier management, AI supports **risk assessment** by analyzing geopolitical trends, weather risks, and past supplier performance. This allows companies to diversify suppliers, build resilience, and react faster to disruptions such as strikes, natural disasters, or political instability.

Big data also enhances **demand forecasting**. AI models analyze sales history, seasonal trends, market data, and promotional campaigns to generate more accurate predictions. These forecasts help companies maintain optimal stock levels, avoid overstocking or shortages, and reduce waste – especially for perishable goods.

One of the most promising combinations is **AI + IoT**, where smart sensors continuously feed data into predictive models. For instance, temperature sensors in refrigerated trucks can detect deviations and notify managers before cargo is spoiled. AI then recommends adjustments in route, vehicle settings, or replacement decisions.

Despite its power, AI adoption requires careful implementation. Systems must be trained on clean, high-quality data, and staff must understand how to interpret AI-generated insights. Ethical concerns also arise around data privacy, algorithmic bias, and job displacement due to automation.

In conclusion, AI, big data, and predictive analytics are transforming logistics into an intelligent, adaptive, and responsive system. These technologies empower logistics providers to anticipate challenges, personalize services, optimize performance, and reduce waste. As data becomes the most valuable asset in the supply chain, companies that invest in analytics and AI will lead the next wave of digital logistics.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What types of data are included in logistics big data?
2. How does AI help convert raw data into actionable decisions?
3. What logistics processes benefit from predictive analytics?

4. What is dynamic routing, and how does it improve delivery efficiency?
5. How do chatbots improve customer service in logistics?
6. In what ways does AI support supplier risk assessment?
7. How does AI-powered demand forecasting help reduce waste?
8. What is the role of IoT in predictive logistics?
9. What are the challenges of implementing AI in logistics?
10. Why is data quality critical for AI system performance?

II. True or False?

1. Big data only includes structured, numerical information.
2. Predictive analytics can identify vehicle breakdowns before they happen.
3. AI is not yet used in customer service.
4. Dynamic routing improves speed, fuel use, and customer satisfaction.
5. AI cannot assist in supply chain risk management.
6. Forecasting based on AI is useful only for e-commerce.
7. Sensors in trucks can be linked to AI for real-time decision-making.
8. AI-generated insights are always accurate and objective.
9. Predictive tools reduce warehouse overstock and understock issues.
10. Clean, high-quality data is essential for effective AI use.

III. Fill in the gaps using the words from the box below:

chatbots, predictive analytics, IoT, dynamic routing, AI, supplier risk, big data, forecasting, anomaly detection, demand

1. ______ helps companies predict future trends based on historical patterns.
2. AI systems are trained to perform ______ and alert managers.
3. Customer queries are often handled by virtual assistants or ______.
4. ______ allows vehicle routes to be adjusted in real time.

5. Logistics companies use ______ to analyze customer behavior and market trends.
6. ______ sensors continuously collect data on location, temperature, and movement.
7. ______ systems process vast volumes of warehouse, vehicle, and client data.
8. AI tools improve ______ accuracy, helping reduce waste and stockouts.
9. ______ can be analyzed to diversify logistics partnerships.
10. Many delivery platforms use ______ to adapt to changing road conditions.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Великі дані включають інформацію з GPS, складів, відгуків клієнтів і погодних умов.
2. Штучний інтелект оптимізує маршрути з урахуванням трафіку, погоди та вартості пального.
3. Прогнозна аналітика допомагає уникати збоїв і планувати запаси.
4. Чат-боти надають миттєві відповіді клієнтам без участі людей.
5. Датчики температури в автоінформують систему про відхилення від норми.
6. Якість даних критично важлива для ефективної роботи AI.

B. Translate from English into Ukrainian:

1. Predictive analytics can forecast demand peaks and delivery delays.
2. AI analyzes driver behavior to improve performance and reduce risk.
3. Big data platforms combine structured and unstructured information.
4. IoT-powered trucks send real-time cargo updates to central servers.
5. Supplier risk tools assess geopolitical trends and historical reliability.
6. Digital logistics systems must be secure, ethical, and transparent.

TEXT 3: ROBOTICS, AUTONOMOUS VEHICLES, AND DRONES IN FUTURE LOGISTICS

The logistics industry is entering a new era of automation, driven by breakthroughs in **robotics**, **autonomous vehicles**, and **unmanned aerial systems (drones)**. These innovations are not just theoretical – they are already being implemented in warehouses, ports, and delivery networks around the world. As demand for faster, safer, and more efficient transport solutions grows, automation is becoming a cornerstone of digital logistics strategies.

In **warehousing**, robotics is transforming how goods are stored, picked, packed, and shipped. Automated guided vehicles (AGVs), robotic arms, conveyors, and shuttle systems are being deployed in modern distribution centers. These machines perform repetitive tasks with high speed and accuracy, reducing human error and labor costs. They also support scalability, as robots can be programmed to adjust to seasonal peaks or sudden changes in demand.

Collaborative robots, or cobots, are designed to work alongside human workers rather than replace them. They handle lifting, stacking, and precision tasks while humans perform supervision and exception handling. Cobots are increasingly used in e-commerce fulfillment centers where speed and customization are key. Unlike traditional robots, cobots are flexible, easier to program, and safer to operate in dynamic environments.

Autonomous vehicles (AVs) are also making their way into logistics. Self-driving trucks, vans, and delivery pods can transport goods without a human driver, reducing labor dependency and increasing fleet efficiency. Equipped with GPS, lidar, radar, and AI-based control systems, AVs can navigate roads, avoid obstacles, and follow optimal routes. In long-haul trucking, AVs may be used in platoons to save fuel and reduce emissions.

Several companies are piloting **autonomous last-mile delivery robots**, small wheeled units that operate on sidewalks and deliver parcels to homes. These robots are designed for short-range, urban environments and are equipped with cameras, sensors, and security features. Although limited in load capacity and speed, they offer a contactless, eco-friendly alternative to van deliveries.

Drones, or unmanned aerial vehicles (UAVs), have gained attention for their potential in fast, remote, and emergency deliveries. Drones are particularly useful in areas with poor road access, post-disaster zones, or in medical logistics. They can carry small, lightweight packages over short to medium distances and deliver them within minutes. Companies like Amazon, Zipline, and UPS are testing drone delivery in the U.S., Africa, and Asia.

Drones require regulatory approval and reliable infrastructure, such as charging stations, geofencing systems, and air traffic coordination. In most countries, drone operations must comply with aviation laws, flight altitude restrictions, and safety regulations. As technology advances and policies evolve, drone integration into urban logistics ecosystems is expected to grow.

Despite their benefits, robotics and autonomous systems face challenges. These include high investment costs, integration complexity, cybersecurity threats, and public acceptance. Ethical issues such as job displacement, algorithmic decision-making, and responsibility for accidents must also be addressed.

In the near future, logistics companies are expected to adopt a **hybrid model**, where automation complements human labor. Robots may handle physical work while humans focus on strategy, planning, and customer interaction. This model improves resilience, especially during labor shortages or health crises, such as pandemics.

In conclusion, robotics, autonomous vehicles, and drones are redefining the possibilities of modern logistics. They offer increased speed, reduced cost, enhanced safety, and environmental benefits. As these technologies become more mature and accessible, they will play a critical role in building agile, intelligent, and future-ready supply chains.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. How are robotics used in modern warehouses?
2. What are collaborative robots (cobots), and how do they differ from traditional robots?
3. What technologies enable autonomous vehicles to operate safely?
4. In what situations are autonomous last-mile delivery robots most effective?
5. What are the key advantages of drones in logistics?
6. What infrastructure is required to support drone delivery systems?
7. What are the major risks and concerns associated with robotics and AVs?
8. How does the hybrid model of automation benefit logistics companies?
9. Why are drones particularly useful in humanitarian and medical logistics?
10. What role will automation play in building future-ready supply chains?

II. True or False?

1. Robots are used only for heavy lifting in logistics.
2. Cobots are programmed to operate without human interaction.
3. Self-driving trucks use radar and lidar for navigation.
4. AVs cannot operate on highways or in platoons.
5. Sidewalk delivery robots are suitable for urban, short-range tasks.
6. Drones require no legal permission to operate in cities.
7. Robotics always replaces human workers in logistics centers.
8. Drone delivery is faster than conventional van delivery for small parcels.
9. Ethical concerns must be addressed when implementing automation.
10. A hybrid model of humans and machines is likely to dominate future logistics.

III. Fill in the gaps using the words from the box below:

cobots, lidar, drones, automation, hybrid model, AVs, fulfillment, parcels, geofencing, UAVs

1. ______ are used for picking and packing in e-commerce logistics.
2. ______ are designed to work safely alongside human staff.
3. Self-driving vehicles use ______ to detect objects and navigate roads.
4. ______ are tested for delivering small ______ in remote or urban areas.
5. Delivery robots are ideal for ______ delivery over short distances.
6. AV stands for ______ ______.
7. ______ allows drones to stay within authorized air zones.
8. A ______ ______ combines human labor and automated systems.
9. Fully autonomous trucks are still in the testing phase for long-haul ______.
10. ______ technology is transforming speed and safety in logistics.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Роботи на складах виконують сортування, упаковку та транспортування товарів.
2. Коботи працюють разом з людьми, підвищуючи ефективність процесів.
3. Автономні транспортні засоби оснащені GPS, радарами та AI.
4. Дрони використовуються для доставки в регіони з обмеженим доступом.
5. Гібридна модель поєднує автоматизацію з людським контролем.
6. Для безпечної роботи дронів потрібні зарядні станції та системи геозонування.

B. Translate from English into Ukrainian:

1. Autonomous delivery robots operate on sidewalks and carry small loads.
2. Cobots are more flexible and safer than traditional industrial robots.
3. Drones can support emergency medical deliveries in hard-to-reach areas.

4. A hybrid workforce improves logistics resilience during crises.
5. Geofencing keeps drones within legal flight zones.
6. The future of logistics will rely on intelligent machines and human insight.

TEXT 4: DIGITAL PLATFORMS, INTEGRATED SYSTEMS, AND VISIBILITY IN MODERN SUPPLY CHAINS

The evolution of digital platforms has fundamentally changed how logistics and transport operations are managed. In today's globalized, time-sensitive economy, the ability to access real-time data, collaborate across partners, and maintain end-to-end visibility is essential. This is where integrated logistics platforms – such as **Transport Management Systems (TMS)**, **Warehouse Management Systems (WMS)**, and **Supply Chain Visibility Platforms** – play a crucial role.

A **digital platform** in logistics is a centralized, cloud-based environment where data, tools, and users interact to manage transport, inventory, communication, and compliance processes. Unlike isolated software systems, modern platforms are designed to be **interoperable**, meaning they can connect with other platforms, devices, and applications used by different partners in the supply chain. This integration supports better decision-making, automation, and performance tracking.

One of the core systems in logistics is the **Transport Management System (TMS)**. A TMS allows logistics providers and shippers to plan, execute, and optimize the physical movement of goods. Key functions include route planning, freight rate calculation, carrier selection, load optimization, tracking, billing, and reporting. By automating these functions, a TMS reduces manual errors, improves speed, and enhances customer service.

Warehouse Management Systems (WMS) are digital platforms that control storage operations, stock movement, inventory levels, and warehouse layout. Advanced WMS tools use real-time data from scanners, RFID tags, and IoT sensors to monitor item locations, expiration dates, and storage conditions. WMS integration with TMS ensures that goods are dispatched correctly, according to stock levels and transportation schedules.

More recently, logistics firms are adopting **Supply Chain Visibility Platforms** that consolidate data from multiple systems – including TMS, WMS, GPS, EDI, IoT devices, and supplier portals – to create a single view of the entire logistics network. These platforms provide real-time information about shipment status, disruptions, estimated arrival times (ETA), customs clearance, and inventory in motion. They often include AI-powered dashboards that generate alerts and suggest corrective actions.

A well-integrated digital ecosystem enhances **transparency** and **collaboration**. Logistics partners – including carriers, customs brokers, freight forwarders, warehouse operators, and customers – can access shared information, update statuses, and make coordinated decisions. This reduces delays, eliminates redundant communication, and increases trust throughout the supply chain.

The concept of **"control towers"** is another innovation in visibility. A logistics control tower is a central analytics hub that monitors the entire supply chain in real time. It collects and processes data from all nodes, identifies risks or delays, and provides operators with actionable insights. Control towers use predictive analytics and AI to model alternative scenarios, allowing faster and smarter responses to disruptions such as weather events, strikes, or supplier failures.

Digital platforms are also helping companies achieve **compliance and sustainability goals**. They support documentation, audit trails, emissions tracking, and KPI reporting. By digitizing paper-based processes, they reduce administrative burden and improve accuracy. In customs procedures, for example, platforms enable **single-window clearance**, where traders submit all documents electronically to one portal, speeding up international shipments.

However, digital integration is not without its challenges. Many companies operate legacy systems that are not compatible with modern platforms. Data security, user training, and cross-system coordination require strategic planning and investment. Smaller firms may lack the resources to implement or maintain complex integrations, creating digital gaps in the supply chain.

In conclusion, digital platforms and integrated systems are transforming logistics from a series of isolated steps into a connected, intelligent, and data-driven ecosystem. With the right tools in place, companies can improve visibility, reduce waste, enhance collaboration, and respond to customer and market demands with greater agility and precision.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What are digital logistics platforms, and how do they differ from traditional software systems?
2. What are the core functions of a Transport Management System (TMS)?
3. How does a Warehouse Management System (WMS) improve warehouse operations?
4. What types of data are integrated into Supply Chain Visibility Platforms?
5. How do these platforms enhance transparency and collaboration?
6. What is a logistics control tower, and what role does it play?
7. How do digital platforms help achieve sustainability and compliance goals?
8. What is single-window clearance in the context of customs procedures?
9. What are the main barriers to integrating modern digital platforms?
10. How does visibility improve decision-making in logistics?

II. True or False?

1. A TMS is used for storage and stock monitoring.
2. WMS systems rely on real-time data from scanners and sensors.
3. Supply Chain Visibility Platforms combine data from multiple digital systems.
4. Visibility tools delay decision-making due to data overload.

5. Control towers provide predictive analytics and response modeling.
6. Paper-based customs procedures are faster than digital platforms.
7. Smaller firms always benefit equally from digital integration.
8. A digital ecosystem can reduce duplication and miscommunication.
9. AI dashboards can suggest actions when disruptions occur.
10. Legacy systems can be a challenge in implementing integration.

III. Fill in the gaps using the words from the box below:

control tower, TMS, visibility, WMS, audit trail, interoperability, RFID, dashboards, customs, ecosystem

1. A ______ gives operators real-time oversight of the entire supply chain.
2. A ______ manages freight planning, execution, and reporting.
3. A ______ is used to monitor warehouse stock and item movement.
4. ______ is the ability to see the location and status of shipments.
5. ______ allows automatic identification and tracking of goods.
6. Platforms must support ______ to connect with other tools and partners.
7. AI-powered ______ help identify risks and optimize routes.
8. A digital ______ reduces silos and enhances collaboration.
9. Digital records create a full ______ for compliance checks.
10. Digital ______ clearance reduces delays in international trade.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Системи управління транспортом оптимізують маршрути, тарифи та відстеження вантажу.
2. Складські платформи використовують RFID і сканери для моніторингу запасів.

3. Видимість у ланцюгах постачання забезпечує прозорість і швидке реагування.
4. Контрольна вежа – це центр аналітики, який відстежує всі логістичні процеси.
5. Платформи підтримують екологічний облік і електронну документацію.
6. Найбільші труднощі викликає інтеграція з застарілими системами.

B. Translate from English into Ukrainian:

1. Supply chain platforms integrate data from warehouses, carriers, and customs.
2. A WMS helps avoid stockouts and ensures accurate dispatching.
3. Single-window customs portals simplify documentation and reduce delays.
4. Control towers use real-time alerts to manage disruptions.
5. A shared digital ecosystem improves visibility and trust.
6. Modern logistics platforms track carbon emissions and automate reporting.

TEXT 5: DIGITAL RISKS, CYBERSECURITY, AND INCLUSIVE INNOVATION IN LOGISTICS

As logistics becomes increasingly digitalized, new opportunities arise – but so do new risks. The integration of smart systems, cloud platforms, AI, and connected devices exposes supply chains to **cybersecurity threats**, **data breaches**, and **digital inequality**. Ensuring that innovation is not only effective but also secure, ethical, and accessible is now a key concern for logistics providers and policymakers alike.

One of the most pressing issues is **cybersecurity**. Digital logistics platforms store vast amounts of sensitive data – including customer records, shipping schedules, payment details, inventory levels, and supplier contracts. These platforms are often targeted by cybercriminals aiming to steal data, demand ransom, or disrupt operations. Ransomware attacks on logistics firms have caused shipment delays, port shutdowns, and revenue losses.

Cyberattacks can also damage reputation and violate compliance regulations such as the **EU's General Data Protection Regulation (GDPR)**. As a result, logistics companies must invest in firewalls, intrusion detection systems, endpoint protection, and regular security audits. Employee training is also vital, as phishing attacks often succeed due to human error.

Another major concern is **data privacy**. Logistics systems collect location data, vehicle usage logs, communication records, and customer preferences. If not properly managed, this data can be misused or leaked. Companies must develop clear data policies, restrict access based on user roles, and ensure transparency with customers regarding how their information is used.

In addition to external threats, digital transformation presents **internal ethical challenges**. Automated decision-making systems may lack fairness, transparency, or human oversight. For example, AI used in route selection or driver assignment may unintentionally discriminate based on geography, load type, or delivery priority. Bias in algorithms can lead to unequal treatment of partners or customers unless carefully audited and adjusted.

Another growing issue is **digital inequality** – the gap between large firms with access to advanced technology and small or rural operators who lack the resources or skills to implement digital tools. This divide can cause inefficiencies, dependency, or exclusion from global supply chains. It also threatens sustainability and resilience, as weaker nodes in the network create vulnerabilities for the entire system.

To address this, governments and trade organizations are promoting **inclusive innovation**. This involves funding for digital infrastructure in underserved regions, training programs for SMEs, and open-source platforms that reduce implementation costs. Public-private partnerships can also help create common data standards, cybersecurity frameworks, and ethical AI guidelines.

Resilience is another critical theme. The COVID-19 pandemic and geopolitical conflicts have shown that digital supply chains must be designed to **recover quickly**

from shocks. Backup systems, cloud redundancy, remote access solutions, and multi-layered security architectures are essential for minimizing disruption during crises.

In response to these risks, many logistics providers are adopting **Zero Trust Architecture (ZTA)**, a cybersecurity model where no system or user is automatically trusted. Every device, transaction, or connection is verified continuously. In addition, cybersecurity is now a core KPI in logistics – companies must not only track fuel use or delivery speed but also **cyber readiness** and **compliance scores**.

In conclusion, digital innovation in logistics is powerful – but it must be protected, audited, and made inclusive. Cybersecurity, ethical design, and equal access are no longer optional. As logistics systems become more intelligent, their vulnerability also grows. The most future-proof companies will be those that invest not only in technology, but in **responsible, secure, and inclusive digital transformation**.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What types of cybersecurity threats affect logistics platforms?
2. How can a ransomware attack impact logistics operations?
3. Why is data privacy critical in digital logistics?
4. What measures can companies take to protect sensitive data?
5. What are the ethical concerns associated with automated decision-making in logistics?
6. How does algorithmic bias affect fairness in logistics operations?
7. What is digital inequality, and how does it impact small logistics operators?
8. What strategies support inclusive innovation in logistics?
9. How does Zero Trust Architecture work in securing digital logistics systems?
10. Why should resilience and cyber readiness be considered core KPIs?

II. True or False?

1. Cyberattacks on logistics companies are rare and cause minimal harm.
2. GDPR is a regulation that affects how logistics firms handle personal data.
3. Phishing attacks are often successful due to human mistakes.
4. AI systems never produce biased or unfair results.
5. Small firms may be excluded from global supply chains due to digital inequality.
6. Open-source platforms can reduce the cost of digital transformation.
7. Zero Trust means that every system component is automatically verified.
8. Cybersecurity should be measured alongside speed and fuel use.
9. Resilience is unrelated to digital logistics.
10. Ethical, secure, and inclusive innovation is key to future-ready logistics.

III. Fill in the gaps using the words from the box below:

cybersecurity, phishing, GDPR, digital inequality, resilience, ZTA, algorithmic bias, open-source, endpoint protection, audit

1. Logistics firms must invest in firewalls and ______ to protect user devices.
2. A ______ attack tricks users into sharing sensitive data via email.
3. ______ requires companies to protect personal data in the EU.
4. ______ causes gaps between firms with and without digital access.
5. ______ allows systems to bounce back quickly after cyber disruptions.
6. ______ ensures that no user or device is automatically trusted.
7. Ethical AI systems must be checked for ______ to ensure fairness.
8. ______ software makes technology more accessible to small firms.
9. Security ______ help detect vulnerabilities and prevent breaches.
10. Strong ______ protocols are essential for digital supply chain safety.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Кібербезпека є пріоритетом для цифрових логістичних платформ.
2. Атаки типу ransomware можуть зупинити роботу портів і затримати постачання.
3. Алгоритмічна упередженість може вплинути на рівність у розподілі маршрутів.
4. Малим компаніям важко інтегрувати складні цифрові системи через брак ресурсів.
5. Архітектура Zero Trust перевіряє кожну дію в системі.
6. Інклюзивні інновації спрямовані на зменшення цифрової нерівності.

B. Translate from English into Ukrainian:

1. Digital platforms must comply with international data protection laws.
2. Cybersecurity audits reduce the risk of system breaches.
3. SMEs may struggle to adopt advanced logistics tools without support.
4. Bias in AI can lead to unfair service or partner prioritization.
5. Public-private partnerships promote inclusive innovation in logistics.
6. Cyber readiness is now considered a core performance indicator.

LEXICAL EXERCISES

Exercise 1. Match the term with its definition:

TERM	DEFINITION
1. Automation	A. A virtual replica used to simulate operations
2. Digital twin	B. Use of machines to perform tasks without human input
3. AI	C. System that plans and optimizes transportation
4. Blockchain	D. Preventing hacking and protecting data

5. Visibility	E. Central hub that monitors the entire logistics flow
6. Predictive analytics	F. Technology that mimics human decision-making
7. TMS	G. Analytical tools to forecast future trends
8. Control tower	H. Real-time monitoring of goods and activities
9. Open-source platform	I. Decentralized ledger for secure transactions
10. Cybersecurity	J. A digital system with freely accessible source code

Exercise 2. Complete the sentences using the correct form of the word:

AI, visibility, TMS, blockchain, WMS, phishing, resilience, IoT, endpoint protection, control tower

1. The ______ helps track shipments across the entire supply chain.
2. ______ devices collect real-time data from containers.
3. A ______ system calculates routes and selects carriers.
4. ______ allows us to monitor stock levels and expiration dates.
5. ______ improves delivery speed by optimizing decisions.
6. Strong ______ prevents device-level cyberattacks.
7. A logistics ______ identifies disruptions and suggests alternatives.
8. ______ attacks trick employees into sharing login details.
9. ______ helps predict disruptions and re-route cargo.
10. A secure system ensures operational ______ during crises.

Exercise 3. Translate the sentences into Ukrainian:

1. Our warehouse is controlled by an automated WMS.
2. Predictive analytics allows us to reduce inventory waste.
3. AI-powered chatbots manage thousands of client queries daily.

4. A digital twin simulates forklift movement inside the facility.
5. Blockchain records every transaction securely and immutably.
6. The control tower uses real-time alerts to prevent bottlenecks.
7. Our TMS connects with customs and carriers automatically.
8. Endpoint protection software was updated this morning.
9. The visibility platform shows where each pallet is located.
10. ZTA verifies each user and device on the logistics network.

Exercise 4. Translate the sentences into English:

1. Вся інформація зберігається на хмарній платформі.
2. Смарт-контракти автоматично підтверджують оплату після доставки.
3. Кібербезпека стала ключовим пріоритетом для компанії.
4. Відкриті платформи знижують витрати на цифрову інтеграцію.
5. Алгоритмічна упередженість може призвести до нерівного розподілу маршрутів.
6. Архітектура нульової довіри забезпечує повну перевірку доступу.
7. Інтернет речей з’єднує транспорт, склади та вантажі.
8. Аналітична вежа координує всі логістичні процеси в реальному часі.
9. Платформа видимості допомагає уникнути затримок.
10. Прогнозна аналітика стала основним інструментом у цифровій логістиці.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Translation
Algorithmic bias	алгоритмічна упередженість
Artificial Intelligence (AI)	штучний інтелект
Automation	автоматизація
Blockchain	блокчейн
Cloud-based platform	хмарна платформа

Control tower	аналітична вежа управління
Cybersecurity	кібербезпека
Digital ecosystem	цифрова екосистема
Digital twin	цифровий двійник
Endpoint protection	захист кінцевих пристроїв
Internet of Things (IoT)	інтернет речей
Open-source platform	платформа з відкритим кодом
Phishing	фішинг (вид шахрайства)
Predictive analytics	прогнозна аналітика
Resilience	стійкість до збоїв
Smart contract	смарт-контракт
Transport Management System (TMS)	система управління транспортом
Visibility	прозорість (відстеження в реальному часі)
Warehouse Management System (WMS)	система управління складом
Zero Trust Architecture (ZTA)	архітектура нульової довіри

GRAMMAR FOCUS: PASSIVE VOICE IN DIGITAL AND AUTOMATED LOGISTICS

I. Passive Voice

Загальна формула: be (in correct tense) + **past participle (V3)**

II. Present Simple Passive

Формула: am / is / are + V3

Приклади:

- Data **is collected** by the system.

- Goods **are tracked** via RFID.

III. Past Simple Passive

Формула: was / were + V3

Приклади:

- The shipment **was delayed** due to a system failure.
- The drone **was launched** from the main hub.

IV. Future Simple Passive

Формула: will be + V3

Приклади:

- A new WMS **will be implemented** next year.
- All packages **will be scanned** automatically.

V. Modals + Passive

Формула: modal + be + V3

Приклади:

- Data **must be protected** under GDPR.
- Deliveries **can be automated** using drones.

GRAMMAR EXERCISES

Exercise 1. Choose the correct passive form:

1. All delivery details (are stored / is stored / are storing) in the cloud system.
2. The platform (was launched / were launched / is launching) in 2023.
3. Inventory levels (will be monitored / will monitor / is monitored) automatically.
4. Transport documents (must be submitted / must submit / must be submitting) before dispatch.

5. A new security protocol (is being tested / is testing / was testing) by the IT department.
6. Temperature sensors (are installed / is installed / were installing) in all containers.
7. This shipment (was delayed / were delayed / is delaying) due to customs inspection.
8. All parcels (should be labeled / should label / should labeling) with QR codes.
9. The entire route (will be tracked / is tracked / is being track) by satellite.
10. Data privacy (has be ensured / has been ensured / has ensured) by default.

Exercise 2. Rewrite the sentences in Passive Voice:

1. The system analyzes large volumes of logistics data.
2. The developer fixed the bug yesterday.
3. Engineers will install new servers next week.
4. Customs officers checked the cargo thoroughly.
5. The manager updates the dashboard every hour.
6. The warehouse team prepared all the packages.
7. A technician is testing the drone at the moment.
8. They will upload the invoices tomorrow.
9. The robot handles sorting and packing.
10. Authorities can track the vehicle using GPS.

Exercise 3. Translate the sentences into English using Passive Voice only:

1. Всі файли були завантажені в систему автоматично.
2. Товари зберігаються на складі з температурним контролем.
3. Новий інтерфейс буде впроваджено в серпні.
4. Вантаж повинен бути перевірений перед митним оформленням.
5. Сповіщення були надіслані клієнтам вранці.
6. Система оновлюється кожні 30 хвилин.

7. Заявки будуть оброблені протягом доби.
8. Всі зміни були схвалені керівництвом.
9. Ці дані не можуть бути змінені вручну.
10. Доступ до системи був заблокований.

Exercise 4. Translate the sentences into Ukrainian using Passive Voice only:

1. The delivery confirmation was sent automatically.
2. All operations are monitored from the control center.
3. The logistics report is generated once per day.
4. A new RFID system will be installed in Q4.
5. This terminal was secured by the IT department.
6. The parcels must be weighed and sealed.
7. Customs clearance is handled digitally.
8. The backup files were deleted during system maintenance.
9. A message was displayed on all user screens.
10. The error log will be reviewed later today.

SPEAKING TASKS

Task 1. Personal Experience & Reflection

Topic: *Have you ever used or observed digital innovations in logistics?*

Prompts:

- Have you seen automation in warehouses or online delivery systems?
- Would you trust a drone to deliver your parcel?
- What AI tools have you encountered in customer service?

Task 2. Pair Interview

Scenario:

You are discussing a new digital solution for your logistics company. One student plays a logistics manager, the other – a consultant.

Discussion points:

- Should we implement AI-based routing or stick to manual planning?
- Are we going to invest in a TMS or upgrade our current WMS?
- How will data security be handled?
- What training will employees need?

Task 3. Mini-Presentation (3-4 minutes)

Choose one topic:

1. The future of drones and autonomous vehicles in logistics
2. How AI is transforming supply chain management
3. Benefits and risks of full automation in logistics
4. The role of cybersecurity in digital freight platforms

Structure:

- Introduction
- 2-3 key ideas with examples
- Short conclusion

Use Passive Voice where appropriate.

Task 4. Group Discussion "Risk Management Workshop"

Scenario:

You are a team of logistics executives at a workshop on digital transformation. Your goal is to develop a **"Cyber & AI Risk Checklist"** for your company.

Discuss and agree on 5 things:

- What must be protected?
- What can go wrong with automation?
- How can ZTA or employee training help?

- What KPIs should we track?
- Should we adopt open-source platforms?

Task 5. Debate

Statement: *AI and automation will eliminate most logistics jobs within 20 years.*

Instructions:

Split into two teams:

- **For the statement:** present arguments about efficiency, automation trends, cost reduction
- **Against the statement:** focus on the need for human supervision, ethical AI, hybrid models, training

UNIT 7: INCOTERMS AND FREIGHT CHARGES

TEXT 1: INTRODUCTION TO INCOTERMS 2020 IN GLOBAL LOGISTICS

In international trade, clearly defined responsibilities between the buyer and the seller are essential to ensure the smooth transportation of goods across borders. To achieve this, the **International Chamber of Commerce (ICC)** created the **Incoterms rules** – a standardized set of trade terms that outline each party's duties, costs, and risks during the shipment process. The most recent version, **Incoterms 2020**, came into effect on January 1st, 2020.

Incoterms stand for **International Commercial Terms**, and they are used globally in sales contracts, invoices, transport documents, and customs declarations. They define key aspects such as:

- **Who arranges and pays for transportation**
- **Where the transfer of risk occurs**
- **Who handles insurance and export/import clearance**

There are **11 Incoterms** in the 2020 version, divided into two main categories:

1. **Rules for any mode of transport (7 terms):**
    - EXW (Ex Works)
    - FCA (Free Carrier)
    - CPT (Carriage Paid To)
    - CIP (Carriage and Insurance Paid To)
    - DAP (Delivered at Place)
    - DPU (Delivered at Place Unloaded)
    - DDP (Delivered Duty Paid)
2. **Rules for sea and inland waterway transport (4 terms):**
    - FAS (Free Alongside Ship)
    - FOB (Free on Board)
    - CFR (Cost and Freight)
    - CIF (Cost, Insurance and Freight)

Each rule specifies the **point at which the seller's responsibility ends and the buyer's responsibility begins**. For example, under **EXW**, the seller makes the goods available at their premises, and the buyer takes full responsibility for loading, shipping, and clearing the goods. Under **DDP**, the seller bears almost all responsibilities, including import duties.

Incoterms also clarify **who pays for what** – including main carriage, terminal handling charges, insurance, and customs duties. This helps prevent disputes, reduce misunderstandings, and streamline negotiation. However, **Incoterms do not cover** the actual transfer of ownership, method of payment, or breach of contract – those are handled by separate legal agreements.

The **2020 revision** introduced several updates, including:

- The replacement of **DAT (Delivered at Terminal)** with **DPU (Delivered at Place Unloaded)** to broaden delivery options
- Enhanced obligations regarding **insurance under CIF and CIP**, with higher minimum coverage recommended for CIP
- Flexibility in using **seller's or buyer's own transport**, especially under FCA and DAP
- Guidance notes and diagrams to help parties understand each term more easily

Understanding Incoterms is essential for logistics managers, freight forwarders, importers, exporters, and legal advisors. Using the wrong term can lead to unexpected costs, liability, or delays. For instance, choosing FOB without understanding port risks or containerization requirements may result in insurance gaps or shipment damage.

To apply Incoterms correctly, parties should always:

1. Use the full term (e.g., CIF Shanghai Incoterms 2020)
2. Specify the **named place or port** of delivery
3. Align Incoterms with contracts, documents, and payment terms

In practice, Incoterms are not only used between seller and buyer but are also referred to by carriers, customs agents, and insurance providers. They support

harmonization in international logistics by providing common definitions and expectations.

In conclusion, **Incoterms 2020** are a vital tool in global logistics, enabling clear communication, legal clarity, and operational efficiency in cross-border trade. Mastery of these terms reduces risk, builds trust between parties, and ensures the successful delivery of goods in international supply chains.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What are Incoterms, and why are they important in international trade?
2. What organization publishes and updates the Incoterms?
3. What does each Incoterm rule define in a contract?
4. How are Incoterms 2020 divided by mode of transport?
5. What is the main difference between EXW and DDP in terms of responsibility?
6. What types of costs and duties are clarified by Incoterms?
7. What changes were introduced in the 2020 revision?
8. Why is the proper use of Incoterms critical for logistics professionals?
9. What are some common mistakes when applying Incoterms?
10. How should Incoterms be properly written and applied in contracts?

II. True or False?

1. Incoterms define who owns the goods during shipping.
2. DDP means the seller is responsible for delivery, duties, and taxes.
3. FOB is used for any mode of transport, including air.
4. Incoterms are mandatory under international law.
5. CIP requires the seller to provide higher insurance coverage than CIF.
6. The term DAT no longer exists in Incoterms 2020.
7. Incoterms include payment terms and ownership transfer.

8. Using vague Incoterms can lead to cost and liability disputes.
9. DPU includes unloading of the goods at destination.
10. All Incoterms must include a named place or port.

III. Fill in the gaps using the words from the box below:

delivery, ICC, DDP, seller, insurance, EXW, contracts, revisions, liability, FOB

1. The ______ bears all responsibility in a DDP shipment.
2. Under ______, the buyer arranges and pays for transportation from the seller's site.
3. Incoterms are issued and maintained by the ______.
4. The latest ______ to Incoterms came into force in 2020.
5. CIF and CIP require the seller to provide ______ coverage.
6. In ______ shipments, goods are delivered on board a vessel.
7. Misunderstanding Incoterms can result in unexpected costs and ______.
8. Incoterms help align ______ with logistics procedures.
9. Every Incoterm must include a clearly defined point of ______.
10. The ______ must arrange export clearance under most Incoterms.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Інкотермс – це міжнародні комерційні терміни, що регулюють відповідальність сторін.
2. Правила 2020 року поділяються на умови для будь-якого транспорту та тільки для морського.
3. DDP означає, що продавець несе всі витрати, включаючи мито.
4. CIF включає оплату фрахту і страхування до порту призначення.

5. Неправильне використання Інкотермс може призвести до фінансових суперечок.
6. Усі терміни повинні супроводжуватись точною назвою місця або порту.

B. Translate from English into Ukrainian:

1. Incoterms are used to assign transport duties, risks, and costs.
2. The term DAT was replaced by DPU in Incoterms 2020.
3. Under EXW, the buyer is responsible for loading and clearance.
4. A TMS system should reflect the Incoterms selected in the contract.
5. Insurance obligations differ under CIP and CIF.
6. Clear use of Incoterms builds trust and reduces risks.

TEXT 2: KEY INCOTERMS EXPLAINED – EXW, FOB, CIF, AND DDP IN PRACTICE

While Incoterms provide a wide range of options for organizing global shipments, a few of them are used far more frequently than others. Among the most widely applied are **EXW (Ex Works)**, **FOB (Free on Board)**, **CIF (Cost, Insurance and Freight)**, and **DDP (Delivered Duty Paid)**. Each of these Incoterms represents a different level of responsibility and cost for the seller and the buyer.

EXW (Ex Works)

EXW is often used when the seller wants **minimum responsibility**. Under EXW, the seller simply makes the goods available at their premises (factory, warehouse, etc.), and the buyer handles **all transportation, export clearance, insurance, and import formalities**.

Example: A Ukrainian manufacturer sells equipment to a buyer in Poland under EXW Kyiv. The Polish buyer must arrange for collection, customs export clearance in Ukraine, international freight, and all charges and paperwork in Poland.

Key point: Risk transfers to the buyer at the seller's gate – even before the goods are loaded onto the truck.

FOB (Free on Board)

FOB is one of the most traditional Incoterms, **used exclusively for sea or inland waterway transport**. Under FOB, the seller is responsible for transporting the goods to the port, clearing them for export, and loading them onto the vessel. Risk passes to the buyer **once the goods are on board**.

Example: A company in China sells goods to a buyer in Germany under FOB Shanghai. The Chinese seller delivers the goods onto the vessel at the port of Shanghai. The German buyer pays for the sea freight, insurance, and import procedures in Hamburg.

Key point: FOB should not be used for containerized goods (FCA is preferable), as responsibility transfers at the ship's rail – not inside terminals.

CIF (Cost, Insurance and Freight)

CIF includes a higher level of seller responsibility than FOB. The seller must **arrange and pay for carriage and minimum insurance** to the named port of destination. However, the **risk transfers to the buyer once the goods are on board** the vessel in the country of export.

Example: An Indian exporter sells tea to a buyer in the UK under CIF London. The exporter arranges sea freight and minimum insurance coverage up to the port of London. If the goods are damaged during the voyage, the buyer must deal with the insurer – not the seller.

Key point: Although the seller pays for the insurance, the buyer bears the risk during the voyage.

DDP (Delivered Duty Paid)

DDP represents the **maximum level of responsibility for the seller**. The seller must handle everything: export clearance, international transport, import clearance, taxes, duties, and delivery to the buyer's location. The buyer's role is minimal – to receive the goods.

Example: A U.S. company sells electronics to a distributor in France under DDP Paris. The American seller clears the goods for export, ships them to France, handles French import duties and VAT, and delivers the goods to the Paris office.

Key point: DDP is convenient for the buyer but can be risky for the seller, especially if they are unfamiliar with the import regulations of the destination country.

Comparative Summary

Term	Seller pays for	Risk transfers at	Seller clears export?	Seller clears import?
EXW	Nothing beyond own premises	At seller's site	No	No
FOB	Inland delivery + loading	On board ship	Yes	No
CIF	Transport + insurance	On board ship	Yes	No
DDP	Everything	Buyer's location	Yes	Yes

In practice, the choice of Incoterm affects not only cost-sharing but also **logistics efficiency, insurance coverage, customs timing, and liability exposure**. For example, using EXW with an inexperienced foreign buyer may cause delays in export clearance. Conversely, DDP might overwhelm a seller unfamiliar with the buyer's country regulations.

In conclusion, choosing the right Incoterm is not only a legal issue – it is also a matter of operational practicality. Logistics professionals must evaluate each party's capacity, knowledge, and preferences before finalizing the contract.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What does the seller provide under EXW, and what is the buyer responsible for?

2. Why is EXW considered the most buyer-responsible Incoterm?
3. What transport mode is FOB limited to, and why?
4. When does risk transfer from seller to buyer under FOB?
5. How does CIF differ from FOB in terms of seller obligations?
6. Who arranges insurance under CIF, and who bears the risk during transport?
7. What is included in the seller's responsibilities under DDP?
8. Why might DDP be risky for the seller?
9. What practical problems can occur if Incoterms are misunderstood?
10. Why is it important to choose Incoterms based on both legal and operational factors?

II. True or False?

1. Under EXW, the buyer is responsible for loading the goods.
2. FOB can be used for rail and air shipments.
3. CIF includes sea freight and insurance costs paid by the buyer.
4. Under CIF, the buyer takes on the risk during sea transport.
5. DDP includes customs duties and local delivery.
6. EXW is often a good option for inexperienced buyers.
7. Under FOB, risk passes to the buyer after goods are delivered to port.
8. DDP gives the seller full control over the import process.
9. CIF provides maximum protection for the seller.
10. Incoterms affect the financial and operational aspects of trade.

III. Fill in the gaps using the words from the box below:

CIF, loading, FOB, insurance, DDP, risk, EXW, buyer, seller, customs

1. Under ______, the seller arranges freight and ______ to the port of destination.
2. With ______, the buyer handles all export and import tasks.

3. ______ is used only for sea transport and includes ______ onto the vessel.
4. In ______, all charges and import ______ are covered by the seller.
5. Under CIF, the ______ pays for insurance, but the ______ carries the risk during shipping.
6. If using ______, risk transfers before the goods leave the seller's site.
7. ______ provides the most responsibility and control for the buyer.
8. ______ offers the most comprehensive responsibility for the seller.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Умови EXW передбачають, що продавець лише надає доступ до товару.
2. FOB застосовується лише для морських перевезень.
3. CIF включає вартість перевезення і страхування, але ризики переходять раніше.
4. DDP – це найзручніша умова для покупця, але ризикована для продавця.
5. У FOB ризик переходить, коли товар опиняється на борту судна.
6. Усі ці терміни передбачають різні точки передачі ризику та розподілу витрат.

B. Translate from English into Ukrainian:

1. EXW is not recommended for international buyers without local partners.
2. The seller pays for shipping and insurance under CIF but does not carry risk after loading.
3. DDP includes all duties, taxes, and transport to the buyer's door.
4. FOB allows the seller to control export and loading but not freight or arrival.
5. Incoterms like DDP or CIF must be clearly specified with the named place.
6. Improper use of Incoterms can lead to disputes, penalties, or delivery failures.

TEXT 3: UNDERSTANDING FREIGHT CHARGES AND COST COMPONENTS IN GLOBAL SHIPPING

When goods are transported internationally, freight charges can make up a significant portion of total trade costs. These charges are not always straightforward – they depend on the shipping mode, Incoterm applied, type of cargo, route, and service level. For logistics professionals, understanding how freight charges are calculated and what components they include is essential for cost management, negotiation, and profitability.

Basic Freight Types

There are two primary categories of freight charges in international logistics:

1. **Main freight** – the cost of transporting goods from the port or place of origin to the port or place of destination.
2. **Pre-carriage and on-carriage** – costs before and after the main transport leg (e.g., from factory to port, or from port to buyer's warehouse).

Freight charges vary by transport mode:

- **Sea freight** (usually charged per container or per weight/volume for LCL)
- **Air freight** (based on chargeable weight)
- **Road and rail freight** (typically based on distance, weight, fuel cost)

What's Included in Freight Charges?

Standard freight charges may include:

- **Basic freight rate** – the core cost of moving the cargo
- **Fuel surcharge (BAF)** – adjusts for changing oil prices
- **Security surcharge** – covers risk-related expenses
- **Terminal Handling Charges (THC)** – fees for loading/unloading at ports or terminals
- **Documentation fees** – charges for bills of lading, customs forms, etc.
- **Peak season surcharge (PSS)** – applies during high-demand shipping periods
- **Currency adjustment factor (CAF)** – adjusts for currency fluctuations

These fees can either be **inclusive** (built into a single price) or **itemized** on the invoice.

Freight Charge Terms: Freight Collect vs Freight Prepaid

Freight payment terms define **who pays** for the transportation costs.

- **Freight Collect**: The buyer pays the freight charges at the destination.
- **Freight Prepaid**: The seller pays in advance, typically at origin.

These terms should align with the Incoterm used. For example, in a **CIF** shipment, the freight is prepaid by the seller, while in **EXW**, the buyer usually pays all freight charges.

Hidden and Additional Costs

Aside from basic charges, there may be hidden or variable fees that affect the total cost:

- **Demurrage and detention charges** – apply when containers are held at port longer than allowed
- **Customs inspection fees** – charged when goods are selected for examination
- **Storage charges** – if goods are not collected on time
- **Port congestion surcharges** – if delays are caused by overcapacity
- **War risk surcharge** – for shipments through high-risk zones

Failure to anticipate these charges can severely impact profitability or cause conflicts between buyer and seller.

Freight Quotes and Negotiation

Freight forwarders typically issue **freight quotations** that list all applicable charges. These quotes are based on:

- Cargo details (type, weight, volume, packaging)
- Route and transport mode
- Incoterms used

- Service speed and equipment needed (reefer, flat rack, etc.)

When negotiating freight rates, buyers and sellers should ask:

- What is included in the base rate?
- Are surcharges fixed or floating?
- How long is the quote valid?
- Are demurrage terms clear?

Conclusion

Freight charges are complex and multi-layered. They involve more than just moving cargo – they reflect oil prices, global demand, political risk, and operational efficiency. Understanding and managing these costs is a core responsibility of any logistics or procurement team. Aligning freight terms with Incoterms, carefully reviewing quotes, and anticipating extra fees can protect margins and ensure smooth transport operations.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What are the main categories of freight charges in international shipping?
2. How do transport modes affect the calculation of freight rates?
3. What additional surcharges are commonly included in freight invoices?
4. What is the difference between Freight Collect and Freight Prepaid?
5. How should these payment terms align with Incoterms?
6. What hidden costs may arise during international shipment?
7. How can demurrage and detention charges be avoided?
8. What information is usually included in a freight quote?
9. Why is it important to ask about surcharge validity and duration?
10. How do freight charges impact overall profitability?

II. True or False?

1. Air freight is typically based on distance rather than weight.
2. Fuel surcharges are included in all Incoterm rules.
3. Terminal Handling Charges cover the cost of loading at ports.
4. Freight Collect means the seller pays the charges at the destination.
5. Demurrage charges occur when containers are held too long at terminals.
6. CIF shipments usually include prepaid freight by the seller.
7. Documentation fees include customs duties and VAT.
8. Storage fees may apply if goods are not picked up on time.
9. Port congestion surcharges are always included in freight quotes.
10. Reviewing freight quotes in detail helps avoid unexpected costs.

III. Fill in the gaps using the words from the box below:

demurrage, prepaid, freight quote, surcharges, CAF, THC, customs, congestion, prepaid, base rate

1. The ______ includes charges for terminal operations at origin and destination.
2. A ______ is an official estimate of transportation and service costs.
3. ______ fees may be charged if goods are selected for inspection.
4. ______ is a fee for late return or prolonged use of containers.
5. When freight is ______, the seller arranges and pays transportation in advance.
6. ______ apply during peak seasons or special risk zones.
7. The ______ is the initial cost of moving the cargo, without extras.
8. ______ may be added due to delays at overcrowded ports.
9. The ______ adjusts for currency exchange rate fluctuations.
10. Incoterms like CIF or DDP usually imply ______ freight charges.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Фрахтові витрати складаються з основного тарифу та додаткових зборів.
2. BAF і CAF залежать від цін на паливо та валютних коливань.
3. Фрахт Collect означає, що покупець платить по прибуттю.
4. Рахунок за зберігання виникає, якщо товар не забрано вчасно.
5. Демередж – це штраф за затримку контейнера на терміналі.
6. Потрібно перевіряти, чи включені надбавки в комерційну пропозицію.

B. Translate from English into Ukrainian:

1. Freight charges depend on weight, volume, mode of transport, and Incoterms.
2. Peak season surcharges may raise shipping costs significantly.
3. Fuel and currency surcharges are not always fixed.
4. A clear freight quote helps avoid misunderstandings and disputes.
5. Hidden fees like detention or inspection may harm profitability.
6. Sellers and buyers must align freight terms with contractual responsibilities.

TEXT 4: SHARING COSTS AND RISKS BETWEEN BUYER AND SELLER: LEGAL AND LOGISTICAL IMPLICATIONS OF INCOTERMS

In international trade, the movement of goods across borders is governed by a complex web of responsibilities, obligations, and risks. At the heart of this process lies the division of costs and liability between the contracting parties. The Incoterms 2020 rules published by the International Chamber of Commerce provide a globally recognized framework that defines which party – the buyer or the seller – is responsible for transportation, insurance, documentation, export/import clearance, and risk during transit.

The correct application of Incoterms enables both sides to understand their roles clearly, preventing conflicts and minimizing legal uncertainty. However, choosing the wrong term or failing to specify key details can result in unexpected expenses, delayed shipments, insurance issues, and even breach of contract claims.

Each Incoterm rule specifies a **“point of delivery”**, which marks the moment when the risk of damage or loss passes from seller to buyer. For instance, under **FOB**, risk transfers once the goods are placed on board the vessel, while under **DAP**, the seller retains risk until the goods arrive at the buyer’s named place. This legal point is not merely theoretical – it determines who files a claim in case of damage and who must pay insurance premiums.

Cost allocation is another critical aspect. Certain Incoterms like **EXW** place almost all costs on the buyer, including inland transport, customs clearance, and loading. Others, like **DDP**, shift the burden entirely to the seller, who must manage all expenses up to delivery, including foreign duties and taxes. In between, there are flexible options like **CPT** or **FCA**, which allow for shared responsibilities and third-party logistics coordination.

It is essential to understand that **risk does not always follow cost**. A seller under CIF may pay for freight and insurance, but the risk transfers at the port of shipment. If the cargo is damaged in transit, the buyer must deal with the insurer. Without adequate awareness of this separation, one party may wrongly assume it is protected – when in fact, it is not.

Insurance coverage, too, is influenced by Incoterms. Under **CIP**, the seller is required to provide a higher level of coverage (ICC A or equivalent), while **CIF** only requires minimum coverage (ICC C). If a buyer expects full reimbursement for potential losses, relying solely on Incoterms without verifying the insurance policy can lead to disappointment and financial exposure.

From a **logistics management perspective**, Incoterms directly affect shipping decisions, transport documentation, and inventory visibility. A buyer taking delivery under EXW must organize inland pick-up, which can be challenging if the seller is located in a foreign country with limited access or language barriers. Conversely, a seller agreeing to DDP may face delays at destination customs due to unfamiliar regulations or unexpected duties.

To avoid such problems, experts recommend that parties:

- Always include the **full term with named place**, e.g., “FOB Rotterdam Incoterms 2020”
- Align Incoterms with **real operational capabilities**, not just pricing preferences
- Clarify insurance obligations **in writing**, beyond Incoterms language
- Ensure that freight charges, transport instructions, and risk transfer points match across all documents: invoice, bill of lading, and letter of credit

In conclusion, Incoterms are more than abbreviations on a contract – they define the legal and financial backbone of a transaction. A carefully selected Incoterm ensures a fair division of duties and minimizes misunderstanding between the buyer and the seller. It is the responsibility of every logistics professional, exporter, and importer to apply these terms with precision, aligning them not only with legal standards but with real-world logistical execution.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What is the primary purpose of using Incoterms in international contracts?
2. How does the point of delivery relate to the transfer of risk?
3. Why is it important to distinguish between cost responsibility and risk?
4. Under which Incoterms does the seller carry full financial responsibility?
5. How can CIF create confusion about risk despite seller-paid freight and insurance?
6. What is the difference in insurance obligation between CIF and CIP?
7. How do Incoterms affect practical logistics decisions?
8. What problems can arise if Incoterms are not aligned with operational realities?

9. Why should Incoterms be specified fully, with location and year?
10. How can poorly chosen Incoterms affect documentation and customs?

II. True or False?

1. Incoterms determine who owns the goods at each stage.
2. Risk and cost always pass from seller to buyer at the same time.
3. DDP places all cost and risk on the seller.
4. EXW is logistically easy for foreign buyers.
5. Incoterms regulate insurance policies directly.
6. CIP requires broader insurance coverage than CIF.
7. Risk transfer is only theoretical and does not affect liability.
8. Bills of lading should match the Incoterms used in the contract.
9. A wrong Incoterm may cause customs delays or extra fees.
10. Incoterms eliminate the need for legal contracts.

III. Fill in the gaps using the words from the box below:

risk, delivery, CIF, visibility, inventory, EXW, *insurance, DDP, contract, seller*

1. The point of ______ defines when responsibility shifts from seller to buyer.
2. Under ______, the buyer handles all logistics from the seller's location.
3. ______ requires only minimum insurance coverage.
4. Under ______, the seller is liable for customs, duties, and last-mile delivery.
5. ______ does not always transfer with cost obligations.
6. If ______ terms are poorly defined, it may lead to confusion and penalties.
7. High-quality ______ coverage must be confirmed beyond Incoterms.
8. Logistics teams rely on Incoterms to manage timing and ______ planning.
9. Incoterms clarify the role of each ______ in export and import procedures.
10. Poor choice of terms affects documentation, customs, and shipment ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Інкотермс визначають, коли переходить ризик між сторонами.
2. Умови CIF і CIP різняться рівнем обов’язкового страхування.
3. Витрати і ризики не завжди переходять одночасно.
4. Вибір невідповідного Інкотермс може спричинити затримки і додаткові збори.
5. Умови повинні включати назву місця і рік редакції (наприклад, Incoterms 2020).
6. Угоди повинні узгоджуватись з фактичними логістичними можливостями.

B. Translate from English into Ukrainian:

1. Under EXW, the buyer is responsible for arranging transport and export clearance.
2. Risk passes on board the ship under FOB, but under DAP it passes upon arrival.
3. Sellers must be cautious using DDP in unfamiliar customs environments.
4. A mismatch between Incoterms and shipping documents can cause disputes.
5. CIP obliges the seller to purchase higher insurance, protecting the buyer better.
6. Freight, customs, and insurance terms must be aligned in all documentation.

TEXT 5: COMMON MISTAKES IN USING INCOTERMS AND THEIR LEGAL CONSEQUENCES IN LOGISTICS PRACTICE

Despite being widely used in global trade, Incoterms are often misunderstood or misapplied, leading to operational disruptions, legal disputes, and financial losses. While the International Chamber of Commerce provides clear guidance on the use of these terms, many companies fail to align their contracts, transport procedures, and documentation accordingly. As a result, even a well-negotiated deal can break down due to a single incorrectly chosen or poorly worded Incoterm.

One of the most frequent mistakes is selecting an **incompatible Incoterm for the transport mode**. For example, **FOB** is strictly intended for sea and inland waterway transport. However, it is often incorrectly applied to container shipments or multimodal transport, where **FCA** would be more appropriate. Using FOB in these cases can create confusion about the point of risk transfer and expose the seller or buyer to unforeseen liabilities.

Another common issue is **failing to specify the exact location** in the Incoterm. Writing "CIF Europe" or "FOB Port" is insufficient and ambiguous. Incoterms must be accompanied by a named port, city, or terminal – for instance, "CIF Hamburg Port" or "FCA Warsaw Terminal." Without this detail, parties may disagree about where delivery ends and risk transfers.

Incorrect alignment of Incoterms with payment or documentary requirements can also cause delays or legal trouble. In many cases, letters of credit require specific documents to be presented – such as a bill of lading showing "on board" status. If the seller chooses an Incoterm that doesn't guarantee this document (e.g., FCA), the buyer's bank may reject the documents, blocking payment and damaging trust between the parties.

In some contracts, companies **assume that Incoterms cover everything**, including insurance terms, transfer of ownership, or liability for delays. This is false. Incoterms only regulate the obligations related to delivery, transport, and risk transfer. Issues like payment method, retention of title, penalties, or legal jurisdiction must be addressed in the main sales contract – not through Incoterms alone.

Real-life legal disputes often stem from these assumptions. One notable case involved a European buyer purchasing machinery from Asia under EXW terms. The buyer assumed the seller would load the cargo onto the truck. However, under EXW, the seller has no such obligation. The truck driver refused to load it himself, and the delay caused the buyer to miss the shipping window. The buyer filed a complaint – but lost, because the seller had fulfilled all duties under EXW.

In another case, a U.S. seller agreed to **DDP terms in Brazil** without understanding local customs procedures. The shipment was held at customs for several weeks due to incorrect paperwork. The buyer refused to assist, and the seller incurred thousands in storage fees and fines. This could have been avoided by choosing a less demanding Incoterm or engaging a local import partner.

To prevent such issues, experts recommend the following best practices:

1. Always choose Incoterms based on **transport method and real capabilities**
2. Include the **full term with location and Incoterms version**
3. Align Incoterms with payment terms, documents, and insurance policies
4. Do not assume Incoterms cover **ownership transfer or penalties**
5. Train legal, logistics, and sales teams in practical Incoterm use

In conclusion, using Incoterms properly requires more than just knowing the acronyms. It requires strategic thinking, operational coordination, and legal literacy. When used correctly, Incoterms reduce risks and streamline communication. When misused, they can create unnecessary conflict, delay shipments, or trigger costly lawsuits.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. Why can the incorrect use of Incoterms lead to legal or financial consequences?
2. What is the main problem with using FOB for container or multimodal shipments?
3. Why is it important to specify the exact location in an Incoterm?
4. How can Incoterms create conflict with letter of credit requirements?
5. What do Incoterms not regulate that companies often mistakenly assume they do?

6. What happened in the EXW case involving a European buyer and Asian seller?
7. Why did the U.S. seller in Brazil lose money under DDP terms?
8. How can miscommunication about documentation lead to payment failure?
9. What other contract elements must be addressed separately from Incoterms?
10. What are five recommended best practices for avoiding mistakes with Incoterms?

II. True or False?

1. It is acceptable to use FOB for container shipments.
2. "FCA Terminal" is an example of a correctly used and specific Incoterm.
3. Incoterms define who owns the goods during transport.
4. Letters of credit may reject documents that don't match the agreed Incoterm.
5. DDP requires the seller to handle complex customs clearance.
6. Incoterms alone are enough to cover late delivery penalties.
7. Training staff on Incoterms reduces legal disputes.
8. The seller must load goods under EXW terms.
9. An incomplete Incoterm can create uncertainty in delivery point and risk.
10. Incorrect use of Incoterms may cause a shipment to be delayed or blocked.

III. Fill in the gaps using the words from the box below:

customs, ownership, FCA, lawsuit, responsibility, container, EXW, delays, DDP, documents

1. Using FOB for a ______ shipment may create risk confusion.
2. Under ______, the seller has no obligation to load the goods.
3. Incorrect ______ submission under DDP can result in storage fees.
4. Failure to provide the right ______ may block letter of credit payment.
5. Incoterms do not determine transfer of ______ or penalties.
6. The seller was not held ______ for loading the goods under EXW.

7. A buyer–seller conflict under DDP led to unexpected ______ at import.
8. A poorly chosen Incoterm may trigger a legal ______.
9. ______ is often used incorrectly when a bill of lading is required.
10. Legal clarity improves when each party understands their ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Використання FOB для контейнерних перевезень є типовою помилкою.
2. Інкотермс повинен завжди містити точне місце поставки.
3. Інкотермс не регулює передачу права власності чи оплату.
4. Невірний Інкотермс може порушити умови акредитива.
5. Продавець під умовами DDP має справу з імпортними митними органами.
6. У випадку з EXW покупець програв справу через невірні очікування.

B. Translate from English into Ukrainian:

1. FOB was misused in a multimodal shipment and led to confusion over liability.
2. Without specifying the port or terminal, Incoterms become legally vague.
3. DDP shipments may fail if the seller lacks knowledge of local procedures.
4. Risk and cost do not always pass at the same moment under Incoterms.
5. Contracts must cover payment terms, penalties, and legal jurisdiction separately.
6. Incoterms training helps prevent contract failure and delays in logistics.

LEXICAL EXERCISES

Exercise 1. Match the term to its definition:

TERM	DEFINITION
1. Freight charges	A. The moment when responsibility shifts from seller to buyer

2. DDP	B. Delivery condition where the seller handles duties and taxes
3. Demurrage	C. Paperwork used to release cargo and receive payment
4. Risk transfer	D. A bank-based payment method linked to shipping documents
5. Carrier	E. Transport condition that includes cost, insurance, and sea freight
6. Letter of credit	F. Freight paid by the seller before shipping begins
7. CIF	G. The base cost of moving cargo from one place to another
8. Customs clearance	H. Handling all official import/export procedures
9. Documentation	I. A transport company that moves goods
10. Prepaid freight	J. A delay penalty for holding a container too long

Exercise 2. Complete the sentences using the correct form of the word:

THC, Incoterm clause, demurrage, DDP, freight forwarder, contract, dispute, bill of lading, customs, CIF

1. The ______ shows that goods were placed on board the ship.
2. We chose ______ so the seller would cover duties and taxes.
3. A ______ helps organize multimodal transport and paperwork.
4. Under ______, the seller pays for freight and insurance.
5. Terminal delays caused unexpected ______ fees.
6. The parties added a clear ______ in the contract to define delivery terms.
7. A disagreement over delivery terms led to a legal ______.
8. ______ clearance must be completed before goods enter the market.
9. The ______ must specify responsibility for insurance and transit.
10. We incurred high ______ due to container hold time at the port.

Exercise 3. Translate the sentences into Ukrainian:

1. The seller paid all freight charges, including terminal handling.
2. We agreed on DDP terms to simplify import procedures.
3. Risk is transferred to the buyer at the moment of loading.
4. The freight forwarder arranged the entire shipment and documents.
5. They used a letter of credit for secure international payment.
6. We added a CIF clause to cover sea transport and insurance.
7. The dispute occurred because the Incoterm was incomplete.
8. Demurrage was charged for exceeding the free container period.
9. Customs clearance took longer than expected.
10. The bill of lading had to match the payment conditions exactly.

Exercise 4. Translate the sentences into English:

1. Усі витрати на фрахт були попередньо оплачені продавцем.
2. Ми обрали FCA, щоб покупець відповідав за транспорт.
3. Документація була неповною, тому банк відмовив у платежі.
4. Коносамент підтверджував відвантаження товару.
5. Умови контракту не узгоджувалися з Інкотермс.
6. Простій контейнера на терміналі спричинив додаткові витрати.
7. Спір виник через неправильне трактування терміну FOB.
8. Покриття страхування не відповідало реальній вартості товару.
9. Для розмитнення нам довелося найняти брокера.
10. Акредитив вимагав чітко вказаного порту доставки.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Translation**
Bill of lading	коносамент

Carrier	перевізник
CIF (Cost, Insurance, Freight)	вартість, страхування і фрахт
Contractual obligation	договірне зобов’язання
Customs clearance	митне оформлення
DDP (Delivered Duty Paid)	доставлено з оплатою мита
Delivery point	точка доставки
Demurrage	демередж (штраф за простій)
Dispute	спір
Documentation	документація
FCA (Free Carrier)	франко-перевізник
Freight charges	фрахтові витрати
Freight forwarder	експедитор
Incoterm clause	умова Інкотермс
Insurance coverage	страхове покриття
Letter of credit	акредитив
Prepaid freight	попередньо оплачений фрахт
Risk transfer	передача ризику
Storage charges	збори за зберігання
Terminal handling charges (THC)	збори за обробку в терміналі

GRAMMAR FOCUS: CONDITIONALS (0, 1ST, 2ND) IN TRANSPORT AND FREIGHT CONTEXTS

I. Zero Conditional (правила, які завжди діють)

Формула: If + Present Simple, Present Simple

Використання: закони, інструкції, логістичні протоколи

Приклади:

- *If the buyer pays late, the shipment stays in the warehouse.*
- *If a container is damaged, the insurance company covers the loss.*

- *If customs finds an error, they delay the release.*

II. First Conditional (можливі ситуації в майбутньому)

Формула: If + Present Simple, will + V

Використання: попередження, домовленості, прогнози

Приклади:

- *If you don't include the correct Incoterm, the freight forwarder will reject the booking.*
- *If the vessel is late, we'll inform the consignee.*
- *If the DDP term is used, the seller will pay import duties.*

III. Second Conditional (гіпотетичні/нереальні ситуації)

Формула: If + Past Simple, would + V

Використання: поради, аналіз помилок, альтернативи

Приклади:

- *If you used FCA instead of FOB, the risk would be transferred more clearly.*
- *If we had more experience with customs, we wouldn't choose DDP.*
- *If the seller knew the regulations, they wouldn't face a penalty.*

GRAMMAR EXERCISES

Exercise 1. Complete the sentences (0, 1st, 2nd mixed):

1. If a bill of lading is missing, the bank ______ (reject) the documents.
2. If we choose EXW, the buyer ______ (organize) all transport.
3. If you don't declare the cargo correctly, customs ______ (fine) you.
4. If the freight forwarder loses the shipment, the insurance ______ (not cover) it.
5. If we used a different Incoterm, we ______ (avoid) this misunderstanding.
6. If a container is overweight, the carrier ______ (refuse) to load it.
7. If the seller prepared the documents properly, the delay ______ (not happen).

8. If Incoterms are not specified, risk transfer ______ (remain) unclear.
9. If they used DAP instead of DDP, they ______ (not pay) import taxes.
10. If we negotiate better freight terms, we ______ (reduce) total cost.

Exercise 2. Match the halves to make up sentences. Translate them into Ukrainian:

1. If you choose FOB...	A. the carrier won't release them.
2. If Incoterms aren't updated...	B. the seller would not offer DDP.
3. If the buyer handled customs...	C. the buyer takes risk on board the ship.
4. If the shipment arrives early...	D. we'll have to get a new offer.
5. If freight is unpaid...	E. it may be held until storage is available.
6. If the seller knew the VAT rules...	F. the buyer is responsible at customs.
7. If insurance is not included...	G. the buyer may need to file a claim.
8. If the quote expires...	H. the risk passes at the wrong point.
9. If the goods are damaged...	I. you might pay more in case of loss.
10. If we used CIF...	J. there may be confusion over delivery.

Exercise 3. Translate the sentences into English (0, 1st, 2nd conditionals):

1. Якщо транспортна компанія не отримає інвойс, вона не відвантажить товар.
2. Якщо ми не вкажемо термін FCA, ризик залишиться на продавці.
3. Якщо продавець погодився б на FOB, ми б уникнули затримки.
4. Якщо вантаж пошкоджений, страхова компанія компенсує збитки.
5. Якщо ми виберемо DDP, то отримаємо більше контролю над доставкою.
6. Якщо митниця знайде порушення, вона накладе штраф.
7. Якщо б у нас був досвід з імпортом, ми б не обирали EXW.
8. Якщо банк не прийме документи, оплата буде затримана.

9. Якщо умови не прописані чітко, виникають конфлікти.
10. Якщо компанія не знає локальні закони, вона зробить помилку.

Exercise 4. Translate the sentences into Ukrainian:

1. If we include proper Incoterms, there will be no delays.
2. If the seller paid duties, the cargo would clear faster.
3. If a shipment is misdeclared, customs delays it automatically.
4. If we used DAP, the buyer wouldn't pay VAT.
5. If freight is calculated by weight, light goods cost less.
6. If they had consulted a freight forwarder, they wouldn't choose CIF.
7. If Incoterms are missing, contract interpretation becomes risky.
8. If the buyer misses the pickup window, they pay demurrage.
9. If this happens again, we'll switch to a new provider.
10. If you included more details, we'd accept the quote.

SPEAKING TASKS

Task 1. Personal Experience & Discussion

Topic: *Have you ever bought something internationally or followed the shipment process?*

Prompts:

- What shipping terms did you see (e.g., DDP, CIF)?
- What problems may happen if the Incoterms are not clear?
- Who should be responsible for customs – the buyer or the seller? Why?

Task 2. Pair Interview – Buyer and Seller Negotiation

Scenario:

You are negotiating a shipment of machinery from Germany to Turkey. One student plays the seller, the other – the buyer.

Negotiation points:

- Which Incoterm should you choose: EXW, FOB, or DDP?
- Who will arrange insurance and freight?
- What happens if the goods are delayed at customs?
- How will you ensure documentation matches the payment terms?

Task 3. Mini-Presentation (3-4 minutes)

Choose one topic:

1. The advantages and risks of using DDP in global trade
2. Comparing EXW and FOB: Which one works better for small businesses?
3. The role of freight forwarders in cost and risk management
4. How hidden charges can impact profitability in logistics

Structure:

- Intro → key points → case or example → conclusion
- *Use 1st or 2nd conditional in your presentation (e.g., "If the buyer uses EXW, they will need a local forwarder").*

Task 4. Group Roleplay – Logistics Team Briefing

Scenario:

You are part of a company's international logistics team. You must prepare a shipment strategy for a new customer in Asia. Discuss:

- Which Incoterm should you offer and why?
- What freight charges must be included or excluded?
- What if the shipment is delayed at the port?
- Who will deal with insurance and demurrage?

Output:

As a team, present your final shipment plan using at least 3 Incoterms terms and 5 relevant logistics expressions.

Task 5. Debate

Statement: *Using DDP gives the best service to the buyer, but it is too risky for the seller.*

Instructions:

Split into 2 teams:

- **For** the statement: argue that DDP builds trust and simplifies delivery.
- **Against** the statement: argue that DDP causes legal, financial, and customs issues.

Use active vocabulary*: DDP, customs clearance, liability, demurrage, freight prepaid, risk transfer, documentation, penalties, etc.*

UNIT 8: LOGISTICS CHAINS AND NODES

TEXT 1: THE STRUCTURE AND STRATEGIC IMPORTANCE OF LOGISTICS CHAINS IN MODERN GLOBAL SYSTEMS

In the age of globalization, the flow of goods from producers to consumers is no longer confined to local or even national borders. Modern commerce depends on highly integrated and geographically dispersed logistics chains that ensure products are sourced, produced, stored, moved, and delivered with precision. These chains – often referred to as **supply chains** – are not merely linear pathways, but dynamic networks involving multiple actors, technologies, and decision points. The efficiency and reliability of these systems determine whether businesses can meet demand, maintain profitability, and stay competitive in volatile markets.

At the core of every logistics chain are several interconnected **functional stages**. These typically include:

1. **Suppliers**, who provide raw materials or components;
2. **Manufacturers**, who transform inputs into finished goods;
3. **Distributors and wholesalers**, who handle large-scale movement and temporary storage;
4. **Retailers**, who present the product to the final customer;
5. **End consumers**, whose needs ultimately drive all upstream activity.

While this may appear to be a simple linear sequence, the actual structure is far more complex. A single manufacturer may source inputs **from multiple countries**, process them at a central location, and then distribute them **across continents** using various carriers and warehouses. In many industries – such as automotive, electronics, pharmaceuticals, and food – supply chains involve dozens of independent participants operating **in different time zones, jurisdictions, and languages**.

Each **link in the chain** is supported by one or more **logistics nodes** – strategic physical points such as **factories, distribution centers, seaports, rail terminals, and cross-docking hubs**. These nodes serve as transition points where goods are received, consolidated, repackaged, stored, or forwarded. The effectiveness of a logistics chain often depends not only on the speed of transport between nodes, but also on how well these nodes are managed in terms of space, labor, equipment, and digital infrastructure.

One of the most critical aspects of logistics chains is **coordination**. Goods do not simply move; they must move **at the right time, in the right quantity, and to the right place**. This requires seamless integration between supply chain partners – suppliers must deliver raw materials **to the production site** just in time for manufacturing; transport providers must collect finished goods **from the plant** and deliver them **to the warehouse** before storage space is exceeded; retailers must receive replenishment stock **before shelf shortages occur**. Poor coordination results in delays, stockouts, spoilage, increased costs, and customer dissatisfaction.

To achieve this level of synchronization, companies rely on advanced digital tools such as **TMS (Transport Management Systems)** and **WMS (Warehouse Management Systems)**. These platforms provide real-time visibility of where goods are, how much stock is available, and when delays occur. By tracking the movement of shipments **from origin to destination**, logistics managers can take corrective action if weather disrupts a shipment, if customs clearance is delayed, or if unexpected demand fluctuations occur **at the final delivery point**.

Importantly, logistics chains are now influenced by **external risk factors** more than ever before. The COVID-19 pandemic revealed how quickly a local factory shutdown or transport bottleneck can disrupt global production. As a result, companies have begun to redesign their chains with greater **resilience** – introducing **buffer inventories**, **multi-supplier sourcing strategies**, and **regionalized networks** to mitigate risks. Instead of relying on a single global hub, firms are increasingly building **decentralized systems** where goods flow **from multiple origins to multiple destinations**, allowing rerouting when needed.

Another key trend is the inclusion of **reverse logistics** into traditional chains. Reverse flows involve the movement of goods **from the customer back to the retailer or manufacturer** – for returns, recycling, or refurbishment. In sectors like fashion, electronics, and e-commerce, reverse logistics can represent up to 30% of volume. This requires integrating **additional nodes** into the chain, such as **returns centers** or **recycling facilities**, and demands equally high coordination and transparency.

The role of **logistics nodes** cannot be overstated. A major port like Rotterdam or Singapore handles thousands of containers daily, serving as a gateway between continents. Inland hubs, such as cross-docking centers or intermodal terminals, allow shipments to switch **from truck to rail** or **from sea to warehouse** in a matter of hours. Poorly functioning nodes can become chokepoints that slow down the entire chain. Therefore, investment in logistics infrastructure –roads, terminals, customs efficiency, warehousing technology – is essential for global trade.

In conclusion, logistics chains are sophisticated, high-stakes systems that stretch far beyond simple transportation. They represent the integrated network of people, companies, assets, data, and resources involved in moving a product **from supplier to customer** – and sometimes back again. For logistics professionals, understanding the architecture and function of the logistics chain, as well as the location and role of each node, is fundamental to optimizing performance, reducing cost, and ensuring long-term supply chain sustainability.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What are the main stages and participants of a typical logistics chain?
2. Why are logistics chains considered complex and non-linear today?
3. What is the role of logistics nodes in the supply chain?
4. How do WMS and TMS platforms contribute to logistics coordination?
5. What risks can arise from poor coordination between stages?
6. Why have companies begun to regionalize and decentralize their supply chains?

7. What is reverse logistics and why is it becoming increasingly important?
8. What are some examples of physical logistics nodes mentioned in the text?
9. How do modern logistics chains respond to unexpected disruptions?
10. In what ways do logistics chains represent more than just physical movement?

II. True or False?

1. Modern supply chains usually involve only two or three participants.
2. A warehouse is an example of a logistics node.
3. TMS systems help with production planning and demand forecasting.
4. Goods move only in one direction along the supply chain.
5. Coordination failures can lead to increased storage and transportation costs.
6. Logistics chains have become less global after COVID-19.
7. Reverse logistics deals with moving goods back to suppliers.
8. Freight forwarders operate within customs zones only.
9. Digital visibility is key to proactive risk management in logistics.
10. Ports, cross-docking terminals, and distribution centers are all logistics nodes.

III. Fill in the gaps using the words from the box below:

coordination, suppliers, warehouse, disruptions, reverse logistics, WMS, inventory, nodes, terminals, delivery

1. A ______ is where goods are stored before being sent to customers.
2. Logistics chains begin with ______ who provide raw materials.
3. Cross-docking ______ enable quick transfer between transport modes.
4. Lack of ______ between partners may cause delays and bottlenecks.
5. ______ is used to manage warehouse processes and stock levels.
6. When demand increases, available ______ must be adjusted quickly.
7. ______ logistics involves returning goods for recycling or refund.
8. Major ports serve as international ______ connecting continents.

9. The final ______ point is the moment when the product reaches the end customer.
10. Global ______ such as war, pandemics, or strikes can interrupt the flow.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Ланцюг постачання починається з постачальників і завершується кінцевим споживачем.
2. У сучасних умовах логістичні ланцюги стають складними та глобальними.
3. Точки концентрації вантажів називають логістичними вузлами.
4. Координація між усіма етапами ланцюга постачання є критично важливою.
5. Збої на одному етапі впливають на весь ланцюг.
6. Системи управління складами забезпечують прозорість запасів.

B. Translate from English into Ukrainian:

1. Logistics chains are built around the movement of goods, data, and services.
2. Distribution centers and seaports are vital physical nodes in logistics.
3. Without proper timing, the chain experiences delays and cost increases.
4. Manufacturers need to receive raw materials just in time for production.
5. Reverse logistics is common in e-commerce and electronics industries.
6. Visibility across the chain helps identify risks and prevent stockouts.

TEXT 2: TYPES AND FUNCTIONS OF LOGISTICS NODES IN THE SUPPLY CHAIN

In logistics, the efficiency and reliability of product flow depend not only on transport systems but also on the performance of **logistics nodes** – strategic physical locations where goods are received, processed, stored, or transferred. These nodes act as operational centers within the broader supply chain, facilitating the movement of cargo **from one stage to another**, often **across modes of transport**, **geographical regions**, or **contracting parties**.

There are several key types of logistics nodes, each serving specific purposes based on its location, infrastructure, and function within the chain. The most common include **warehouses**, **distribution centers**, **cross-docking terminals**, **ports**, **rail hubs**, **intermodal terminals**, and **bonded zones**.

Warehouses are storage facilities where inventory is held **until needed**. They may serve regional, national, or global supply chains. Warehouses are typically static nodes that allow companies to buffer demand fluctuations, reduce delivery lead times, and consolidate goods before dispatch. Depending on the product type, warehouses can be ambient, temperature-controlled, or hazardous-material certified.

Distribution centers (DCs) go beyond simple storage. They are dynamic nodes that combine receiving, order picking, sorting, labeling, packing, and outbound shipping. DCs are positioned close to end markets to support **last-mile delivery** and e-commerce. Their goal is to minimize dwell time and optimize customer service through **fast turnover and real-time inventory accuracy**.

Cross-docking terminals are designed to transfer goods directly **from inbound to outbound transport** without long-term storage. Products are sorted and loaded onto outbound trucks **within hours**. This model is used in just-in-time logistics and retail, where speed and flow continuity are critical. Cross-docking reduces handling costs, minimizes storage needs, and accelerates throughput.

Seaports and airports serve as major international gateways, enabling the intercontinental movement of goods. These high-volume nodes process **containers, pallets, and bulk cargo**, and often include customs inspection zones, bonded storage, and transshipment facilities. Ports are essential for long-haul maritime trade, while airports are used for high-value or time-sensitive shipments.

Rail hubs and intermodal terminals allow cargo to be shifted **between trucks and trains**, often combining road and rail advantages. Intermodal logistics improves efficiency on long distances and supports sustainable transport goals by reducing carbon emissions.

Bonded warehouses or customs zones are special nodes used for storing imported goods **before customs duties are paid**. These allow companies to defer taxes, store international shipments in proximity to demand areas, and re-export goods without clearance. They are critical in global trade strategies involving multiple destinations or transit hubs.

The positioning of logistics nodes must be strategic. A node located too far **from key highways**, **ports**, or **customer zones** may create delays and higher transport costs. Conversely, well-placed nodes reduce delivery time, increase flexibility, and improve responsiveness. Modern companies use **network design models** and **GIS tools** to optimize the location of their warehouses and terminals.

In recent years, logistics nodes have also become more **digitally integrated**. Smart warehouses now use **RFID tracking, automated guided vehicles (AGVs), pick-to-light systems**, and warehouse execution software. Ports apply **digital customs clearance, container scanning, and slot booking**. These upgrades increase throughput, reduce errors, and support real-time visibility **within and between nodes**.

In conclusion, logistics nodes form the structural backbone of the supply chain. While transport moves goods between locations, it is at the nodes where most logistics operations – receiving, processing, consolidating, storing, dispatching – actually take place. Their design, capacity, location, and digital connectivity have a direct impact on cost, service level, and agility. For logistics professionals, understanding how to configure and operate these nodes is essential for achieving high-performance supply chains.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What is the role of logistics nodes in the supply chain?

2. How do warehouses differ from distribution centers in function and purpose?
3. What is cross-docking, and in which industries is it commonly used?
4. Why are seaports and airports considered international gateways?
5. What are the advantages of using rail hubs and intermodal terminals?
6. How do bonded warehouses benefit global trade?
7. What happens if a logistics node is poorly positioned?
8. How do digital tools enhance the performance of logistics nodes?
9. What kind of technologies are used in modern smart warehouses?
10. Why are logistics nodes referred to as the structural backbone of the chain?

II. True or False?

1. Distribution centers mainly serve for long-term product storage.
2. Cross-docking reduces handling and storage time.
3. Ports and airports only serve regional supply chains.
4. Intermodal terminals help combine different types of transport.
5. Bonded warehouses allow companies to avoid paying customs duties at all.
6. The location of a logistics node affects delivery time and cost.
7. Smart warehouses use technologies like AGVs and RFID.
8. Seaports usually store goods permanently for local distribution.
9. GIS tools are used to optimize node locations.
10. Digital customs clearance is applied in modern ports.

III. Fill in the gaps using the words from the box below:

cross-docking, customs, intermodal, bonded, visibility, terminals, e-commerce, AGVs, warehouses, positioning

1. ______ warehouses help postpone import taxes until goods are sold or re-exported.
2. ______ centers perform picking, packing, and last-mile sorting.

3. ______ systems allow quick transfer between truck and rail.
4. In ______, goods are moved from inbound to outbound trucks without storage.
5. Automated solutions like ______ improve warehouse efficiency.
6. ______ zones in ports help verify and inspect imported cargo.
7. Poor node ______ can increase shipping distance and delivery cost.
8. Modern logistics relies on real-time inventory ______ between nodes.
9. Cross-docking is especially common in the ______ sector due to speed demands.
10. Logistics ______ support cargo consolidation, processing, and transit.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Розподільчі центри знаходяться близько до кінцевих споживачів для швидкої доставки.
2. На терміналах здійснюється перевалка вантажу між різними видами транспорту.
3. Перехресне докування дозволяє мінімізувати час зберігання на складі.
4. Митні склади дозволяють компаніям зберігати товари до розмитнення.
5. Інтермодальні вузли сприяють сталому розвитку логістики.
6. Сучасні склади використовують автоматизовані транспортні засоби й RFID.

B. Translate from English into Ukrainian:

1. A bonded warehouse stores imported goods without immediate duty payment.
2. Cross-docking increases speed by avoiding long-term storage.
3. Intermodal terminals are used to combine road, rail, or sea transport.
4. Logistics nodes must be strategically positioned near infrastructure.
5. Digital upgrades have improved accuracy and inventory control.
6. Seaports and airports connect global markets and serve high-volume flows.

TEXT 3: FLOW OF GOODS BETWEEN LOGISTICS NODES: TYPES OF MOVEMENT AND CHAIN INTERACTIONS

The movement of goods within a logistics chain is not a simple process of going from point A to point B. Instead, it is a carefully coordinated system of flows between **logistics nodes**, each of which has a specific function in preparing, processing, or redirecting cargo. The efficiency of these flows determines not only the speed of delivery, but also the cost structure, inventory levels, and customer satisfaction.

Goods flow in several distinct **directions and patterns** within supply chains. The most common type is the **forward flow** – the movement of goods **from suppliers to manufacturers, then to distribution centers, and finally to end customers**. However, other types of movement are equally important, including **reverse flows**, **lateral flows**, and **in-transit redirection**.

Forward flow represents the primary movement of goods from origin to consumption. For example, a manufacturer may ship products **from a central factory to regional warehouses**, and then **from those warehouses to retail outlets or directly to customers**. These movements are usually planned in advance, based on forecasting and demand planning. They are supported by **inventory control systems** that track how much stock is held at each node and when replenishment is needed.

Reverse flow, also known as **returns logistics**, involves goods moving in the opposite direction – **from the customer or retailer back to the distribution center or manufacturer**. This can happen due to product defects, order errors, recycling, or warranty repairs. Reverse logistics has grown in importance, especially in e-commerce and electronics, where up to 20–30% of goods may be returned. Managing this flow efficiently requires dedicated processes, return labels, inspection systems, and often **secondary storage nodes**.

Another type of movement is **lateral flow**, which occurs **between nodes at the same level**. For instance, a company may move inventory **from one regional warehouse to another** to balance stock or respond to local demand spikes. Lateral flows are especially common in **retail networks**, where rapid reallocation of goods helps avoid stockouts or overstocking in certain stores.

A more dynamic pattern is **in-transit redirection**, where the destination of a shipment is changed **while the goods are already moving**. This requires advanced tracking technologies, real-time communication, and flexible carrier agreements. For example, a shipment bound for a distribution center in Berlin may be rerouted to a temporary hub in Prague if demand shifts unexpectedly. This capability supports **agility and responsiveness**, especially in volatile or fast-moving markets.

All types of flow involve interaction with **logistics nodes**. At each node, goods may be **unloaded, scanned, inspected, sorted, consolidated, repackaged, or relabeled** before continuing their journey. For this reason, even a brief stop at a node can significantly affect overall delivery time. Efficient movement between nodes depends on route planning, documentation readiness, labor availability, and infrastructure capacity.

Physical flows must also be matched with **information flows**. Digital platforms such as TMS or ERP systems transmit shipping data, inventory status, and delivery confirmations **between nodes in real time**. These systems use **prepositions of movement and place** (e.g., from, into, onto, through, across, along) to define routing instructions, helping ensure that goods are delivered accurately and efficiently.

Moreover, **international flows** add another layer of complexity. Goods may cross **borders, customs zones, and regulatory environments**, requiring additional documentation and timing coordination. A container shipped **from Shanghai to Rotterdam** must be cleared through both Chinese and European authorities, transferred **from the ship into port storage**, and then moved **onto rail or truck** for inland distribution. Failure to manage these transitions leads to congestion, demurrage charges, and shipment delays.

In conclusion, the movement of goods between logistics nodes involves a variety of flow types – forward, reverse, lateral, and redirected. Each type requires specific infrastructure, planning, and information systems. For logistics professionals, mastering the flow of goods across and between nodes is essential for reducing lead times, avoiding errors, and building supply chains that are both efficient and responsive to change.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What is the primary goal of coordinating the movement of goods between logistics nodes?
2. What are the key types of flows described in the text?
3. How does forward flow differ from reverse flow in terms of direction and purpose?
4. What factors contribute to the rise of reverse logistics in modern commerce?
5. What is lateral flow, and when is it typically used?
6. How does in-transit redirection improve supply chain agility?
7. What actions typically occur when goods arrive at a logistics node?
8. Why are information flows critical to physical flows in logistics?
9. What challenges are associated with cross-border flows?
10. How do prepositions of place and movement support logistics operations?

II. True or False?

1. Reverse flow refers to the delivery of goods from a distribution center to retail.
2. Lateral movement happens between nodes of the same level.
3. In-transit redirection can only occur before shipment begins.
4. Returned goods are always disposed of after inspection.
5. Real-time data exchange helps coordinate routing decisions.
6. Goods are never handled at logistics nodes between departure and arrival.
7. International shipping flows require synchronized customs clearance.
8. TMS systems enable redirection of moving cargo.

9. Physical and digital flows are managed separately in logistics.
10. Unplanned lateral flows often help reduce overstock in specific regions.

III. Fill in the gaps using the words from the box below:

reverse, lateral, in-transit, scanned, repackaged, routing, cross-border, documentation, ERP, shipment

1. Goods returned by customers are part of the ______ flow.
2. ______ flow allows stock to be rebalanced between equal-level nodes.
3. An ______ redirection may occur while the truck is still moving.
4. When arriving at a node, cargo is usually ______ and sorted.
5. Products may be ______ at the distribution center before final delivery.
6. Real-time ______ instructions help avoid delays.
7. ______ movement requires careful attention to customs and legal rules.
8. TMS and ______ systems track inventory locations between nodes.
9. Each ______ must have matching documents and delivery labels.
10. Missing ______ can delay clearance at international ports.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Зворотній потік включає повернення товарів на склад або виробнику.
2. Латеральні переміщення дозволяють балансувати запаси між регіонами.
3. Перенаправлення під час транспортування вимагає гнучких перевізників.
4. Товар сканується та перевіряється на кожному вузлі.
5. Інформаційний потік супроводжує фізичний на всіх етапах.
6. При міжнародних перевезеннях важливо підготувати всю документацію заздалегідь.

B. Translate from English into Ukrainian:

1. Forward flow includes the movement from manufacturers to end customers.
2. Returned electronics are inspected, sorted, and sent for repair.
3. Real-time shipment tracking improves visibility across the chain.
4. Cross-border movement adds regulatory complexity to logistics.
5. Digital instructions define where and how goods move between nodes.
6. Reverse flows now account for a significant portion of e-commerce logistics.

TEXT 4: DIGITAL COORDINATION BETWEEN LOGISTICS NODES IN INTEGRATED SUPPLY CHAINS

The complexity of modern supply chains demands more than physical infrastructure and transport capacity – it requires seamless digital coordination between all logistics nodes. As goods move across continents and through various handling points, real-time data exchange and centralized control have become critical to maintaining speed, accuracy, and visibility throughout the chain.

Digital coordination refers to the use of connected systems that synchronize the operations of suppliers, manufacturers, warehouses, ports, carriers, customs authorities, and retailers. This synchronization ensures that goods arrive when expected, are handled appropriately at each node, and proceed without unnecessary delays. The flow of goods is now inseparable from the flow of information.

One of the most important components in this system is the **Transport Management System (TMS)** – a software solution that allows companies to plan, execute, and track the movement of freight. TMS platforms collect and analyze data on transport availability, carrier performance, transit times, and costs. When integrated with **Warehouse Management Systems (WMS)** and **Enterprise Resource Planning (ERP)** tools, they enable organizations to control their logistics operations from a single interface.

These systems help coordinate truck arrivals, container unloading, warehouse slot assignment, pallet picking, dispatch sequencing, and delivery routing. For example, a shipment moving from a manufacturing facility to an urban distribution hub must be precisely scheduled and confirmed through digital platforms to avoid congestion, missed delivery windows, or idle time. If a delay occurs, rerouting can be initiated instantly with notifications sent to all parties.

Customs integration is another key function. When cargo crosses international borders, digital coordination with customs systems allows for faster clearance. Electronic data interchange (EDI), digital invoices, and automatic document generation reduce manual processing and the risk of human error. Customs inspections, security checks, and transit approvals can now be pre-arranged through platform interfaces – minimizing bottlenecks at ports and border crossings.

Digital coordination also enables proactive problem-solving. When weather, strikes, or technical failures threaten supply chain continuity, logistics systems can instantly identify at-risk shipments and suggest alternatives. This may include rerouting goods through secondary hubs, delaying delivery with client approval, or redistributing inventory from nearby nodes. Such **predictive agility** is only possible when systems are interconnected and continuously updated.

In addition, real-time coordination supports **performance monitoring**. Managers can track vehicle arrival times, warehouse processing speed, dwell times, and service level compliance. These indicators are used to assess the productivity of logistics nodes and identify weak points. For instance, if one cross-docking terminal consistently shows longer processing times, resource allocation or procedural changes may be necessary.

Another benefit of digital coordination is **inter-organizational visibility**. When multiple companies collaborate across a single supply chain – such as a shipper, a freight forwarder, a customs broker, and a distributor – shared access to logistics data ensures consistency and trust. All stakeholders can follow the same shipment timeline, see current status updates, and work from the same documentation set.

In summary, logistics coordination today is as much digital as it is physical. The ability to move goods efficiently between nodes depends on accurate, timely, and transparent information exchange. Whether coordinating truck loading at a warehouse or verifying export clearance at a port, digital platforms play a decisive role in reducing delays, lowering costs, and increasing supply chain responsiveness.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What is the main purpose of digital coordination in logistics networks?
2. How do TMS, WMS, and ERP systems contribute to supply chain efficiency?
3. What types of operations can be controlled through digital platforms at logistics nodes?
4. Why is customs integration important in international logistics coordination?
5. What are the advantages of using electronic data interchange (EDI)?
6. How can digital systems help prevent or respond to disruptions in the supply chain?
7. What types of performance indicators are used to monitor logistics nodes?
8. How does shared visibility between companies improve logistics outcomes?
9. What risks can arise without real-time data exchange between logistics partners?
10. How does digital coordination affect delivery speed, cost, and reliability?

II. True or False?

1. Digital coordination replaces the need for physical infrastructure.
2. TMS platforms allow companies to monitor and reroute shipments.
3. Customs clearance cannot be integrated into digital logistics platforms.
4. Predictive agility helps respond to disruptions before they escalate.
5. ERP systems are only used for accounting and finance.
6. Real-time dashboards can reduce human error in cargo handling.
7. Freight forwarders and distributors cannot access shared logistics platforms.
8. Longer dwell times at nodes usually indicate high performance.

9. Digital document generation accelerates customs processes.
10. Inter-organizational visibility builds trust across the supply chain.

III. Fill in the gaps using the words from the box below:

TMS, disruptions, dashboards, customs, rerouting, clearance, visibility, ERP, platforms, integration

1. A ______ system helps plan and track the movement of freight.
2. Digital ______ allows all partners to monitor the same shipment in real time.
3. Logistics ______ display key performance metrics for each node.
4. When ______ occur, the system may recommend new routes.
5. Seamless ______ between transport and warehouse systems improves speed.
6. Modern platforms allow for automated ______ and risk checks.
7. Electronic ______ speeds up document handling at borders.
8. ______ software connects operations, finance, and supply chain planning.
9. Real-time ______ improves decision-making under pressure.
10. Logistics ______ reduce delays and improve compliance across companies.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Цифрова координація забезпечує точне управління рухом товарів між вузлами.
2. TMS дозволяє планувати маршрути, відстежувати вантажі та керувати документами.
3. Інтеграція з митними системами прискорює процес оформлення.
4. У разі збоїв система може запропонувати перенаправлення або зміну графіку.
5. Загальний доступ до даних підвищує довіру між усіма учасниками логістики.

6. ERP поєднує фінансові, складські й операційні функції в єдину систему.

B. Translate from English into Ukrainian:

1. Customs clearance is faster when systems generate documents electronically.
2. Without real-time visibility, delays and miscommunication increase.
3. Logistics performance can be monitored through digital dashboards.
4. Freight movement depends on synchronized digital and physical processes.
5. Companies use ERP to link finance with supply and demand planning.
6. Logistics platforms enable rerouting and disruption alerts automatically.

TEXT 5: INFRASTRUCTURE CHALLENGES, STRATEGIC RISKS, AND THE FUTURE OF LOGISTICS CHAINS AND NODES

As global commerce grows increasingly complex, the infrastructure that supports the movement of goods – from local warehouses to international ports – is under mounting pressure. Logistics chains today span vast geographies and rely on a dense network of interconnected nodes, each with specific roles and requirements. While digitalization and supply chain innovations have improved visibility and coordination, these advancements have also exposed deeper vulnerabilities rooted in infrastructure, capacity, and geopolitical risk. Understanding and addressing these challenges is central to ensuring long-term supply chain resilience and competitiveness.

One of the most persistent issues in modern logistics is **infrastructure imbalance**. In many regions, rapid growth in trade volumes has outpaced the development of roads, ports, rail systems, and warehouse networks. Major seaports in Asia and Europe, for example, operate near full capacity, with limited room for physical expansion. As a result, congestion has become a chronic problem. Ships may wait days for a berth, and containers may sit idle for extended periods in overcrowded terminals. Inland logistics suffers similarly: overloaded highways, limited rail access, and poor intermodal links create delays and increase transport costs.

This bottleneck effect is amplified by the emergence of **logistics megahubs** – large, centralized facilities that serve as national or regional gateways. While efficient under normal conditions, these hubs can become single points of failure when disrupted. A strike, flood, cyberattack, or regulatory shutdown at a major node – such as Rotterdam, Singapore, or Los Angeles – can reverberate through global chains for weeks or months. This has given rise to growing interest in **decentralization**, where companies diversify their supply networks and add backup facilities to reduce dependence on a single critical node.

Another challenge is **infrastructure inequality** between developed and developing economies. While global corporations increasingly operate in emerging markets, local logistics capabilities often lag behind. Poor road quality, outdated handling equipment, insufficient cold storage, and inefficient customs procedures hinder the reliable movement of goods. This creates logistical blind spots and makes it difficult to implement modern warehouse systems, digital tracking, or just-in-time strategies. As trade patterns shift, investment in infrastructure across Africa, Southeast Asia, and Latin America becomes vital.

Sustainability is also reshaping how logistics infrastructure is designed and evaluated. Regulatory pressure to reduce carbon emissions is forcing companies to rethink long-haul transport, optimize routing, and invest in greener nodes. This includes using electrified rail, developing urban micro-distribution hubs, and adopting warehouse automation that reduces energy consumption. Additionally, there is rising attention to circular supply chains, where waste streams are reintegrated into production – a model that demands new logistics flows and dedicated reverse logistics nodes.

The rise of **urbanization and e-commerce** presents further strain on logistics systems. Consumers increasingly expect same-day or next-day delivery, which requires dense distribution networks and last-mile hubs within or near cities. However, urban land is limited and expensive, and public resistance to freight traffic, noise, and emissions often leads to zoning restrictions or curfews. This forces logistics providers to balance delivery speed with sustainability, regulatory compliance, and land use constraints.

Security and geopolitical risk represent yet another set of threats. Global logistics chains are exposed to cyberattacks, theft, piracy, smuggling, and data breaches. The more digitally integrated a supply chain becomes, the more vulnerable it is to digital sabotage. Physical threats – such as military conflict, sanctions, or political unrest – can close transport corridors and isolate nodes without warning. The COVID-19 pandemic, war in Ukraine, and Red Sea shipping attacks have shown how quickly supply lines can be disrupted. In response, many companies now perform **supply chain risk mapping** to identify vulnerabilities at both node and network levels.

Looking forward, **the future of logistics infrastructure will depend on innovation, flexibility, and strategic investment**. Governments and companies alike must invest in infrastructure that is not only scalable, but also smart, sustainable, and resilient. This includes digitizing customs procedures, automating ports and warehouses, integrating renewable energy into facilities, and expanding multimodal transport options.

Advanced technologies such as **AI-driven routing, autonomous vehicles, drone delivery, and digital twins** will play an increasingly central role in logistics planning and node management. These innovations will make it possible to predict disruption, dynamically reroute flows, optimize warehouse layouts, and even simulate entire logistics networks before physical changes are made.

In conclusion, the physical infrastructure of global logistics – roads, terminals, ports, and storage facilities – remains a foundational element of supply chain success. But to meet the challenges of the next decade, infrastructure must evolve beyond static capacity. It must become **intelligent, adaptive, and sustainably integrated** with the broader logistics ecosystem. The companies and governments that embrace this shift will shape the supply chains of the future – and the global economy with them.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What are the main infrastructure-related challenges facing global logistics chains today?
2. Why do logistics megahubs create both efficiency and vulnerability?
3. How does infrastructure inequality affect emerging markets in global trade?
4. What role does sustainability play in the future design of logistics infrastructure?
5. How has e-commerce and urbanization reshaped logistics needs?
6. What are the key risks that logistics systems face in a geopolitical context?
7. How are companies adapting to digital threats and physical disruptions?
8. What is the importance of risk mapping in logistics network planning?
9. Which technologies are expected to transform future logistics infrastructure?
10. What characteristics must modern logistics infrastructure have to remain effective in the next decade?

II. True or False?

1. Most major ports today still operate below capacity.
2. A single disruption at a megahub can affect global supply chains.
3. Emerging markets usually offer superior digital logistics systems.
4. Urban micro-distribution hubs are used to meet e-commerce demand.
5. Reverse logistics requires the same infrastructure as forward logistics.
6. Infrastructure development has no relation to sustainability goals.
7. Digital twins allow simulation of logistics networks before implementation.
8. Autonomous vehicles and drones are unlikely to impact node operations.
9. Cyberattacks are a growing threat to logistics coordination systems.
10. The future of logistics depends solely on physical infrastructure.

III. Fill in the gaps using the words from the box below:

congestion, decentralization, resilience, megahub, emissions, e-commerce, zoning, geopolitical, digitizing, infrastructure

1. Port ______ causes vessel delays and longer container dwell times.
2. A logistics ______ can become a critical risk if it fails.
3. ______ is the process of spreading operations to multiple smaller nodes.
4. Companies aim to build ______ into supply chains to handle disruptions.
5. High urban ______ makes it difficult to establish new last-mile facilities.
6. ______ platforms are placing more pressure on delivery speed and networks.
7. Governments are investing in ______ to support growing freight volumes.
8. ______ conflicts and sanctions can instantly block trade corridors.
9. ______ customs clearance helps reduce delays at borders.
10. Greener warehouses reduce energy use and carbon ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Перевантаженість портів призводить до затримок і штрафів за зберігання.
2. Централізовані логістичні вузли можуть стати точками відмови під час кризи.
3. Країни, що розвиваються, часто мають слабку інфраструктуру та застаріле обладнання.
4. Зростання електронної комерції вимагає щільної мережі складів у містах.
5. Загроза кібератак посилюється зі зростанням цифрової інтеграції.
6. Майбутнє логістики залежить від інновацій, гнучкості та сталого розвитку.

B. Translate from English into Ukrainian:

1. Infrastructure scalability must be matched with intelligence and sustainability.

2. Urban delivery faces both real estate and environmental restrictions.
3. Digital coordination allows faster customs clearance and cargo handling.
4. Strategic risk mapping helps prevent major supply chain disruptions.
5. Multimodal expansion reduces reliance on congested road networks.
6. Investing in resilient infrastructure is key to long-term logistics success.

LEXICAL EXERCISES

Exercise 1. Match the term to its definition:

Terms:	**Definitions:**
1. Reverse logistics	**A.** A facility where cargo changes transport modes (e.g., train to truck)
2. Logistics node	**B.** The total volume of cargo a facility can process over time
3. Distribution center	**C.** Return flow of goods from end user back to the supplier or warehouse
4. Bottleneck	**D.** A delay point or constraint in a logistics system
5. Intermodal terminal	**E.** The legal process of declaring cargo for cross-border transport
6. Customs clearance	**F.** The physical location where cargo is handled, stored, or transferred
7. Throughput	G. Strategic delivery planning based on routes and time
8. Routing	**H.** Holding and organizing inventory in specialized facilities
9. Freight movement	**I.** Movement of goods from one location to another

10. Warehousing — **J.** A central facility for product sorting, packing, and dispatch

Exercise 2. Fill in the gaps:

chain, routing, warehousing, congestion, clearance, terminal, visibility, bottleneck, freight, node

1. Customs ______ is required before international delivery.
2. A cross-docking ______ allows quick transfer of goods.
3. We need better inventory ______ between warehouses.
4. The supply ______ was disrupted by a strike at the port.
5. ______ planning must adjust to weather and road closures.
6. The company invested in new ______ systems for perishable goods.
7. A blocked checkpoint created a ______ in the logistics corridor.
8. ______ delays at the hub increased delivery time.
9. The factory acts as a production ______ in the network.
10. Increased ______ rates indicate high trade activity.

Exercise 3. Translate into Ukrainian:

1. The goods moved through three logistics nodes before final delivery.
2. Cross-docking reduces storage costs and accelerates dispatch.
3. Reverse logistics is essential for handling product returns.
4. The new terminal improved regional freight throughput.
5. Customs clearance was delayed due to document mismatch.
6. Congestion at the border slowed down the entire chain.
7. Warehousing operations require strict temperature control.
8. Bottlenecks can occur when transport is faster than unloading capacity.
9. The routing software suggested a new corridor via Hungary.
10. Inventory visibility helps prevent stockouts and overstocking.

Exercise 4. Translate into English:

1. Логістичний ланцюг включає постачальників, склади та роздрібні точки.
2. Склад виконує роль логістичного вузла в системі.
3. Перехресне докування дозволяє обійти етап тривалого зберігання.
4. Інтермодальний термінал об'єднує залізничні та автомобільні перевезення.
5. Зворотна логістика потребує окремих потоків і місць обробки.
6. Маршрутизація повинна враховувати погодні умови та дорожню ситуацію.
7. Митне оформлення було завершене впродовж доби.
8. Пропускна здатність складу зросла після автоматизації.
9. Вузьке місце виникло через нестачу персоналу на розвантаженні.
10. Внутрішня логістика часто недооцінюється в стратегічному плануванні.

MINI GLOSSARY: LOGISTICS CHAINS AND NODES

English Term	Ukrainian Equivalent
Border crossing	перетин кордону
Bottleneck	вузьке місце (перешкода)
Cross-docking terminal	термінал перехресного докування
Customs clearance	митне оформлення
Distribution center	розподільчий центр
Freight movement	переміщення вантажів
Handling operations	операції з обробки вантажу
Inland logistics	внутрішня логістика
Intermodal terminal	інтермодальний термінал
Inventory visibility	прозорість запасів

English Term	Ukrainian Equivalent
Logistics chain	логістичний ланцюг
Logistics node	логістичний вузол
Node congestion	перевантаження вузла
Reverse logistics	зворотна логістика
Routing	маршрутизація
Supply flow	потік постачання
Throughput	пропускна здатність
Transport corridor	транспортний коридор
Warehouse management	управління складом
Warehousing	складське зберігання

GRAMMAR FOCUS: PREPOSITIONS OF PLACE AND MOVEMENT IN LOGISTICS

I. Prepositions of Place (статичне положення)

Використовуються для опису розташування об'єктів у просторі.

Preposition	Use Example	Logistics Example
in	inside something	The goods are stored **in** the warehouse.
on	on a surface	The pallet is placed **on** the loading dock.
at	specific point	The truck is **at** the gate.
under	beneath	Boxes are kept **under** the shelf.
next to / beside	alongside	The forklift is parked **next to** the ramp.
between	in the middle	The hub is located **between** two ports.

Preposition	**Use Example**	**Logistics Example**
behind / **in front of**	position	The terminal is **behind** the container yard.

II. Prepositions of Movement (рух від/до/через)

Описують переміщення товарів між вузлами.

Preposition	**Use Example**	**Logistics Example**
from	origin	Goods are shipped **from** the supplier.
to	destination	The cargo is sent **to** the port.
into	entering a space	The truck drives **into** the warehouse.
onto	moving onto a surface	Crates are loaded **onto** the trailer.
out of	exiting a space	The shipment is taken **out of** storage.
through	passing inside	The goods move **through** customs.
across	from one side to another	The shipment travels **across** the border.
along	following a path	Trucks drive **along** the highway.
past	going by	The driver went **past** the checkpoint.
toward	in the direction of	The vessel is heading **toward** Rotterdam.

GRAMMAR EXERCISES

Exercise 1. Choose the correct preposition:

1. The containers are stacked ______ the dock. *(on / in / under)*
2. The forklift moved the pallet ______ the truck. *(into / out of / onto)*
3. Goods pass ______ the terminal before inspection. *(through / past / between)*
4. The driver stopped ______ the warehouse entrance. *(next to / along / into)*
5. The cargo arrived ______ the distribution center at 6 a.m. *(at / in / on)*
6. Boxes were taken ______ the freezer to be loaded. *(onto / out of / across)*

7. The truck traveled ______ the highway toward the depot. *(along / across / into)*
8. The customs office is located ______ the export gate. *(at / behind / onto)*
9. Goods are sorted ______ arrival. *(on / at / to)*
10. The container moved ______ the crane and then to the ship. *(under / past / out of)*

Exercise 2. Match the halves:

1. The pallets were placed...	**A.** onto the wooden platform.
2. Goods are transported from...	**B.** out of the trailer.
3. The truck moved slowly...	**C.** in the database.
4. The operator lifted the boxes...	**D.** from the central plant.
5. The cargo passed...	**E.** along the coast.
6. The documents are stored...	**F.** through the security scanner.
7. The warehouse is located...	**G.** into the storage zone.
8. The ship arrived...	**H.** at the container terminal.
9. The team unloaded crates...	**I.** past the inspection area.
10. The route goes...	**J.** behind the railway station.

Exercise 3. Translate into English paying attention to prepositions:

1. Товари зберігаються **на** складі.
2. Вантаж проїхав **через** митний контроль.
3. Водій поставив палети **на** платформу.
4. Контейнери були вивантажені **з** судна.
5. Ми транспортуємо товари **від** виробника **до** споживача.
6. Пункт перевірки розташований **перед** терміналом.
7. Фура заїхала **в** склад.
8. Пошта йде **уздовж** шосе до хаба.
9. Оператор вивіз коробки **з-під** стелажів.
10. Піддон знаходиться **поруч із** навантажувачем.

Exercise 4. Translate into Ukrainian:

1. The cargo was moved from the port to the inland terminal.
2. Crates were taken out of the damaged trailer.
3. The route goes across the mountain region.
4. The customs office is located at the exit gate.
5. Trucks are parked next to the loading zone.
6. Goods are loaded onto the container ship.
7. The highway runs along the border.
8. The package was scanned through the control point.
9. Pallets were moved into the cold storage facility.
10. The container was placed behind the warehouse.

SPEAKING TASKS

Task 1. Personal Experience & Discussion

Topic: *Have you ever tracked a shipment or dealt with delivery delays?*

Prompts:

- What happened and how was the issue resolved?
- Which parts of the logistics chain were involved?
- Do you think the delay was caused by poor node coordination or external risk?

Task 2. Pair Interview – Logistics Chain Audit

Scenario: You and your partner are logistics consultants auditing a company's supply chain.

Interview Structure:

- Ask each other: Where are the main logistics nodes located?
- What type of flows (forward, reverse, lateral) are used most?

- Are there any bottlenecks in the current chain?
- Which digital systems (TMS, WMS) are implemented and how effective are they?

Goal:

Write a short conclusion together on how to improve one weak point.

Task 3. Mini-Presentation (3–4 minutes)

Choose one topic:

1. The role of distribution centers in modern logistics
2. Cross-docking as a solution to warehouse congestion
3. The importance of visibility between logistics nodes
4. Digital platforms for managing multimodal transport

Structure:

- Intro → Key Points → Case Example → Conclusion
- Use appropriate terminology *(e.g., flow, node, routing, hub, warehouse, intermodal)*

Task 4. Group Discussion – Building a Logistics Network

Scenario: Your team works for a company expanding into Southeast Europe. You must design a new logistics network

Questions to Discuss:

- Where will you place distribution centers and why?
- How will you manage international flows and customs?
- What digital tools will help optimize operations between nodes?
- How will you ensure resilience against border delays and infrastructure risks?

Output:

As a team, present a logistics map and explain your node selection and routing choices.

Task 5. Debate

Statement: *Investing in decentralized logistics nodes is better than relying on megahubs.*

Instructions:

Split into 2 teams:

- **For**: Argue that decentralization reduces risk, improves flexibility, and supports local markets.
- **Against**: Argue that megahubs are more efficient, cost-effective, and better for global routing.

UNIT 9: BASIC PORT OPERATIONS

TEXT 1: THE STRUCTURE AND ROLE OF SEAPORTS IN GLOBAL LOGISTICS

Seaports are foundational elements of the global logistics infrastructure. As physical and operational gateways between sea and land transport, they serve as high-volume entry and exit points for goods flowing across the world. More than 80 % of the volume of global trade is transported by sea, and virtually every supply chain with international components involves port infrastructure at some stage. Modern ports are not only spaces where ships dock and unload – they are complex, dynamic systems integrating technology, logistics, labor, and regulation to ensure continuous cargo movement.

A standard commercial seaport consists of multiple interdependent zones and facilities. These include **berths** and **quays**, where vessels are moored for cargo handling; **container yards**, where intermodal units are stacked and prepared for inland transport; **bulk terminals** for raw materials such as coal, ore, or grain; **tanker terminals** for petroleum and chemicals; and **warehousing areas** used for short-term storage or customs inspection. Supporting all of this are internal road networks, rail sidings, gate checkpoints, and digital control centers.

Ports are also categorized by their function. **Gateway ports**, like Hamburg or Los Angeles, serve domestic markets by connecting maritime and inland freight networks. **Transshipment hubs**, such as Singapore and Tanjung Pelepas, specialize in transferring containers from large vessels to smaller feeder ships without crossing customs borders. **Feeder ports** and **dry ports** often operate in secondary locations, distributing cargo to final destinations or aggregating outbound freight from hinterland zones.

A critical element of every port's operation is the **coordination of cargo flows**. Ships arrive on fixed or variable schedules, and port operators must manage berth allocation, pilotage, tugboat assistance, crane scheduling, container staging, and documentation in rapid succession. For container vessels carrying thousands of twenty-foot equivalent units (TEUs), unloading and reloading is a precisely timed process. Miscommunication or equipment failure can result in cascading delays that affect inland transport schedules, warehouse operations, and even factory production lines.

The **actors operating within the port** environment form a highly specialized network. These include port authorities (public or private entities managing the infrastructure and regulatory environment); **terminal operators** (responsible for day-to-day cargo handling); **shipping lines** (owning and operating vessels); **freight forwarders** and **customs brokers** (coordinating multimodal transport and documentation); and **logistics providers** offering warehousing, drayage, and last-mile services. Successful port operations depend on tight coordination among these parties, as well as shared access to information and common standards of communication.

In recent years, port authorities have invested heavily in **digitalization**. Technologies such as Port Community Systems (PCS), real-time cargo tracking, electronic gate systems, remote crane control, and automated yard vehicles are increasingly common. These tools enable just-in-time logistics, reduce idle time at terminals, and enhance visibility across the supply chain. In some ports, artificial intelligence is being used to optimize berth planning, predict congestion, or support security inspections.

Efficiency and performance at ports are directly tied to their **integration with inland transport systems**. A well-functioning port is not isolated – it must be seamlessly connected to highways, railways, river terminals, and distribution hubs. For example, the Port of Antwerp operates a trimodal strategy, offering road, rail, and inland waterway connections for nearly every container. Without such connectivity, ports become **logistical bottlenecks** rather than enablers of trade.

Equally important is the **role of ports in customs and regulatory compliance**. Ports serve as national control points, where imported and exported goods are verified, taxed, and cleared for movement. Customs inspections, sanitary checks, and security screening must all be conducted swiftly to avoid unnecessary demurrage or detention. Delays in customs zones can lead to port congestion, missed transshipment windows, and increased shipping costs.

The **environmental impact** of port operations is now a growing concern for regulators and operators alike. Large ports face pressure to reduce emissions from vessels, trucks, and terminal equipment. As a result, many are adopting cold ironing (shore-side power supply), hybrid or electric yard equipment, and low-emission fuels. Furthermore, ports are expected to manage waste, noise, and land-use conflicts with surrounding communities. The transition toward **sustainable port operations** is becoming a competitive advantage and a regulatory necessity.

Ports also play a critical role in **emergency response and geopolitical resilience**. Natural disasters, cyberattacks, pandemics, and regional conflicts can disrupt port access or damage facilities. For example, the blockage of the Suez Canal in 2021 demonstrated the fragility of global maritime flows and the systemic impact of a single disruption. As a result, ports are increasingly adopting **resilience planning**, which includes redundancy in infrastructure, digital backups, and scenario modeling.

In summary, seaports are not just physical locations but **strategic systems** that underpin global commerce. Their role spans far beyond loading and unloading – they influence supply chain speed, trade cost, inventory strategy, customs regulation, environmental compliance, and geopolitical stability. As global logistics evolve, ports will remain indispensable, but they must continue to adapt through innovation, collaboration, and sustainable design to meet the complex demands of the 21st-century economy.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What are the primary functions of a modern commercial seaport?
2. How do gateway ports differ from transshipment and feeder ports?

3. Which infrastructure zones are typically found in a seaport?
4. What are the roles of different actors within the port environment?
5. Why is digitalization important for port efficiency?
6. How are ports integrated with inland transport systems?
7. What role do ports play in customs and regulatory processes?
8. What environmental strategies are ports adopting today?
9. Why is resilience planning essential for port operations?
10. How do ports influence overall supply chain performance?

II. True or False?

1. More than half of global trade is carried out through air freight.
2. Container yards are used for storing and staging intermodal cargo.
3. Port congestion typically occurs due to customs inspections only.
4. Freight forwarders operate ships and manage vessel schedules.
5. Digital tools can help predict terminal congestion and optimize berth planning.
6. A port disconnected from rail or road is still considered efficient.
7. Ports must comply with environmental regulations regarding emissions.
8. Resilience planning is useful only in the event of cyberattacks.
9. Transshipment hubs are located inland near production centers.
10. Efficient port operations reduce overall logistics costs.

III. Fill in the gaps using the words from the box below:

transshipment, congestion, intermodal, berth, inspection, authority, resilience, automation, customs, dry port

1. The vessel was assigned a ______ at the main container terminal.
2. A ______ hub allows containers to switch vessels without crossing borders.
3. ______ integration ensures containers can move by truck, train, or ship.
4. The port ______ regulates safety, infrastructure, and public access.

5. ______ delays increased after a customs system failure.
6. A ______ is an inland facility that replicates port services.
7. Modern terminals use ______ to reduce crane labor costs.
8. Efficient ______ clearance is critical for international trade.
9. Port ______ is necessary to handle climate and geopolitical disruptions.
10. All cargo must go through ______ before release to the market.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Морські порти є ключовими вузлами у глобальному ланцюзі постачання.
2. Порт повинен мати з'єднання з автомобільними та залізничними коридорами.
3. Термінали обробляють контейнери, сипучі вантажі та небезпечні матеріали.
4. Портові операції потребують чіткої координації між усіма учасниками.
5. Цифрові системи дозволяють відстежувати вантажі в реальному часі.
6. Затори в порту можуть призвести до затримок у поставках і збільшення витрат.
7. У портах проводиться митне оформлення і санітарний контроль.
8. Усталений портовий оператор інвестує в автоматизацію і штучний інтелект.
9. Порти повинні адаптуватися до нових екологічних норм.
10. Блокування Суецького каналу продемонструвало вразливість глобального ланцюга.

B. Translate from English into Ukrainian:

1. A gateway port connects maritime trade to the domestic market.
2. Containers were offloaded and staged in the yard for rail transport.
3. Each vessel is assigned a berth based on its arrival schedule.

4. Shipping agencies coordinate documentation and crew services.
5. Port congestion affects delivery times across the entire supply chain.
6. Customs authorities inspect cargo for compliance and documentation.
7. Transshipment ports rely on frequent connections to feeder routes.
8. Green ports are investing in electric cranes and cold ironing.
9. Cyberattacks on port systems can paralyze operations for days.
10. Resilient ports maintain backup systems and alternative routing plans.

TEXT 2: CORE CARGO OPERATIONS, PLANNING, AND COORDINATION IN SEAPORTS

Behind every vessel docking at a seaport lies a carefully orchestrated series of operations designed to move goods as efficiently, securely, and predictably as possible. Port operations are far more than the physical act of loading or unloading cargo – they are the product of logistics planning, infrastructure readiness, labor scheduling, and real-time coordination between dozens of stakeholders. Each movement within a port must be synchronized to avoid costly delays, maximize throughput, and ensure compliance with international safety and customs standards.

The primary functions of a seaport revolve around **cargo handling**, which includes the receipt, storage, transfer, and dispatch of goods. These operations can be broadly divided into **containerized cargo**, **bulk cargo** (solid or liquid), and **general cargo**. Each cargo type requires its own specialized processes, equipment, and safety protocols.

Containerized cargo operations dominate many commercial ports today. When a vessel arrives, a berthing window is confirmed based on port schedules, weather conditions, and terminal availability. Once moored, quay cranes are positioned to begin unloading containers, which are systematically removed from the vessel according to pre-defined stowage plans. These containers are transferred to trucks or automated guided vehicles (AGVs) and moved to a **container yard**, where they are stacked and organized based on delivery mode (rail, road, or transshipment) and urgency.

Loading operations follow a similar process in reverse. Export containers arrive at the terminal by truck or train, pass through security and customs clearance, and are staged in rows until it is time to load them onto the vessel in accordance with the ship's stability plan and destination sequence. Efficient loading and unloading require precise data exchange between ship captains, terminal operators, and logistics companies. A single mislabelled container or miscommunication can disrupt vessel departure or delay connecting inland shipments.

Bulk cargo operations involve materials like coal, ore, grain, cement, and oil. These goods are handled using specialized grabs, conveyor systems, pipelines, or gantry cranes. Loading rates for bulk cargo depend heavily on the product type and handling equipment. For example, grain loading must be managed to avoid dust emissions, while oil terminals must adhere to strict environmental and fire safety protocols. Contamination, spillage, or imbalance in loading can lead to operational or environmental risks.

Beyond physical movement, **planning and scheduling** are critical components of port efficiency. Each vessel is assigned a **berthing slot** and an **operations window**, which must be respected to maintain terminal flow. Delays due to late arrival, labor shortages, equipment malfunction, or port congestion can trigger demurrage fees, disrupt supply chain timetables, and increase cost for all parties. To avoid these risks, ports increasingly rely on **digital scheduling platforms**, real-time vessel tracking (AIS systems), and predictive algorithms to coordinate berth assignments and terminal resources.

Safety and security are another core focus of port operations. Each terminal must follow international safety standards (e.g., ISPS Code, IMO regulations) regarding personnel protection, hazardous materials, and emergency procedures. Access to cargo zones is strictly controlled, and all workers must undergo safety training and use personal protective equipment. Additionally, ports must be prepared for threats such as cargo theft, contraband, smuggling, and cyberattacks on terminal systems. Advanced surveillance, RFID tagging, drone patrols, and integrated customs screening help mitigate these threats.

Human resource coordination remains essential despite automation. Skilled crane operators, vessel pilots, yard planners, customs officers, and truck dispatchers must work in tight synchrony. Labor shifts are carefully scheduled, and many ports operate 24/7 to meet global demand. Labor unions and collective agreements play a significant role in port operations, particularly in terms of shift duration, safety, and equipment usage.

Modern ports must also balance **efficiency with sustainability**. Handling operations consume significant energy, and idle cargo contributes to emissions and financial loss. As a result, many ports are upgrading to electric cranes, using hybrid terminal tractors, and redesigning yard layouts to reduce internal movement. Some container terminals have implemented **fully automated stacking systems (ASCs)** to increase density, accuracy, and energy efficiency. These investments are reshaping the operational landscape of modern seaports.

Finally, **intermodal coordination** defines how successfully cargo is transferred from ship to inland destination. A container unloaded at 06:00 must be ready for a departing train by 10:00. If the train is delayed or capacity is insufficient, the container must be temporarily stored, tracked, and possibly redirected. Delays in inland logistics – due to weather, strikes, or capacity limits – frequently impact port throughput and terminal congestion.

In summary, core port operations involve a delicate balance of physical execution, digital coordination, safety assurance, and stakeholder alignment. Whether managing a container flow from Asia to Europe, or loading grain onto a tanker in South America, port efficiency depends on real-time information, technical readiness, workforce precision, and constant planning. Seaports that successfully align these elements not only ensure smooth cargo movement – they become catalysts for global economic connectivity.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What are the key stages involved in containerized cargo handling?
2. How does the loading of export containers differ from unloading imports?
3. Why is stowage planning critical in vessel operations?
4. What are some specific operational differences between container and bulk cargo handling?
5. How do scheduling platforms and AIS systems improve port performance?
6. What types of safety and security risks exist in port environments?
7. Why is labor still essential despite increasing automation?
8. How do ports reduce internal congestion and energy consumption?
9. What role do fully automated stacking systems (ASCs) play in modern ports?
10. Why is intermodal coordination vital for maintaining terminal flow?

II. True or False?

1. Containers are loaded randomly onto ships based on arrival time.
2. Berthing delays can result in financial penalties.
3. Grain and oil require the same loading protocols.
4. Customs inspection occurs after containers leave the port.
5. Yard operations are unaffected by delays in inland transport.
6. Personal protective equipment is required for all port workers.
7. Bulk cargo is handled with cranes only.
8. Labor unions influence how equipment is used in port terminals.
9. Digital platforms allow predictive berth planning.
10. RFID tags are used for both tracking and security.

III. Fill in the gaps using the words from the box below:

stowage, demurrage, terminal, berth, inspection, AGVs, surveillance, dispatch, emissions, stacking

1. Every vessel must submit a ______ plan before cargo is loaded.
2. Port congestion can lead to ______ charges for idle ships.
3. Containers are transported from the vessel to the ______ yard.
4. A ______ slot must be reserved prior to ship arrival.
5. Customs officers conduct cargo ______ inside the secured zone.
6. Modern ports use ______ for unmanned yard transport.
7. Advanced ______ systems monitor port entry points.
8. After staging, cargo is prepared for inland ______.
9. Idle cranes and trucks increase energy use and ______.
10. Automated ______ cranes increase yard capacity and reduce errors.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Усі вантажні операції в порту мають бути точно скоординовані.
2. Контейнери розміщуються на судні згідно з планом укладки.
3. Насипні вантажі вимагають спеціального обладнання та екологічних заходів.
4. Цифрові платформи допомагають уникати заторів і затримок.
5. Захист персоналу та контроль доступу є обов'язковими у портах.
6. Затримки на залізниці можуть призвести до накопичення контейнерів у терміналі.
7. Автоматизовані системи укладки зменшують витрати на енергію.
8. Порти повинні дотримуватися міжнародних норм безпеки й охорони праці.
9. Контейнери мають бути відвантажені з терміналу протягом визначеного вікна.

10. Порти впроваджують гібридну техніку для зменшення шкідливих викидів.

B. Translate from English into Ukrainian:

1. Vessel arrival is followed by precise container unloading procedures.
2. Yard planners allocate storage zones based on urgency and mode of transport.
3. Bulk cargo terminals require advanced fire safety systems.
4. Port security includes digital surveillance and restricted access zones.
5. Predictive software minimizes idle time and resource conflicts.
6. Customs clearance is integrated into the port's digital flow.
7. Crane operators follow a fixed schedule coordinated with vessel logistics.
8. Terminal congestion affects road and rail transport planning.
9. Electric equipment reduces environmental impact in container yards.
10. Port teams must respond rapidly to delays, breakdowns, or changes in routing.

TEXT 3: CUSTOMS CLEARANCE, BORDER CONTROL, AND DOCUMENTATION IN MODERN PORT OPERATIONS

In addition to handling cargo movement, modern seaports serve a critical role as **customs and regulatory gateways**. Before goods can be released into or out of a country, they must be documented, declared, verified, and approved by national customs authorities. Efficient customs clearance is vital for ensuring legal compliance, preventing smuggling, protecting national interests, and maintaining the flow of international trade. Delays or errors at this stage can disrupt entire supply chains and generate significant financial and reputational losses.

Customs clearance involves several steps, beginning with the **submission of shipping documents** to the port's customs system. These documents typically include a **bill of lading**, **invoice**, **packing list**, **certificate of origin**, and **import/export declaration**. Depending on the cargo and destination, additional paperwork may be required, such as phytosanitary certificates, fumigation reports, or technical compliance documents.

At many ports, these procedures are now **digitalized** through **Electronic Data Interchange (EDI)** and **Port Community Systems (PCS)**. These platforms allow shipping lines, customs officers, freight forwarders, and terminal operators to share information in real time. A container arriving at a port may already be pre-cleared by customs authorities before the vessel even docks, significantly reducing idle time and storage costs. In high-efficiency ports like Rotterdam or Shanghai, this system enables some containers to be offloaded and released within just a few hours.

However, not all cargo moves automatically. Customs authorities conduct **risk-based screening**, where selected shipments are flagged for inspection based on origin, value, type, or historical patterns. These inspections may be documentary, physical, or scanned via high-resolution imaging systems. In some countries, customs also work in cooperation with border security, health authorities, or tax agencies to verify the legality and safety of the cargo.

Physical inspections take place in designated customs zones inside the port. Containers may be opened manually, scanned via x-ray, or analyzed for chemical content. These operations require careful coordination, as inspection areas are limited in capacity and staff. Poor planning can lead to port congestion, missed delivery deadlines, and increased demurrage fees.

The importance of accurate documentation cannot be overstated. A missing certificate, incorrect HS code, or mismatched invoice may result in the entire container being blocked. Ports and logistics companies therefore invest in **document control systems**, automated compliance checks, and customs brokerage services to minimize such risks. Experienced customs brokers play a vital role in navigating regulatory complexity, resolving disputes, and ensuring timely clearance.

In **international trade**, each country has its own customs regulations, tariffs, and procedures. Harmonization is promoted through global frameworks such as the **World Customs Organization (WCO)**, the **Harmonized System (HS)**, and

incoterms. However, disparities still exist – a cargo cleared in one port may face completely different procedures in another. As a result, global supply chains must factor customs clearance time, paperwork, and fees into route planning and scheduling.

Recent years have seen growing interest in **pre-arrival processing** and **authorized economic operator (AEO)** status. Pre-arrival allows documents to be submitted and processed before the cargo arrives, enabling faster release. AEO status, recognized internationally, grants trusted traders reduced inspection rates, simplified procedures, and dedicated clearance lanes.

Another development is the use of **blockchain-based documentation systems**, which provide unalterable records of shipping documents, approvals, and transfer history. These technologies are still emerging but promise to further enhance transparency, reduce fraud, and speed up interagency coordination.

In addition to customs, ports also manage **border control and compliance functions**. For example, food imports may be inspected by health authorities, and dual-use goods (e.g., chemicals or electronics) may require special permits. Ports must provide secure and equipped inspection zones, with refrigeration, safety equipment, and qualified personnel.

In summary, customs clearance and documentation are not auxiliary to port operations – they are central to the functioning of global trade. Efficient clearance depends on timely, accurate documentation, digital integration, professional brokerage, and interagency coordination. Ports that manage this process smoothly increase throughput, reduce delays, and enhance national and international trade competitiveness.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What documents are typically required for customs clearance at a port?

2. How do EDI and Port Community Systems improve customs efficiency?
3. What is risk-based screening and how does it affect cargo flow?
4. Where and how are physical inspections conducted in seaports?
5. What are the consequences of missing or incorrect shipping documents?
6. What role do customs brokers play in port operations?
7. Why do international shipments often face differing clearance procedures across ports?
8. How does AEO status benefit logistics companies?
9. What is the potential of blockchain in customs documentation?
10. Why is interagency cooperation important during cargo inspections?

II. True or False?

1. All cargo is inspected manually by customs.
2. Customs clearance can begin before the cargo arrives at the port.
3. Invoices and packing lists are optional for international trade.
4. Physical inspection zones require strict safety measures.
5. The Harmonized System (HS) is used for product classification.
6. Blockchain documentation can be altered after submission.
7. A single customs delay can affect the entire supply chain.
8. AEO status is only recognized at national level.
9. Dual-use goods may require additional permits for export/import.
10. Customs zones operate separately from port facilities.

III. Fill in the gaps using the words from the box below:

certificate, broker, blockchain, x-ray, clearance, origin, inspection, customs, fees, document

1. A missing ______ of origin can delay the entire shipment.
2. Customs ______ includes checking documents, duties, and risk criteria.

3. The container was selected for physical ______ by security agents.
4. A customs ______ acts on behalf of importers and exporters.
5. New ______ technology is used to record unchangeable trade data.
6. The bill of lading is the most important shipping ______.
7. Cargo was scanned using high-resolution ______ systems.
8. Customs ______ vary depending on the country and product.
9. Accurate classification of goods requires the correct HS code on the ______.
10. Pre-arrival ______ saves time during port operations.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Для митного оформлення необхідно подати рахунок, пакувальний лист і коносамент.
2. Деякі вантажі обираються для фізичної перевірки на основі аналізу ризиків.
3. Відсутність сертифіката походження може призвести до затримки доставки.
4. Цифрові платформи дозволяють здійснювати митне оформлення до прибуття вантажу.
5. У зонах митного контролю використовуються рентгенівські сканери та ручна перевірка.
6. Досвідчений митний брокер допомагає уникнути порушень і штрафів.
7. У деяких країнах імпорт продуктів харчування перевіряється санітарною службою.
8. AEO-статус прискорює проходження митниці та зменшує кількість перевірок.
9. Блокчейн-системи забезпечують прозорість і надійність документообігу.
10. Кожен порт має власні вимоги щодо документів і процедур.

B. Translate from English into Ukrainian:

1. Customs clearance is a key part of international port operations.
2. Delayed approval of shipping documents may lead to storage charges.
3. Some shipments are flagged based on declared value or origin country.
4. A freight forwarder often works closely with a customs broker.
5. Blockchain allows transparent recording of shipment history and approvals.
6. The certificate of fumigation must be attached for agricultural goods.
7. All customs zones require secure access and licensed personnel.
8. Electronic platforms reduce paperwork and improve coordination.
9. Regulatory checks may involve tax agencies and health authorities.
10. Documentation errors can trigger legal disputes and shipment rejections.

TEXT 4: PORT COLLABORATION, LOGISTICS NETWORKS, AND DIGITAL ECOSYSTEMS IN GLOBAL TRADE

As international trade becomes more interconnected and time-sensitive, the performance of seaports depends not only on internal efficiency but also on their ability to **collaborate with external partners**. No port operates in isolation. Instead, it functions as part of a global logistics network involving **governments, shipping lines, inland carriers, digital providers, customs agencies, and multinational corporations**. The effectiveness of this ecosystem is measured by how well these actors synchronize operations, exchange information, and respond to shared challenges.

A core aspect of this collaboration is **port-to-port integration**. Major global shipping routes – such as Asia – Europe or Asia – North America – involve transshipment hubs, feeder terminals, and inland dry ports. Coordination between these nodes allows containers to move quickly and predictably across borders, modes, and time zones. Ports that engage in **bilateral or multilateral agreements** with other terminals (e.g., green corridors, synchronized customs procedures, slot alignment) are able to reduce dwell time, simplify documentation, and offer more reliable service to carriers and customers.

To support this, many ports have joined **digital logistics platforms** and **Port Community Systems (PCS)** that connect all actors in a unified digital environment. These platforms provide real-time data on cargo status, truck arrivals, equipment availability, vessel schedules, and customs status. When a container is discharged in Hamburg, the system immediately notifies the receiving hub in Prague or Warsaw, where preparations for inland delivery can begin – even before the truck or train departs. This kind of transparency and **data continuity** is critical to just-in-time logistics.

Another important dimension is **collaboration with government agencies**. Ports are subject to national transport, trade, environmental, and security regulations. As trade increases and becomes more complex, seaport operators must maintain constant contact with **customs authorities, health inspection units, immigration, and port police**. These interactions now take place through **single-window systems**, where all documents and clearances can be submitted digitally, reducing human error and processing time.

Many governments also rely on ports as **strategic economic assets**. Ports generate revenue, support employment, and attract foreign investment. In return, national and regional governments provide **infrastructure funding, regulatory frameworks, tax incentives**, and in some cases, direct ownership. Public-private partnerships (PPPs) have become increasingly popular as a means of modernizing terminals, building intermodal corridors, and adopting sustainable technologies. Successful examples include the expansion of Rotterdam's Maasvlakte terminals and Singapore's Tuas Mega Port – both implemented through joint ventures between state authorities and private operators.

In addition to government cooperation, ports are increasingly linked to **multinational logistics providers**, such as Maersk, DP World, MSC, and DHL. These companies use ports as nodes within broader transport and warehousing networks. To attract and retain such partners, ports must offer competitive handling rates, reliable performance metrics, scalable infrastructure, and real-time digital access. Port authorities now compete globally not only on size and location, but on **connectivity, efficiency, and innovation**.

Moreover, collaboration extends to **sustainability and environmental governance**. Green ports coordinate with shipping companies and logistics providers to reduce emissions, adopt clean technologies, and comply with international standards such as IMO 2020 or Fit for 55. Coordinated environmental programs – such as slow steaming incentives, shore-side power integration, or shared carbon tracking – require cooperation across the full logistics chain.

Resilience building is another area where coordinated ecosystems show value. When the COVID-19 pandemic disrupted global shipping schedules, ports had to coordinate with health authorities, customs, and carriers to adjust operations, manage backlogs, and reroute cargo. Ports that maintained strong partnerships were better able to respond quickly and avoid prolonged congestion. In conflict zones or in the case of climate-related disasters, ports must cooperate with emergency agencies and military logistics units to maintain basic cargo movement and humanitarian response.

Digitalization has become the foundation of all this coordination. Beyond PCS, ports are investing in **blockchain-based trade ledgers**, **digital twins**, **AI-based congestion forecasting**, and **smart gate systems**. These systems enable autonomous vehicles, intelligent cranes, and real-time communication with external actors, thus converting ports into **smart logistics nodes** within globally synchronized supply chains.

In conclusion, modern port success relies on collaboration – not only within the terminal, but across entire networks of public, private, and digital partners. The port of the future is not defined solely by capacity, but by its ability to connect, adapt, and lead within the broader logistics ecosystem. As global trade evolves, so must the coordination mechanisms that keep ports at the center of it.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. Why is collaboration essential for the performance of modern seaports?
2. What are some advantages of port-to-port integration agreements?
3. How do digital platforms like PCS improve logistics coordination?
4. What role do government agencies play in supporting port operations?
5. Why are public-private partnerships important in port development?
6. How do multinational logistics providers influence port strategy?
7. What environmental goals are being pursued through port collaboration?
8. How did ports respond to the disruptions caused by COVID-19?
9. What digital tools are used to support port resilience and efficiency?
10. How is the concept of a "smart port" defined in today's logistics ecosystem?

II. True or False?

1. Ports operate independently and do not rely on external actors.
2. PCS platforms provide real-time cargo and customs updates.
3. Governments play no role in financing or regulating ports.
4. Digital twins allow ports to simulate operations for better planning.
5. Public-private partnerships are limited to customs procedures.
6. Ports compete based only on location and physical capacity.
7. Shore-side power is used to reduce emissions while ships are docked.
8. AEO status is managed entirely by private port operators.
9. Blockchain can improve transparency in shipping documents.
10. Port resilience involves cooperation with health and security agencies.

III. Fill in the gaps using the words from the box below:

PCS, integration, resilience, incentives, intermodal, ecosystem, blockchain, single-window, congestion, PPP

1. Ports use ______ platforms to digitally connect customs, carriers, and terminals.
2. Bilateral ______ between ports helps synchronize vessel slots and customs.
3. Green ______ such as tax breaks encourage investment in clean technologies.
4. ______ systems allow all cargo documents to be submitted in one interface.
5. Public-Private Partnerships (______) help modernize terminals and expand infrastructure.
6. Ports that belong to a strong logistics ______ can respond faster to disruptions.
7. Advanced ______ systems simulate port operations for forecasting.
8. Delays in one terminal can cause ______ across the transport network.
9. Cross-border ______ corridors connect ports with rail and inland hubs.
10. ______ technology secures and verifies shipping documentation history.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Сучасні порти є частиною глобальної логістичної екосистеми.
2. Цифрові платформи дозволяють координувати розклад суден і документообіг.
3. Порти співпрацюють із митницею, санітарною службою та прикордонниками.
4. Публічно-приватні партнерства допомагають розширювати портову інфраструктуру.
5. Блокчейн використовується для збереження незмінної історії документів.
6. Концепція «розумного порту» передбачає цифрову інтеграцію з усіма учасниками логістики.
7. Затримки в одному хабі можуть спричинити затори по всьому ланцюгу.

8. У відповідь на COVID-19 порти переглянули свої процедури безпеки.
9. Порти, які мають сильні зв'язки з урядом, отримують доступ до інвестицій.
10. Екологічна співпраця між портами включає використання берегового живлення.

B. Translate from English into Ukrainian:

1. Modern ports rely on external coordination to remain competitive.
2. Real-time data exchange helps reduce errors and delays.
3. Government agencies provide oversight, infrastructure, and legal frameworks.
4. Intermodal connections ensure efficient cargo transfer inland.
5. Port authorities are investing in smart gate systems and predictive tools.
6. Green corridors between ports help meet international environmental targets.
7. Digital twins support operational simulations and infrastructure planning.
8. Collaborative port networks improve trade transparency and routing.
9. Customs declarations are handled via national single-window systems.
10. Multinational logistics companies integrate ports into global supply chains.

TEXT 5: THE FUTURE OF SEAPORT OPERATIONS – CYBERSECURITY, AUTOMATION, AND SUSTAINABLE TRANSFORMATION

As global trade continues to evolve, so too must the systems that support it. Seaports – historically focused on physical handling and spatial expansion – are now entering a new phase of transformation driven by **cybersecurity, automation, artificial intelligence, and sustainability imperatives**. In this new era, the port is no longer simply a place where cargo changes mode – it is a **digitally intelligent, environmentally responsive, and security-driven logistics node** at the center of global commerce.

One of the most urgent challenges facing seaports today is **cybersecurity**. As terminals adopt more digital systems – from Port Community Systems (PCS) and blockchain documentation to automated gate and crane operations – they also become vulnerable to cyber threats. A single attack on a terminal's IT infrastructure can paralyze cargo flows, expose sensitive data, and compromise national security. The 2017 NotPetya malware incident, which affected the global shipping giant Maersk, demonstrated the devastating ripple effects of cyber disruptions. Today, port authorities must invest in **firewalls, intrusion detection systems, data redundancy, encryption, and 24/7 monitoring**. Staff must be trained not only in physical safety, but in cyber hygiene and response protocols.

Automation and artificial intelligence (AI) are also reshaping the port landscape. Automated stacking cranes, driverless container carriers, intelligent yard planning systems, and drone-based inspections are becoming increasingly common. These tools reduce human error, improve accuracy, and increase operational speed. In fully automated terminals such as the Port of Rotterdam's Maasvlakte II, containers are handled by robotic systems with minimal human input, allowing 24/7 operations with fewer delays and lower emissions.

However, automation also raises social and labor questions. The transition to smart terminals affects employment structures, requiring reskilling and negotiation with labor unions. While repetitive or hazardous tasks may be eliminated, new roles in **system monitoring, digital maintenance, and AI-assisted planning** are emerging. Ports must balance innovation with social responsibility and inclusion.

The future of seaport operations is also defined by **sustainability pressures**. Ports are under increasing scrutiny to reduce their carbon footprint, noise, water pollution, and land use impact. Regulators and customers alike are demanding **green corridors, emission tracking, renewable energy use**, and compliance with international environmental standards. Ports across Europe and Asia are now experimenting with **shore-side electricity (cold ironing)**, hydrogen fuel for yard equipment, solar-powered warehouses, and green-certified infrastructure. These innovations reduce greenhouse gas emissions from vessels while docked and align port development with national climate goals.

Climate resilience is another emerging priority. As sea levels rise and extreme weather becomes more frequent, ports must adapt their infrastructure and operations. This includes reinforcing breakwaters, elevating key facilities, upgrading drainage systems, and designing terminals to withstand higher wind and wave loads. Climate risk assessments are now part of long-term port planning in vulnerable regions such as Southeast Asia, the Caribbean, and the Gulf Coast.

In addition, ports are increasingly seen not just as endpoints, but as **strategic hubs within digital supply chains**. The integration of **Internet of Things (IoT)** devices, smart sensors, predictive analytics, and **digital twins** enables port operators to simulate cargo flows, test congestion scenarios, and plan infrastructure upgrades in virtual environments before applying them in real life. This leads to better investment decisions, safer logistics planning, and higher overall resilience.

Looking forward, seaports must also prepare for **changing trade dynamics**. Geopolitical shifts, regionalization of supply chains, nearshoring, and e-commerce growth all alter cargo patterns and require more agile port systems. Ports that were once optimized for mass containerization may now need to serve smaller vessels, more regional volumes, or faster turnover requirements. Agile infrastructure, flexible labor policies, and dynamic digital integration will be essential.

Finally, collaboration between **public authorities, private operators, technology firms, academia, and international organizations** will shape the port of the future. Innovation does not occur in isolation: testbeds for automation, AI labs, green shipping pilots, and digital standards require multi-stakeholder cooperation. As logistics becomes more interconnected and intelligent, ports must lead not only in cargo handling, but in innovation ecosystems.

In conclusion, the next generation of seaport operations is defined by **security, intelligence, adaptability, and sustainability**. Those ports that invest now in cybersecurity, automation, digital coordination, and climate resilience will not only survive – they will lead. As gateways to global trade, ports must evolve from static terminals into **smart, strategic, and sustainable engines of global logistics**.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What cybersecurity threats do modern ports face, and why are they critical?
2. How has automation changed the way ports operate?
3. What are the benefits and challenges of using artificial intelligence in terminals?
4. In what ways must ports adapt to climate change and rising sea levels?
5. What role does shore-side power play in environmental sustainability?
6. Why is workforce reskilling essential in the age of port automation?
7. How do digital twins and smart sensors support port planning?
8. How is the role of ports changing within global and regional supply chains?
9. Why is collaboration important for port innovation and transformation?
10. What core qualities define the "next generation" seaport?

II. True or False?

1. Cyberattacks can paralyze all operations within a port terminal.
2. Shore-side electricity increases emissions during cargo handling.
3. Fully automated terminals require no human involvement.
4. Resilience against climate change is irrelevant to port operations.
5. Automation eliminates the need for all port labor.
6. Smart ports use real-time data to optimize cargo flow.
7. Cold ironing refers to reducing cargo temperature.
8. Climate-resistant infrastructure includes drainage and elevation upgrades.
9. Digital twins simulate port operations before implementation.
10. Ports that invest in sustainability and intelligence will be global leaders.

III. Fill in the gaps using the words from the box below:

automation, intrusion, shoreline, redundancy, sustainability, digital twins, reskilling, emissions, robotics, smart

1. Ports are adopting ______ to improve efficiency and reduce manual labor.
2. Cybersecurity tools include firewalls and ______ detection systems.
3. Shore-side power helps reduce vessel ______ while docked.
4. Staff must undergo ______ to adapt to new automated systems.
5. ______ logistics nodes use sensors and AI to manage operations.
6. ______ is a core goal for ports seeking green certification.
7. Infrastructure ______ is needed to withstand storms and flooding.
8. ______ cranes operate continuously in automated container yards.
9. Ports build ______ into their data systems to protect against failure.
10. ______ models allow port authorities to test changes before building.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Сучасні порти інвестують у захист від кібератак і втрат даних.
2. Автоматизовані системи зменшують кількість помилок і підвищують швидкість.
3. Використання електрики з берега знижує викиди від суден.
4. Порти повинні укріплювати берегову лінію та покращувати дренажні системи.
5. Цифрові двійники дозволяють симулювати зміни в логістиці до їх реалізації.
6. Переорієнтація ланцюгів постачання змінює роль портів у торгівлі.
7. Безпека даних стала такою ж важливою, як і фізична безпека вантажу.
8. У майбутньому порти повинні працювати як центри інновацій.

9. Інтелектуальні сенсори допомагають відслідковувати вантаж у реальному часі.
10. Автоматизація вимагає нових навичок у працівників терміналів.

B. Translate from English into Ukrainian:

1. Port cybersecurity now includes training for all levels of staff.
2. Robotics are being used in cranes, yard transport, and surveillance.
3. Sustainable ports use solar, wind, and hydrogen-based energy.
4. AI systems analyze congestion patterns and suggest route changes.
5. Ports must prepare for geopolitical shifts and e-commerce demand.
6. Collaboration with tech firms accelerates innovation adoption.
7. Cold ironing reduces noise and pollution in urban terminals.
8. Ports that lead in digitalization will shape future logistics.
9. Climate resilience is not optional – it's operationally necessary.
10. The next-generation port is cybersecure, automated, and adaptive.

LEXICAL EXERCISES

Exercise 1. Match the terms to definitions:

TERMS	DEFINITIONS
1. Berth	**A.** Official approval for goods to enter or leave a country
2. Stevedore	**B.** A location where a ship is secured and loaded/unloaded
3. Demurrage	**C.** Delays due to overcrowded terminals or limited capacity
4. Customs clearance	**D.** Worker responsible for loading and unloading cargo manually

5. Terminal automation	**E.** System to handle cargo using robotics and digital tools
6. Smart port	**F.** Professional responsible for operating large lifting machines
7. Cargo inspection	**G.** Document listing items carried by a vessel
8. Port congestion	**H.** Use of digital systems and sensors to optimize port efficiency
9. Crane operator	**I.** Examination of freight for legal or safety compliance
10. Cargo manifest	**J.** Fee charged when a ship stays too long at port

Exercise 2. Fill in the gaps using the words from the box:

berth, inspection, congestion, RFID, authority, yard, cybersecurity, demurrage, clearance, automation

1. The container waited at the ______ for over 12 hours.
2. ______ systems track each shipment's location in real time.
3. The port ______ enforces safety and environmental rules.
4. Customs ______ was completed before the cargo was unloaded.
5. The ship was delayed due to heavy ______ at the terminal.
6. Every container must pass a cargo ______ before release.
7. Failure to unload on time resulted in additional ______ charges.
8. Digital ______ has improved efficiency in large ports.
9. The terminal increased ______ investment after a hacking attempt.
10. Forklifts operate inside the container ______.

Exercise 3. Translate into English:

1. Судно прибуло до швартового місця о 5 ранку.
2. Стивідори працюють на розвантаженні контейнерів.

3. Митне оформлення завершено перед вивезенням вантажу.
4. Контейнер був заблокований для перевірки вантажу.
5. Через перевантаження порту виникла затримка з відправленням.
6. Водії використовують RFID-мітки для швидшого доступу.
7. Порт запровадив цифрового двійника для тестування сценаріїв.
8. Автоматизація терміналу зменшила кількість людських помилок.
9. Електроживлення з берега знижує викиди суден.
10. Плата за простій нараховується після закінчення безкоштовного періоду.

Exercise 4. Translate into Ukrainian:

1. The container yard was full by noon due to vessel delays.
2. The port authority regulates access to all terminal zones.
3. The operator used a digital twin to simulate crane efficiency.
4. Customs clearance is required before inland transport.
5. A cargo manifest must be submitted to port control.
6. Shore-side power reduces environmental impact in busy ports.
7. Demurrage fees apply if loading takes longer than scheduled.
8. Smart ports use real-time data to adjust equipment usage.
9. Cybersecurity threats have become a major concern for port managers.
10. Stevedores and crane operators work together to handle bulk cargo.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Translation**
Berth	швартове місце
Cargo inspection	перевірка вантажу
Cargo manifest	вантажна відомість
Container yard	контейнерний майданчик
Crane operator	оператор крана

English Term	**Ukrainian Translation**
Customs clearance	митне оформлення
Cybersecurity	кібербезпека
Demurrage	плата за простій
Digital twin	цифровий двійник
Environmental compliance	дотримання екологічних норм
Intermodal terminal	інтермодальний термінал
Port authority	портова адміністрація
Port congestion	перевантаження порту
RFID tag	радіочастотна мітка
Shore-side power (cold ironing)	берегове електропостачання судна
Smart port	розумний порт
Stevedore	портовий вантажник (стивідор)
Terminal automation	автоматизація терміналу
Vessel tracking	відстеження судна
Yard tractor	термінальний тягач

GRAMMAR FOCUS: PRESENT PERFECT & PRESENT PERFECT CONTINUOUS IN PORT OPERATIONS

(Опис завершених дій та тривалих процесів у портовій логістиці)

I. Present Perfect

has/have + past participle

Використовується для опису:

- результатів у теперішньому моменті,
- досвіду,
- завершених дій без уточнення часу.

Examples in port context:

- *The vessel* ***has arrived*** *at the terminal.*
- *They* ***have completed*** *customs clearance.*
- *We* ***have handled*** *over 5,000 TEUs this week.*
- *The port* ***has implemented*** *a new digital system.*

II. Present Perfect Continuous

has/have + been + verb-ing

Використовується для опису:

- тривалих дій, що почались у минулому і тривають досі,
- процесів з відчутним результатом у теперішньому.

Examples in port context:

- *They* ***have been unloading*** *the ship since 6 a.m.*
- *The team* ***has been preparing*** *documentation for customs.*
- *The port* ***has been investing*** *in automation technologies.*
- *We* ***have been experiencing*** *delays due to weather.*

GRAMMAR EXERCISES

Exercise 1. Choose the correct form:

1. The crane operators **(have completed / have been completing)** the loading process.
2. We **(have been preparing / have prepared)** the documents for customs since yesterday.
3. The vessel **(has docked / has been docking)** at the quay for over an hour.
4. The port authority **(has issued / have issued)** new safety instructions.
5. He **(has been working / has worked)** in the container yard all morning.

6. They **(have installed / have been installing)** new surveillance systems this month.
7. The logistics team **(has handled / has been handling)** five shipments today.
8. The company **(has been using / has used)** RFID tracking for the last three years.
9. Customs **(has inspected / has been inspecting)** hazardous cargo this morning.
10. We **(have been updating / have updated)** the terminal software regularly.

Exercise 2. Complete the sentence using Present Perfect or Present Perfect Continuous:

1. The ship has just...
2. The workers have been...
3. This port has recently...
4. Since Monday, we have been...
5. The customs office has already...
6. The operator has not yet...
7. The logistics team has been...
8. For the past hour, they have been...
9. The company has invested in...
10. We have not received...

Exercise 3. Translate into English using Present Perfect or Present Perfect Continuous:

1. Порт щойно отримав новий кран.
2. Вони працюють на розвантаженні вже дві години.
3. Ми ще не завершили оформлення документів.
4. Цей термінал використовує автоматизацію з 2020 року.
5. Оператор не відправив звіт.
6. Вони проводять інспекцію небезпечного вантажу з ранку.

7. Порт уже запровадив цифрову систему.
8. Вантажівка чекає з п’ятої години.
9. Ми не отримували скарг від клієнтів цього тижня.
10. Працівники складають контейнери вже півдня.

Exercise 4. Translate into Ukrainian. Pay attention to the usage of Present Perfect or Present Perfect Continuous:

1. The customs officers have already released the shipment.
2. We have been checking the arrival list since early morning.
3. The team has implemented new tracking software.
4. They have not responded to the clearance request yet.
5. Port staff have been following new safety protocols.
6. The ship has been waiting to berth for three hours.
7. We have never used blockchain in this port before.
8. The operator has just scanned the container.
9. They have been transporting bulk cargo all week.
10. Our partners have recently upgraded their facilities.

SPEAKING TASKS

Task 1. Personal Experience & Observation

Topic: *Have you ever observed or learned about a seaport in operation?*

Prompts:

- Where was it located? What did you notice?
- What impressed you most about its organization or infrastructure?
- Did you see evidence of automation or sustainability?
- What challenges do you think that port faces?

Task 2. Pair Interview – Port Operations Simulation

Scenario: *You and your partner are terminal managers preparing for a new container vessel arriving tomorrow.*

Interview questions:

- How will you schedule berthing and unloading?
- Which teams need to be notified?
- What customs or inspection procedures must be prepared?
- Will automation or manual handling be used?
- What risks or delays do you expect?

Goal:

Summarize your operational plan and risk forecast in 3–4 sentences.

Task 3. Mini-Presentation (3–5 minutes)

Choose one topic:

1. How automation is transforming port logistics
2. Port cybersecurity: threats and prevention strategies
3. The role of ports in achieving sustainable global trade
4. Customs clearance as a critical link in international logistics

Structure:

- Introduction → 2–3 Main Points → Real-life Example → Conclusion
- Use key terms: berth, clearance, smart port, congestion, yard, emissions, demurrage

Task 4. Group Discussion – Smart Port Design

Scenario: *Your team is designing a new "smart port" for a growing regional economy.*

Discuss:

- What features must the port include (automation, cold ironing, PCS, etc.)?
- How will it minimize environmental impact?
- How will you balance technology and workforce?

- How will you protect the port from cyber threats?
- What partnerships are needed?

Goal:

Create a short proposal with key infrastructure and technology highlights.

Task 5. Debate

Statement: *Fully automated ports are more efficient, but less resilient.*

Instructions:

Form two teams:

- **Affirmative**: Argue that full automation increases risk, reduces adaptability, and may fail in crises.
- **Negative**: Argue that automation reduces human error, improves throughput, and enhances global competitiveness.

UNIT 10: PACKAGING AND LABELING IN LOGISTICS

TEXT 1: FUNCTIONS AND CLASSIFICATIONS OF PACKAGING IN LOGISTICS

Packaging plays a fundamental role in logistics, acting as the physical and informational interface between the product and every stage of its distribution. It is not merely a container, but a multifunctional element that affects cost, safety, efficiency, and sustainability across the entire supply chain. As global trade intensifies and e-commerce expands, packaging has evolved from simple protection to a strategic tool that supports identification, tracking, storage, handling, and customer experience.

In logistics, packaging is typically divided into **three levels**:

1. **Primary packaging** – the material directly surrounding the product (e.g., a bottle, a pouch, a can).
2. **Secondary packaging** – combines several primary units for easier handling or display (e.g., cardboard boxes, shrink wrap).
3. **Tertiary packaging** – used for bulk handling and transport (e.g., pallets, crates, stretch-wrapped loads).

Each level serves a different function and is optimized for different stages of the supply chain. **Primary packaging** focuses on product integrity and shelf appeal. **Secondary packaging** groups units for efficiency and branding, while **tertiary packaging** ensures safe transport and space optimization in warehouses and vehicles.

The **core functions of packaging** in logistics include:

1. **Protection** – against mechanical damage (shock, vibration), moisture, light, temperature, and contamination. Fragile goods, perishable food, and sensitive electronics require packaging that is specifically adapted to their vulnerability.
2. **Containment and unitization** – grouping items into manageable units that are easier to count, move, and track. Proper unitization reduces loss and handling time.
3. **Communication and labeling** – packages transmit vital information: product codes, expiry dates, handling instructions, barcodes, RFID tags, and legal

labels. Packaging is the primary surface for compliance with **regulations** such as **ADR for hazardous goods**, **IATA** for air freight, or **ISO 780** for symbols.

4. **Convenience** – both for logistics personnel (ease of stacking, lifting, scanning) and for end-users. Standardized dimensions simplify loading into containers, trucks, and shelves.
5. **Efficiency and cost optimization** – packaging affects **transport density**, storage layout, and loading speed. Lightweight, durable materials can lower fuel use and reduce breakage.
6. **Sustainability** – packaging is a key focus of environmental policies. Reducing plastic use, improving recyclability, and designing **returnable packaging systems** are goals pursued by many logistics firms and regulators.

Packaging materials vary widely depending on the product and mode of transport. Common materials include **corrugated cardboard** (for light and medium-weight cargo), **wooden crates** (for heavy or industrial items), **plastic containers** (durable and reusable), **metal drums** (for liquids or chemicals), and **textile sacks** (for grains or powders). **Flexible packaging** like pouches and wraps is also growing in popularity, especially for consumer goods.

In addition to materials, **design** plays a crucial role. A poorly designed package can lead to wasted space, damaged goods, or increased costs. Logistics planners must consider **stacking strength, weight limits, dimensional efficiency**, and environmental conditions during transport (humidity, temperature shifts, pressure changes).

Smart packaging is also gaining momentum. It incorporates **RFID, QR codes, temperature sensors**, and tamper-evident features. These technologies support real-time tracking, traceability, and quality assurance, particularly in food, pharma, and high-value segments.

Packaging performance is often evaluated using criteria such as:

- Resistance to compression, impact, puncture
- Compatibility with mechanized handling systems

- Compliance with international labeling and documentation standards
- Total cost (material + logistics + environmental disposal)

Companies must often **balance competing goals** – e.g., minimizing packaging weight vs. ensuring adequate protection; maximizing space utilization vs. allowing ventilation for fresh goods; reducing packaging cost vs. avoiding product damage.

Finally, packaging decisions must align with logistics strategies such as **just-in-time delivery**, **cross-docking**, or **multi-temperature distribution**. For example, goods passing through automated cross-docking terminals must arrive in stackable, barcode-labeled units that can be sorted without manual repacking. Retailers may request shelf-ready packaging, while international shipments require compliance with customs markings and phytosanitary regulations.

In conclusion, packaging is a critical logistics function that supports the movement, safety, and visibility of goods from origin to destination. As technologies and regulations evolve, so too must packaging strategies – becoming smarter, lighter, more sustainable, and more integrated with digital systems.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What are the three levels of packaging in logistics and how do they differ?
2. How does packaging contribute to product protection during transportation?
3. In what ways does packaging support communication in the supply chain?
4. What is the role of unitization in logistics operations?
5. Why is packaging design important for dimensional efficiency?
6. How does smart packaging enhance traceability and product control?
7. What are the main types of materials used in tertiary packaging?
8. How can companies balance sustainability and protection in packaging?
9. What types of information are typically included on transport packaging labels?
10. How should packaging align with strategies like cross-docking or JIT delivery?

II. True or False?

1. Secondary packaging is used primarily for direct end-user consumption.
2. Tertiary packaging includes pallets and stretch-wrapped units.
3. Wooden crates are typically used for lightweight consumer goods.
4. RFID and QR codes can be part of smart packaging systems.
5. Packaging has no influence on transport density or fuel costs.
6. Proper labeling can help comply with customs and legal requirements.
7. Packaging for cross-docking must allow for manual repacking.
8. Shelf-ready packaging is used in distribution centers only.
9. Packaging design can affect stacking and storage safety.
10. ADR and IATA are regulatory frameworks for labeling and transport.

III. Fill in the gaps using the words from the box below:

unitization, shelf-ready, corrugated, tracking, containment, phytosanitary, primary, pallet, symbols, secondary

1. ______ packaging is in direct contact with the product.
2. ______ cardboard is used for boxes and shipping containers.
3. A ______ label may include handling instructions and temperature limits.
4. ______ packaging supports consumer display at retail locations.
5. ______ packaging groups several units into larger packages.
6. ______ helps group items into single transportable units.
7. A ______ is a typical component of tertiary packaging.
8. ______ documents are needed for international shipments of produce.
9. Good packaging ensures both protection and ______.
10. RFID and barcodes support product ______ in transit.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Первинне пакування безпосередньо охоплює товар.
2. Третинне пакування включає палети й обгорткові матеріали.
3. Упаковка забезпечує захист від вологи, ударів і пилу.
4. Правильне маркування дозволяє уникнути помилок при доставці.
5. Картонна упаковка є легкою, але має обмежену міцність.
6. Система зворотного пакування дозволяє багаторазове використання тари.
7. Смарт-упаковка дозволяє відстежувати температуру під час транспортування.
8. Упаковка має відповідати умовам автоматизованого складу.
9. Упаковка для небезпечного вантажу має відповідати стандарту ADR.
10. Компанія зменшила обсяг пластику в упаковці задля екологічності.

B. Translate from English into Ukrainian:

1. Packaging must support stacking and protect against mechanical damage.
2. Primary, secondary, and tertiary packaging serve different logistics purposes.
3. Smart packaging includes RFID, sensors, and tracking labels.
4. Environmental packaging initiatives aim to reduce waste and carbon footprint.
5. Packaging should comply with international handling symbols and barcodes.
6. Shrink wrap is often used to stabilize palletized loads.
7. Returnable packaging systems lower long-term logistics costs.
8. Customs may require product labeling in multiple languages.
9. Packaging design must consider shelf dimensions and vehicle space.
10. Cross-docking requires packaging that is ready for fast sorting and dispatch.

TEXT 2: LABELING, SYMBOLS, AND REGULATORY MARKINGS IN GLOBAL LOGISTICS

Labeling is one of the most vital components of modern packaging, serving as the **informational layer** that ensures goods are correctly identified, legally compliant, and safely handled throughout the supply chain. A product or shipment without proper labeling can become invisible to tracking systems, rejected at customs, mishandled during loading, or even deemed hazardous by regulators. Effective labeling goes far beyond branding – it plays a central role in **compliance, traceability, and operational efficiency**.

There are several key categories of labeling in logistics:

1. **Identification labels** – These include basic information such as product name, SKU, batch number, quantity, dimensions, origin, destination, and barcodes. This data is essential for inventory systems, order picking, and warehouse scanning.
2. **Regulatory and safety labels** – Required by international transport authorities, these include warnings, hazard symbols, and handling instructions. For instance:
   - The **ADR** (European Agreement concerning the International Carriage of Dangerous Goods by Road) specifies pictograms and UN numbers for chemicals and explosive items.
   - The **IATA** (International Air Transport Association) mandates strict labeling for air cargo, especially for lithium batteries, biological materials, or flammable gases.
   - The **IMO** (International Maritime Organization) governs labeling for seaborne hazardous goods.
   - The **ISO 780** standard defines internationally recognized **pictograms** (e.g., “Keep Dry”, “Fragile”, “This Side Up”).
3. **Instructional labels** – These support proper handling:
   - "Do Not Stack"
   - "Handle with Care"
   - "Keep Frozen"
   - “Clamp Here” (for forklift positioning)
4. **Traceability and tracking labels** – These are essential in modern supply chains and include:

- **Barcodes** (1D and 2D): scanned at various checkpoints
- **QR codes**: can include links to product documentation
- **RFID tags**: embedded for contactless tracking and inventory monitoring
- **Serial shipping container codes (SSCC)**: unique identifiers used in pallet-level logistics

Each type of label must be **clear, durable, weather-resistant**, and positioned for maximum visibility during handling and scanning. Poor labeling leads to scanning errors, delays, misplaced goods, and customs disputes. As such, many logistics providers follow **GS1 standards**, which ensure consistent labeling and coding across international supply chains.

In cross-border transport, **multilingual labeling** is often required to comply with the importing country's language regulations. This is particularly true for food, chemicals, pharmaceuticals, and retail goods. Some labels must include expiration dates, ingredients, allergen warnings, or certification seals – such as **CE**, **RoHS**, or **organic** symbols.

The shift toward **smart labeling** has further transformed logistics. Smart labels can transmit data in real time, detect temperature changes, signal tampering, and interface with mobile apps or warehouse management systems (WMS). This is especially useful in **cold chain logistics**, where certain goods must remain within tight temperature ranges. A temperature-sensitive label that turns color or sends alerts if the product gets too warm is now a standard feature in pharmaceutical and food shipping.

Labeling also supports **reverse logistics and returns processing**. Labels indicating return instructions, return addresses, or reusable package cycles (e.g., "Return to sender") help close the logistics loop in sustainable systems. In circular supply chains, proper return labeling improves tracking, accountability, and reprocessing.

Despite digitalization, physical labels remain indispensable – especially in **multimodal shipping**, where containers change hands between sea, air, rail, and road.

The labeling must remain legible, relevant, and compliant across all legs of the journey.

Finally, labeling is often connected with **customs declarations and electronic documentation**. Matching label information with digital entries in customs databases reduces border delays, prevents discrepancies, and improves international trade fluidity.

In summary, labeling in logistics is not a cosmetic feature – it is a critical **safety, legal, and operational tool**. As supply chains grow more global, automated, and regulated, labeling must meet higher standards of accuracy, durability, and intelligence. The better the label, the smoother the logistics.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What are the main functions of labeling in logistics?
2. What types of information are typically found on identification labels?
3. How does regulatory labeling differ for road, air, and sea transport?
4. What are some examples of instructional handling labels?
5. How do barcodes and QR codes support warehouse operations?
6. What is the purpose of RFID and SSCC in large-scale logistics?
7. Why must labels be weather-resistant and highly visible?
8. What role does multilingual labeling play in global shipments?
9. How does smart labeling benefit cold chain logistics?
10. Why is labeling important in reverse logistics and returns?

II. True or False?

1. Labeling is mainly used for branding and marketing.
2. IATA regulations apply to maritime shipments.
3. The ISO 780 standard defines international pictograms for packaging.

4. Barcodes can only be used at the retail stage.
5. RFID tags enable contactless tracking in warehouses.
6. Fragile goods require clear and specific labeling.
7. Multilingual labels are mandatory in all international deliveries.
8. Tamper-evident labels help detect unauthorized access.
9. Smart labels are replacing physical labels completely.
10. Customs procedures may depend on matching label data with digital records.

III. Fill in the gaps using the words from the box below:

barcode, adhesive, multilingual, tamper-evident, ADR, *pictograms, RFID, expiration, compliance, SSCC*

1. ______ labels help detect if a package has been opened unlawfully.
2. The ______ label includes a machine-readable product number.
3. ______ labels must be printed when shipping to countries with language laws.
4. ______ coding allows pallets to be tracked as unique logistic units.
5. ADR labeling is required for dangerous goods shipped by road under the ______ convention.
6. Cold chain shipments often include ______ sensors or tags.
7. All goods must be labeled in accordance with legal and ______ standards.
8. Symbols like "Fragile" or "Keep Upright" are known as international ______.
9. The packaging must have the ______ date printed clearly for customs.
10. High-quality ______ labels are used to withstand transport conditions.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Маркування є обов'язковим для митного оформлення.
2. Етикетка має містити назву товару, номер партії та країну походження.
3. Згідно з ADR, небезпечні вантажі повинні мати спеціальні символи.

4. Етикетки повинні бути стійкими до вологи, пилу та механічного стирання.
5. Смарт-етикетки дозволяють відстежувати температуру вантажу в режимі реального часу.
6. Для зворотної логістики важливо вказати адресу повернення.
7. У багатьох країнах вимагається маркування іноземною та національною мовами.
8. RFID-технології допомагають прискорити інвентаризацію.
9. QR-коди можуть вести до цифрового паспорта товару.
10. Наклейка з терміном придатності повинна бути чітко видимою.

B. Translate from English into Ukrainian:

1. Regulatory labels reduce risk during the transportation of dangerous goods.
2. Product packaging must include proper pictograms and international codes.
3. RFID allows multiple shipments to be scanned simultaneously.
4. Smart labels detect humidity and temperature breaches.
5. Cold chain failures are often identified using sensor-enabled tags.
6. Customs authorities verify label information against digital manifests.
7. Tamper-evident features increase shipment security.
8. GS1 standards ensure global compatibility of tracking codes.
9. Labels used on reusable packaging must remain readable after multiple cycles.
10. Improper labeling may result in fines, delays, or rejection at the border.

TEXT 3: INNOVATIONS IN PACKAGING – SUSTAINABILITY, TECHNOLOGY, AND THE FUTURE OF LOGISTICS PACKAGING

As the logistics industry adapts to stricter environmental regulations, rising fuel costs, and growing demand for transparency, **packaging is becoming a field of rapid innovation**. No longer seen as a passive protective shell, modern packaging is increasingly expected to deliver value in terms of **sustainability, digital intelligence, cost-effectiveness, and circularity**.

One of the most prominent shifts is toward **eco-friendly packaging solutions**. Companies are replacing single-use plastics with recyclable, compostable, or biodegradable materials. Corrugated cardboard with water-based inks, molded pulp trays, starch-based films, and biodegradable foams are being widely adopted in e-commerce and food logistics. These materials reduce the carbon footprint and comply with **Extended Producer Responsibility (EPR)** policies being introduced in many countries.

In industrial and commercial logistics, the focus is shifting to **reusable and returnable packaging systems**. These include **foldable plastic crates, metal cages, collapsible bulk containers, and reusable pallets**. Used primarily in closed-loop supply chains or within distribution centers, these systems lower total packaging waste and reduce long-term costs. The challenge lies in tracking return flows, managing cleaning and inspection cycles, and ensuring reverse logistics efficiency.

Another significant innovation is the use of **smart packaging** that integrates **sensors, chips, and wireless technology**. These systems support real-time **monitoring of temperature, humidity, tilt, shock, and even light exposure** – critical in pharmaceuticals, electronics, and perishables. Smart labels with **NFC (Near-Field Communication)** or **BLE (Bluetooth Low Energy)** allow operators and customers to access shipment data using smartphones.

Digital printing technologies have revolutionized the customization of packaging. Labels can now include unique QR codes, serialized barcodes, and dynamic content that changes depending on destination, product type, or inventory status. This enables high traceability and adaptive inventory control in fast-moving logistics networks.

As logistics evolves toward **Industry 4.0**, packaging must align with **automated handling systems**, robotics, and AI-driven warehouse operations. Packages must conform to exact dimensions, stacking strength, and barcode readability standards. Even a 1 cm deviation in box height can disrupt automated conveyor or robotic palletizing systems. Consequently, **“automation-friendly” packaging** is now a design standard.

Lightweighting is another trend, aiming to reduce package weight without compromising durability. This reduces shipping costs, fuel consumption, and emissions. Composite packaging, hollow structures, and engineered materials achieve this while maintaining structural integrity.

From a sustainability perspective, logistics companies are adopting **Life Cycle Assessment (LCA)** tools to measure the environmental impact of different packaging formats. They analyze emissions from production, transport, usage, and disposal – helping companies choose materials and designs that minimize harm.

Digital transformation is also helping address **packaging waste**. Some companies are piloting **digital-only delivery labels** that eliminate paper use altogether, or using **smart bins** that track packaging returns and optimize collection routes.

Consumer demand is another key driver of innovation. In B2C e-commerce, buyers increasingly expect packaging to be **minimal, recyclable, and aesthetically pleasing**. Brands are responding with designs that combine protective function with unboxing experience – using embossed logos, peel-and-seal closures, and recyclable cushioning that doesn’t look industrial.

Looking ahead, the future of packaging in logistics will combine **data-driven design, sustainability certification, and interoperability** with digital systems. International platforms like **GS1**, **EUDR**, and **EcoLabel** will standardize green compliance and labeling across markets. Packaging will become **“intelligent by default”**, able to sense, respond, and communicate within digital supply chains.

In conclusion, packaging is undergoing a quiet revolution. Driven by regulation, customer expectations, and automation, it is becoming **lighter, smarter, reusable, and environmentally responsible**. As logistics companies embrace circular models and intelligent infrastructure, packaging will become a strategic enabler of sustainable, efficient, and transparent supply chains.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What materials are commonly used for eco-friendly packaging in logistics?
2. How do reusable and returnable packaging systems work in supply chains?
3. What are the benefits and challenges of implementing smart packaging?
4. How do sensors and wireless technologies support cold chain logistics?
5. What role does digital printing play in modern labeling and tracking?
6. Why is “automation-friendly” packaging important for warehouse systems?
7. How does lightweight packaging contribute to sustainability?
8. What is a Life Cycle Assessment (LCA), and how is it applied in packaging?
9. How are customer expectations shaping packaging design in e-commerce?
10. What future trends are expected to shape logistics packaging in the next decade?

II. True or False?

1. Compostable films are widely used in heavy industrial packaging.
2. Smart packaging can monitor shock, tilt, and temperature.
3. Digital printing enables packaging personalization and traceability.
4. Hollow packaging structures are banned due to low strength.
5. Barcode accuracy is critical for automation compatibility.
6. Smart bins help optimize waste collection routes.
7. E-commerce customers prefer bulky, multi-layered packaging.
8. Light packaging increases fuel consumption and delivery costs.
9. NFC and BLE technologies are used in modern logistics labels.
10. All packaging must now be biodegradable by law.

III. Fill in the gaps using the words from the box below:

lifecycle, automation, lightweighting, smart, returnable, traceability, NFC, compostable, customization, circular

1. ______ packaging allows reuse in closed-loop supply chains.
2. ______ packaging communicates with digital devices for data sharing.
3. Packaging ______ evaluates environmental impact from production to disposal.
4. In robotic warehouses, ______-friendly packaging is a must.
5. ______ designs help cut shipping weight and emissions.
6. Consumers demand minimal, ______, and recyclable packaging.
7. ______ labels can connect packages to mobile apps.
8. ______ packaging decomposes naturally and reduces landfill waste.
9. ______ helps identify a shipment's location and history.
10. In a ______ economy, packaging supports reuse and material recovery.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Біорозкладні плівки активно використовуються в харчовій логістиці.
2. Повторне пакування дозволяє зменшити кількість відходів і витрат.
3. Смарт-упаковка може виявляти зміну температури або удар.
4. Надруковані QR-коди дозволяють відстежувати походження вантажу.
5. Автоматизовані склади вимагають точного розміру й міцності упаковки.
6. Полегшене пакування знижує витрати на паливо та доставку.
7. LCA аналізує вплив упаковки на довкілля протягом усього життєвого циклу.
8. Користувачі очікують екологічного та привабливого пакування без надлишку.
9. Смарт-контейнери здатні передавати дані в реальному часі.

10. Майбутнє пакування — це поєднання інтелекту, екології та зручності.

B. Translate from English into Ukrainian:

1. Reusable pallets reduce material waste and long-term logistics costs.
2. Smart packaging alerts managers about shipment damage or heat exposure.
3. Digital printing supports faster, cleaner, and flexible label production.
4. Automation requires strict packaging dimensions and label readability.
5. Lightweight materials reduce environmental impact during transportation.
6. Customers reject packaging with unnecessary layers and non-recyclables.
7. A circular system relies on returns, refurbishment, and reuse.
8. Near-field communication connects packages with digital networks.
9. Compostable mailers are replacing plastic pouches in e-commerce.
10. The logistics industry is investing in sustainable packaging at scale.

TEXT 4: PACKAGING REGULATIONS, STANDARDS, AND COMPLIANCE CHALLENGES IN GLOBAL LOGISTICS

In global logistics, packaging is not only a matter of protection and efficiency – it is also a matter of legal compliance. **National laws, international conventions, industry-specific standards, and safety regulations** all define what kind of packaging is acceptable, how it must be labeled, and what documentation must accompany it. Failing to comply with these requirements may result in delays, fines, denied entry, or even destruction of goods.

International trade flows are governed by various **regulatory bodies and frameworks**. One of the most widely used standards in logistics packaging is **ISO 780**, which establishes internationally recognized pictograms and handling symbols such as “Fragile”, “Keep Dry”, and “This Side Up”. These ensure that handlers across countries and languages interpret package instructions consistently.

Export packaging must often be tailored to the rules of the **destination country**. For example, wooden packaging sent to the EU or the United States must comply with

ISPM 15 – a phytosanitary regulation that requires wooden crates and pallets to be **heat-treated or fumigated** and marked with an internationally recognized stamp. Shipments that violate this rule may be quarantined or rejected.

Another essential area is **hazardous goods packaging**, which must adhere to frameworks such as:

- **ADR** (European transport by road)
- **IATA Dangerous Goods Regulations (DGR)** for air freight
- **IMO IMDG Code** for maritime shipments

These frameworks specify how hazardous materials should be packed, labeled, marked with UN numbers, and accompanied by specific documentation such as safety data sheets. The type of container, packaging material, and even packaging inner linings must meet strict resistance criteria and pass drop and leak tests. Failure to follow these rules can endanger people, infrastructure, and the environment — and result in legal consequences.

Sector-specific packaging compliance is also critical. For example:

- **Pharmaceutical packaging** must follow Good Distribution Practice (GDP) and ensure tamper-proof labeling, validated temperature control, and traceability.
- **Food packaging** must comply with hygiene, allergen labeling, and shelf-life requirements (often under **EU 1169/2011** or **FDA FSMA**).
- **Electronics packaging** may require anti-static protection and compliance with **RoHS** and **WEEE** directives.

Additionally, many countries demand **labelling and documentation in their official language**. Customs authorities may block shipments that have English-only labels, especially for products like chemicals, food, cosmetics, and personal care items.

Another layer of complexity is added by **environmental compliance**. Increasingly, importers must demonstrate that their packaging meets recycling targets or does not contain banned materials. The **EU Packaging and Packaging Waste**

Directive, **Green Dot system**, and **EUDR** (European Deforestation Regulation) require companies to document sourcing, recycling, and material traceability.

In some regions, packaging must also meet **product safety** and **consumer protection regulations**. Misleading or missing labeling, incorrect material declarations, or use of non-approved packaging for food contact can trigger fines or market recalls.

To manage these risks, many logistics companies now rely on **compliance departments, third-party verification agencies**, and **automated document management systems**. These tools help standardize labeling, validate packaging specs, and flag inconsistencies before goods are shipped.

However, even with best practices, **compliance failures still occur**, often due to:

- Poor translation of regulatory language
- Lack of harmonized labeling systems
- Inconsistent packaging across SKUs or markets
- Last-minute product modifications
- Supply chain fragmentation between manufacturer, packer, and distributor

A single shipment may cross **multiple jurisdictions** – each with its own inspection procedures and legal criteria. Thus, ensuring packaging compliance becomes not just a legal task but a **strategic function** that directly impacts delivery speed, customer satisfaction, and operational cost.

In conclusion, packaging compliance is a critical component of global logistics. It intersects with safety, health, customs, environmental law, and commercial regulation. Companies that take packaging regulations seriously – by building internal expertise, using standardized systems, and cooperating with customs brokers – are better positioned to avoid costly disruptions and ensure secure, lawful, and efficient global transport.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What are the main legal consequences of non-compliant packaging in international logistics?
2. What does the ISO 780 standard regulate in the context of packaging?
3. How does ISPM 15 affect wooden packaging and pallets?
4. What are the key packaging requirements for hazardous goods?
5. What sector-specific standards exist for pharma, food, and electronics?
6. Why is multilingual labeling important in customs clearance?
7. What are some environmental compliance frameworks affecting packaging?
8. How can companies ensure compliance before international shipment?
9. What are typical reasons for packaging-related customs rejections?
10. Why is packaging compliance considered a strategic function?

II. True or False?

1. All wooden packaging must be painted before export.
2. ISO 780 regulates global safety symbols on packages.
3. ADR, IATA, and IMO have identical packaging requirements.
4. Tamper-evident labels are mandatory for pharmaceutical shipments.
5. A food shipment labeled only in English may be rejected in some countries.
6. Compliance with RoHS applies to all textile shipments.
7. Drop tests are required for packaging hazardous goods.
8. Customs authorities check packaging materials for recycling compliance.
9. Using third-party agencies can help reduce regulatory risks.
10. Packaging standards do not vary between product categories.

III. Fill in the gaps using the words from the box below:

ISPM, phytosanitary, multilingual, compliance, ADR, documentation, customs, verification, GDP, recycling

1. The ______ marking is required for wooden pallets used in exports.
2. Pharmaceutical packaging must follow ______ standards to ensure integrity.
3. ______ packaging instructions are essential to pass health inspections.
4. Goods that fail ______ checks may be refused at the border.
5. ______ labeling is mandatory for chemicals in many jurisdictions.
6. ______ authorities can demand full traceability of packaging materials.
7. ______ certificates confirm treatment of wooden crates.
8. Exporters must ensure that their packaging complies with local ______ laws.
9. Hazardous shipments must meet ______ transport regulations.
10. Third-party ______ agencies help validate packaging standards.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Дерев’яна тара має бути термічно оброблена відповідно до ISPM 15.
2. Неправильне маркування може призвести до штрафу або знищення вантажу.
3. ISO 780 встановлює міжнародні символи на пакуванні.
4. Вибухонебезпечні матеріали мають упаковуватись за стандартами ADR.
5. Митниця може заблокувати партію товару через неправильне пакування.
6. Виробники електроніки дотримуються директив RoHS та WEEE.
7. Продукти харчування мають бути марковані державною мовою країни-імпортера.
8. Комплаєнс з екологічними нормами контролюється на рівні ЄС.
9. Тампер-контроль – обов’язковий для фармацевтичного пакування.
10. Найчастіші помилки – це неправильний переклад та нестача етикеток.

B. Translate from English into Ukrainian:

1. Improper packaging may lead to cargo quarantine or refusal.
2. Heat-treated wood must bear the ISPM 15 certification stamp.
3. Customs authorities review environmental documentation for packaging waste.
4. Dangerous goods require drop-tested, certified containers.
5. Multilingual labeling prevents delays and fines during inspection.
6. Electronics must be packed in compliance with anti-static standards.
7. Each product category has its own packaging legislation.
8. Food items must include nutritional and allergen labeling.
9. Good Distribution Practice ensures cold chain compliance for medicines.
10. Inconsistent labeling across SKUs can result in border delays.

TEXT 5: PACKAGING OPTIMIZATION AND COST EFFICIENCY IN LOGISTICS

Packaging is a critical cost component in logistics. While it represents only a small share of the product's value, it has a **disproportionate impact on transport costs, storage efficiency, damage risk, and environmental footprint**. Therefore, packaging optimization is a strategic activity aimed at reducing total logistics costs while maintaining protection, compliance, and handling efficiency.

The true cost of packaging is not limited to the price of materials. It includes **labor, equipment wear, space utilization, fuel consumption, handling time, waste disposal, and damage compensation**. Optimizing packaging means analyzing the total system rather than just minimizing box price.

One of the most common goals is to achieve **dimensional efficiency**. Poorly sized packaging leads to wasted space in containers and trucks, which increases fuel use per unit and limits payload. Over-dimensioned boxes also require more dunnage (internal padding), take longer to stack, and may incur volumetric pricing penalties in air freight.

Case study: A European electronics company reduced box height by 2 cm across its entire line of accessories. This small adjustment allowed an extra layer of boxes per pallet and increased container capacity by 14 %. As a result, they shipped fewer containers, reducing annual logistics costs by 9 %.

Material reduction and substitution is another optimization method. Replacing double-walled cardboard with reinforced single-wall designs, or switching from foam inserts to molded pulp, can reduce both weight and material cost. However, substitution must be tested for protection levels – cost savings from material reduction may be lost if product damage increases.

Automation compatibility is also crucial. Packaging that fits automated handling systems enables faster throughput, fewer errors, and lower labor costs. Standardized box sizes, uniform barcode placement, and rigid structure help avoid robotic misreads, jamming, or rejection in conveyor systems.

Modular packaging design is used to align package dimensions with pallet and container dimensions. For example, boxes that align with the standard **EUR-pallet (1200×800 mm)** or **ISO container** floor plans can maximize stacking density and minimize void space. This approach reduces stretch film usage, improves loading time, and increases route profitability.

In **e-commerce logistics**, lightweight and right-sized packaging is essential to minimize last-mile costs. Courier pricing often depends on **volumetric weight**, so companies now invest in **automated box-sizing systems** that scan each product and produce a custom-fit box on demand. This also improves the customer experience by reducing excess materials and unboxing waste.

Damage cost modeling is a key part of packaging economics. In some supply chains, 2-5% of goods are damaged due to impact, compression, vibration, or humidity. Packaging decisions must weigh material savings against the expected cost of returns, replacements, and brand damage. Optimization tools can simulate damage risk based on transport type, distance, product fragility, and handling frequency.

Packaging standardization across SKUs and markets also improves purchasing efficiency and reduces inventory complexity. Instead of managing 70 box types for 200 products, some companies reduce packaging formats to a small, stackable range that covers 90 % of cases. This simplifies storage, sourcing, and staff training.

Collaboration with logistics partners can unlock further savings. For example, co-designing packaging with carriers ensures compatibility with vehicle sizes and sorting systems. Sharing data on pallet optimization, delivery routes, and stacking success rates helps develop better packaging strategies tailored to real-world conditions.

In conclusion, packaging optimization is not only about saving cents per box – it is about improving the economics of the entire logistics system. Efficient, modular, automation-ready, and protective packaging delivers lower costs, higher speed, and better customer outcomes. As fuel prices rise and pressure grows for sustainability, companies that invest in smart packaging design will achieve significant competitive and financial advantage.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. Why is packaging considered a strategic element in logistics cost structure?
2. What are the hidden costs associated with packaging beyond material price?
3. How does dimensional efficiency affect transport and fuel usage?
4. What was the outcome of the electronics company’s 2 cm box height reduction?
5. What risks come with reducing packaging material too aggressively?
6. How does automation influence packaging design?
7. What is modular packaging, and how does it optimize space?
8. Why is custom-fit packaging important in e-commerce logistics?

9. How can damage cost modeling influence packaging decisions?
10. What are the benefits of standardizing packaging across SKUs?

II. True or False?

1. Packaging cost only includes the purchase price of boxes.
2. Dimensional inefficiency can lead to higher air freight charges.
3. Molded pulp inserts are heavier than foam inserts.
4. Packaging that fits automation systems reduces error rates.
5. EUR-pallets are used to standardize packaging in Asian supply chains.
6. Volumetric weight is relevant for last-mile courier pricing.
7. Damage costs are irrelevant when products are inexpensive.
8. Standardizing packaging types can simplify warehouse training.
9. Packaging optimization reduces unboxing experience in B2C sectors.
10. Packaging co-design with carriers can improve delivery performance.

III. Fill in the gaps using the words from the box below:

modular, damage, throughput, dimensional, custom-fit, optimization, automation, returns, collaboration, simulation

1. ______ packaging helps maximize pallet and container usage.
2. Companies use software to ______ damage risks in transport.
3. ______ boxes reduce the need for excessive padding.
4. Packaging must ensure high speed and low error in ______ systems.
5. ______ packaging lowers total logistics costs across operations.
6. ______ efficiency refers to size-to-space ratio in transport.
7. Excess packaging leads to more waste, lower efficiency, and costly ______.
8. Cost modeling helps balance material savings and ______ rates.
9. Packaging that works with robots ensures smooth warehouse ______.
10. Cross-functional ______ between carriers and suppliers leads to better design.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Оптимізація пакування знижує витрати на зберігання та транспортування.
2. Занадто велика тара займає більше місця та збільшує витрати на паливо.
3. Важливо знайти баланс між легкістю пакування та захистом від пошкоджень.
4. Пакування має бути сумісним з автоматизованими конвеєрами.
5. Модульне пакування полегшує штабелювання на палетах.
6. Надмірне скорочення матеріалів може призвести до збільшення повернень.
7. В інтернет-торгівлі використовують індивідуальні розміри коробок.
8. Уніфікація пакування спрощує навчання персоналу складу.
9. Витрати на пошкодження включають повернення, заміни та втрату довіри.
10. Партнерство з перевізником дозволяє адаптувати пакування до логістики.

B. Translate from English into Ukrainian:

1. Poor packaging dimensions increase container underutilization.
2. Right-sized boxes reduce dunnage and improve pallet density.
3. The company achieved 9% annual savings by redesigning packaging.
4. Automation requires strict placement of labels and openings.
5. Lightweight packaging improves fuel efficiency in long-haul routes.
6. Modular formats align with standard container floor plans.
7. Damage simulation software predicts failure risks in advance.
8. Standardized packaging reduces procurement and storage complexity.
9. Custom-fit e-commerce boxes reduce courier charges.
10. Effective packaging optimization strengthens the entire supply chain.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	**Ukrainian Equivalent**
Automation-compatible	сумісний з автоматизацією
Barcode	штрихкод
Corrugated cardboard	гофрований картон
Custom-fit box	коробка за розміром
Damage risk	ризик пошкодження
Dunnage	наповнювач / амортизаційний матеріал
Environmental compliance	екологічна відповідність
Fragile	крихкий
ISPM 15	міжнародний фітосанітарний стандарт
Label	етикетка
Labeling regulations	вимоги до маркування
Life cycle assessment	оцінка життєвого циклу пакування
Packaging material	пакувальний матеріал
Pallet	палета / піддон
Returnable packaging	багаторазова тара
RFID tag	RFID-мітка
Shrink wrap	термозбіжна плівка
Stackable	такий, що штабелюється
Tamper-evident seal	пломба захисту від розтину
Volumetric weight	об’ємна вага

LEXICAL EXERCISES

Exercise 1. Match the terms to definitions:

TERMS	DEFINITIONS
1. Dunnage	**A.** Tag that stores product info and allows wireless tracking
2. RFID tag	**B.** Material that protects goods inside packages from movement or damage
3. Returnable packaging	**C.** Box designed specifically to fit a product with minimal waste
4. Tamper-evident seal	**D.** Ability to be layered safely in storage or transit
5. Volumetric weight	**E.** Packaging law related to recyclability and material safety
6. Custom-fit box	**F.** Seal that shows if a package has been opened or tampered with
7. Stackable	**G.** Plastic film that contracts tightly when heated
8. ISPM 15	**H.** Returnable crates or containers used repeatedly in logistics
9. Shrink wrap	**I.** Measurement used by couriers based on size, not actual weight
10. Environmental compliance	**J.** Regulation requiring heat treatment of wooden export pallets

Exercise 2. Fill in the gaps using the words form the box:

labeling, barcode, damage, custom-fit, recyclable, fragile, compliance, automation, pallet, dunnage

1. This shipment requires a clear "______" label and extra cushioning.
2. We use ______ boxes for high-value electronics.
3. The ______ was marked incorrectly and caused customs delay.
4. All wooden crates must comply with ______ standards.

5. Proper ______ reduces the risk of vibrations in transit.
6. Every package must be placed correctly on the ______.
7. The scanner couldn't detect the ______ due to poor placement.
8. Packaging must be ______ to meet EU environmental rules.
9. Automation-friendly packaging ensures compatibility with sorting systems.
10. The product was damaged due to insufficient ______ protection.

Exercise 3. Translate into English:

1. Коробки повинні бути штабельованими та маркованими належним чином.
2. Повертаєма тара допомагає зменшити витрати на одноразову упаковку.
3. Тампер-контрольна пломба гарантує, що ніхто не відкривав товар.
4. Для експорту дерев'яної тари потрібна обробка за ISPM 15.
5. Термозбіжна плівка фіксує вантаж на палеті.
6. Ми обираємо RFID-мітки для точного відстеження.
7. Вся упаковка повинна відповідати екологічним стандартам.
8. Якщо штрихкод не читається, система зупиняється.
9. Оцінка життєвого циклу дозволяє зменшити вуглецевий слід пакування.
10. Об'ємна вага впливає на тариф при авіаперевезеннях.

Exercise 4. Translate into Ukrainian:

1. Dunnage is essential to protect fragile items inside the crate.
2. ISPM 15 requires wooden pallets to be heat-treated and stamped.
3. Labeling errors can delay customs clearance.
4. We use smart labels with QR codes and RFID tags.
5. Pallet optimization helps reduce container usage.
6. Tamper-evident seals are used in pharma logistics.
7. The packaging must be recyclable and automation-compatible.
8. Volumetric weight affects courier charges for lightweight goods.

9. Life cycle assessment shows the total environmental cost of packaging.
10. Our warehouse uses only stackable returnable boxes.

GRAMMAR FOCUS: ADJECTIVES AND COMPARISONS IN LOGISTICS PACKAGING

I. Types of Adjectives

Adjectives in logistics describe characteristics of packaging, cargo, materials, and procedures.

Adjective Type	Example	Logistics Context Example
Descriptive	*durable, flexible, lightweight*	*The crate is* ***durable*** *and* ***stackable****.*
Quantitative	*many, some, several, few*	*There are* ***several*** *layers of wrapping.*
Qualitative	*eco-friendly, compliant, reusable*	*This is an* ***eco-friendly*** *alternative.*
Material-based	*wooden, plastic, corrugated*	*We use* ***corrugated*** *cardboard boxes.*

II. Comparisons of Adjectives

1. Comparative Form

Used to compare two items.

Structure: *adjective + -er* or *more + adjective*

Examples:

- This box is **lighter** than the previous model.
- Wooden crates are **more resistant** to pressure than cardboard boxes.

2. Superlative Form

Used to compare one item with a group.

Structure: *the* + *adjective* + *-est* or *the most* + *adjective*

Examples:

- This is the **strongest** packaging type we offer.
- Plastic is **the most cost-effective** material for short-term use.

III. Irregular Forms

Positive	Comparative	Superlative
good	better	best
bad	worse	worst
far	farther	farthest

GRAMMAR EXERCISES

Exercise 1. Choose the correct form:

1. Wooden boxes are ______ than plastic ones. *(strong / stronger / the strongest)*
2. This is the ______ packaging we have tested. *(most protective / more protective / protective)*
3. RFID labels are ______ to scan than barcodes. *(easy / easier / easiest)*
4. Recycled film is ______ but less durable. *(cheaper / the cheapest / cheap)*
5. Which solution is ______ for returnable packaging? *(more effective / most effective / effectiver)*
6. The new crates are ______ to stack. *(easy / easier / more easier)*
7. That pallet is ______ than required. *(larger / more large / large)*
8. This box is ______ than the old version. *(light / lighter / lightest)*
9. Foam inserts are ______ for fragile items. *(better / more good / the best)*
10. We chose the ______ supplier for sustainable labels. *(best / better / good)*

Exercise 2. Complete the sentence:

1. Smart packaging is more...
2. Reusable containers are usually...
3. Corrugated cardboard is lighter than...
4. This label is easier to...
5. Among all the options, this one is the...
6. Hazardous goods need...
7. Cold chain boxes are more expensive but...
8. Plastic trays are stronger than...
9. Which box is the most...
10. Returnable systems are better for...

Exercise 3. Translate into English:

1. Це пакування легше, ніж попереднє.
2. Найкраще рішення для свіжих продуктів – термобокс.
3. Картон дешевший, але менш міцний, ніж дерево.
4. Смарт-етикетки точніші, ніж звичайні.
5. Це найефективніша система відстеження в нашому складі.
6. Яка упаковка є екологічнішою?
7. М'яке пакування краще підходить для крихких товарів.
8. Ми обрали найдешевшого постачальника, але якість гірша.
9. Усі наші контейнери стали міцнішими цього року.
10. Логістика вимагає найлегшого й найміцнішого пакування.

Exercise 4. Translate into Ukrainian:

1. This packaging is stronger and more reliable.
2. We chose the most eco-friendly solution available.
3. Paper inserts are cheaper but offer less protection.
4. Smart containers are easier to monitor.

5. Which system is more efficient – barcodes or RFID?
6. That label is clearer and easier to scan.
7. This was the worst supplier we have worked with.
8. Plastic is lighter than metal but not as durable.
9. Our newest product has the simplest packaging.
10. The return rate is higher with reusable boxes.

SPEAKING TASKS

Task 1. Personal Experience & Observation

Topic: *What packaging have you encountered in real-life logistics or shopping?*

Prompts:

- Have you ever received poorly packaged goods? What was the issue?
- What kind of labeling caught your attention — and why?
- Have you seen eco-friendly or reusable packaging?
- What packaging impressed you with its design or functionality?

Task 2. Pair Interview – Logistics Decision-Making

Scenario: *You and your partner are logistics specialists discussing a new packaging solution for electronics exports.*

Interview questions:

- What material and size will you choose?
- How will you reduce damage risk and save space?
- Will the packaging be reusable or single-use?
- How will you label the boxes and track shipments?
- Will your packaging meet international compliance standards?

Goal:

Present your packaging proposal to a supervisor.

Task 3. Mini-Presentation (3–5 minutes)

Choose one topic:

1. Packaging optimization as a tool for logistics cost reduction
2. Importance of proper labeling in international transport
3. Smart and eco-friendly packaging: future trends
4. How packaging design affects warehouse automation

Structure:

- Introduction → Key Points → Example → Conclusion
- Use vocabulary like: recyclable, pallet, barcode, modular, compliance, RFID, volumetric weight

Task 4. Group Discussion – Redesigning a Packaging System

Scenario: *Your team must redesign packaging for fragile medical devices being shipped globally.*

Discuss:

- What materials and box dimensions will you use?
- How will you balance cost, protection, and sustainability?
- What labeling and regulatory standards must be followed?
- How will you ensure temperature control and traceability?
- Can your packaging be reused or returned?

Goal: Prepare a brief project summary with justification.

Task 5. Debate

Statement: *Packaging should prioritize sustainability, even if costs rise.*

Instructions: Form two groups:

- **Affirmative**: Argue that sustainability is essential for long-term competitiveness and compliance.
- **Negative**: Argue that cost-efficiency and damage prevention must come first in global logistics.

UNIT 11: GREEN LOGISTICS AND SUSTAINABILITY

TEXT 1: INTRODUCTION TO GREEN LOGISTICS AND SUSTAINABLE TRANSPORT

Green logistics refers to the **strategic planning and implementation of environmental practices** across all stages of the supply chain, with the goal of reducing ecological damage while maintaining operational efficiency. In today's global economy, companies must consider not only speed and cost, but also their environmental footprint. This includes carbon emissions, noise pollution, energy use, packaging waste, and land occupation.

The term *green logistics* encompasses a wide range of activities: from **eco-friendly packaging and emission control**, to **energy-efficient transportation, warehouse sustainability, and return logistics optimization**. All logistics actors – manufacturers, carriers, freight forwarders, and retailers – are being held responsible for their environmental performance. Increasingly, regulatory frameworks, client demands, and corporate sustainability goals require companies to **adopt greener strategies** and **document their environmental impact**.

One of the most important concepts in green logistics is the **reduction of CO_2 emissions**, especially in the transport sector. Freight transport is one of the largest contributors to greenhouse gas emissions. To address this, companies are encouraged – and sometimes required – to implement strategies such as:

- Using **electric or hybrid vehicles**
- Transitioning to **rail or intermodal transport**
- **Optimizing delivery routes** through digital planning systems
- Consolidating shipments to reduce partial loads
- **Introducing biofuels** or alternative energy sources

In the warehousing sector, energy consumption can be reduced through the use of **LED lighting, motion sensors, improved insulation**, and **solar energy systems**. Modern warehouses are also being designed with **LEED or BREEAM certification**, which evaluate environmental performance across multiple areas including water usage, energy, and materials.

Governments and international organizations are now requiring logistics firms to **report, monitor, and reduce emissions**. In the EU, the "Fit for 55" package obliges transport companies to lower carbon output by at least 55% by 2030. The **IMO 2020 regulations** limit sulphur content in marine fuels, while the **Carbon Border Adjustment Mechanism (CBAM)** forces companies to account for carbon costs when importing goods.

However, green logistics is not only about compliance. It also brings **long-term business benefits**:

- Reduced fuel costs
- Enhanced brand image
- Competitive advantage in sustainable markets
- Access to government incentives and subsidies
- Lower waste management costs

To achieve sustainable operations, logistics must be **re-evaluated at every level**: vehicle choice, delivery frequency, packaging materials, warehouse design, staff training, and customer behavior. Clients are becoming more sensitive to green issues, and many prefer to order from companies that offer **carbon-neutral delivery** or **sustainable return policies**.

It is important to note that **no single solution** can make a supply chain fully green. Instead, companies must integrate **multiple incremental improvements**, measure their environmental impact, and report transparently. Digitalization plays a key role in this process. With tools like **transport management systems (TMS), emissions calculators, and IoT sensors**, logistics data can be tracked, analyzed, and used to reduce inefficiencies.

In conclusion, green logistics is no longer optional – it is a **strategic imperative**. Companies that integrate environmental thinking into their logistics networks not only protect the planet but also improve performance, cut costs, and increase customer loyalty. As global regulations tighten and public awareness grows, the logistics of tomorrow must be both smart and sustainable.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What is the main purpose of green logistics in the supply chain?
2. Which environmental aspects are addressed by sustainable logistics?
3. What are the key strategies for reducing transport-related emissions?
4. How can warehousing be optimized for energy efficiency?
5. What does the "Fit for 55" initiative require from logistics companies?
6. How does digitalization support green logistics implementation?
7. What types of certifications can warehouses obtain for sustainability?
8. What business advantages does green logistics provide?
9. Why is a multi-level approach necessary for sustainability in logistics?
10. How do customer preferences influence green logistics practices?

II. True or False?

1. Green logistics only focuses on packaging.
2. Companies are legally required to report emissions in some countries.
3. Marine fuels must meet sulphur limits under IMO 2020.
4. Customers have no influence on sustainability policies.
5. LED lighting reduces energy use in warehouses.
6. Carbon-neutral delivery has no impact on brand image.
7. Digital route planning helps optimize emissions.
8. A single innovation can make a supply chain fully green.
9. Hybrid trucks and trains help reduce CO_2 emissions.
10. Solar power is used in eco-friendly warehouse design.

III. Fill in the gaps using the words from the box below:

emissions, optimization, solar, compliance, carbon-neutral, packaging, incentives, digitalization, certification, insulation

1. The company uses ______ panels to power its distribution center.
2. Government ______ support the shift to green infrastructure.
3. ______ of delivery routes can lower fuel consumption.
4. All warehouses must follow environmental ______ standards.
5. Clients often prefer ______ shipping options.
6. Modern logistics systems rely on ______ to reduce waste.
7. Poor ______ causes energy loss in cold storage warehouses.
8. Biofuels help reduce harmful transport ______.
9. Green warehouse projects may seek LEED or BREEAM ______.
10. Eco-friendly ______ reduces waste and improves recyclability.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Зелена логістика зменшує викиди й покращує екологічний імідж компанії.
2. Уряди вимагають звітувати про рівень викидів парникових газів.
3. Оптимізація маршрутів допомагає знизити витрати пального.
4. На складах використовують енергоощадне освітлення та сонячні панелі.
5. Система Fit for 55 встановлює суворі екологічні цілі до 2030 року.
6. Споживачі обирають постачальників із вуглецево-нейтральною доставкою.
7. Сертифікація BREEAM оцінює енергоефективність і використання ресурсів.
8. Біопаливо — це стале джерело енергії для транспорту.
9. Екологічна упаковка зменшує кількість відходів у ланцюгу постачання.

10.Цифровізація допомагає аналізувати й скорочувати логістичні витрати.

B. Translate from English into Ukrainian:

1. Companies must reduce their environmental impact across all operations.
2. Sustainable transport solutions include rail, hybrid trucks, and route planning.
3. Smart warehouses use solar panels and LED systems.
4. Digital tools track emissions and improve efficiency.
5. Regulatory compliance is a major driver of green logistics.
6. Clients expect transparency in environmental reporting.
7. Packaging plays a key role in reducing waste and carbon footprint.
8. The logistics sector contributes significantly to CO_2 levels.
9. Carbon reporting will be mandatory for EU importers under CBAM.
10. Green logistics is a business necessity, not a trend.

TEXT 2: SUSTAINABLE TRANSPORT STRATEGIES – ALTERNATIVE FUELS, ELECTRIFICATION, AND ROUTE OPTIMIZATION

Transport is one of the most visible and emission-intensive components of the logistics chain. Trucks, ships, planes, and trains move billions of tons of freight each year, consuming vast amounts of fuel and contributing significantly to greenhouse gas emissions. As a result, developing sustainable transport strategies has become a priority for companies and governments seeking to decarbonize supply chains.

One of the most direct ways to reduce transport emissions is by transitioning from **fossil fuels to alternative energy sources**. The most common sustainable alternatives include:

- **Electric vehicles (EVs):** Widely used in last-mile delivery, EVs produce no tailpipe emissions and are ideal for urban environments. Their adoption is supported by government incentives, lower maintenance costs, and growing infrastructure.

- **Hydrogen fuel cell vehicles:** Suitable for long-distance and heavy-duty transport, hydrogen-powered trucks emit only water vapor and offer faster refueling than battery-electric models.
- **Biofuels and synthetic fuels:** Derived from organic materials such as used cooking oil, algae, or agricultural waste, biofuels can replace diesel in existing engines with minimal modification.
- **Liquefied Natural Gas (LNG):** Used mainly in maritime and long-haul trucking, LNG burns more cleanly than diesel but still produces carbon emissions.

In addition to changing the type of fuel, companies must also focus on **operational efficiency**. One powerful method is **route optimization** – using algorithms and GPS data to plan the most fuel-efficient delivery paths. This reduces mileage, idle time, and congestion. Companies that implement dynamic routing software can save up to 15–20% on fuel costs and emissions.

Another strategy is **modal shift** – transferring freight from road to **rail or inland waterways**, which are significantly more energy-efficient. A single freight train can carry the equivalent of 40–50 trucks, consuming less fuel per ton-kilometer and reducing road congestion. Intermodal hubs and standardized containers allow for easier transitions between modes.

Consolidation of shipments also plays a major role. Instead of delivering multiple partial truckloads, companies can combine orders into full-load shipments. This requires better coordination between warehouses, carriers, and customers – often supported by transport management systems (TMS). Full-load logistics not only lowers emissions but also reduces delivery costs and improves resource use.

Some logistics providers are experimenting with **urban micro-hubs and cargo bikes** to deliver goods in city centers without relying on large vans. These methods reduce noise, air pollution, and traffic. Combined with **low-emission zones** and restrictions on diesel vehicles, cities are creating ecosystems that encourage cleaner last-mile logistics.

Beyond the vehicle or route level, transport strategy must consider **fleet maintenance**, **driver behavior**, and **load planning**. Simple practices such as regular engine checks, driver training in eco-driving, and balanced load distribution can yield measurable environmental benefits.

Globally, sustainable transport is guided by regulatory frameworks such as:

- **EU Green Deal** and "Fit for 55" (road transport decarbonization)
- **IMO 2020** and **EEXI/CII** (cleaner shipping)
- **ICAO CORSIA** (carbon offsetting for aviation)
- **Smart Freight Centre's GLEC Framework** for emissions calculation

These policies are pushing companies to **invest in cleaner fleets**, upgrade their routing systems, and report emissions transparently.

In conclusion, sustainable transport is not limited to buying electric vehicles – it is a **multi-layered strategy** that combines technology, planning, and behavior. Companies that integrate alternative fuels, optimize routes, and shift modes will not only reduce their environmental impact but also improve operational resilience and regulatory compliance.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What types of alternative fuels are being used in logistics transport?
2. How do electric vehicles benefit last-mile delivery?
3. What advantages does hydrogen fuel offer for long-distance freight?
4. Why is route optimization important for sustainability?
5. What is a modal shift, and why is it environmentally beneficial?
6. How does shipment consolidation reduce emissions and cost?
7. What are urban micro-hubs, and how do they support clean logistics?
8. How can driver behavior impact environmental performance?
9. Which international frameworks regulate sustainable transport?

10. Why must transport strategy be multi-layered?

II. True or False?

1. Electric vehicles produce tailpipe CO_2 emissions.
2. LNG is a fossil fuel with zero emissions.
3. Route optimization software can reduce both time and fuel usage.
4. Rail transport emits more CO_2 per ton-kilometer than trucks.
5. Partial-load shipments are more sustainable than consolidated ones.
6. Hydrogen trucks are slower to refuel than battery-powered EVs.
7. Cargo bikes can help reduce emissions in urban areas.
8. Modal shift involves changing from road to air transport.
9. Driver training can contribute to greener logistics.
10. Transport strategies should address vehicles, behavior, and planning.

III. Fill in the gaps using the words from the box below:

emissions, intermodal, idle, biofuels, optimization, hydrogen, congestion, modal, cargo, electrification

1. Delivery trucks often generate unnecessary ______ while waiting in traffic.
2. ______ planning systems reduce fuel usage and mileage.
3. ______ logistics combine road, rail, and water-based shipping.
4. ______ fuel cells emit only water vapor as exhaust.
5. ______ bikes are used in low-emission urban delivery zones.
6. A ______ shift helps move freight from road to rail.
7. ______ fuels can be made from cooking oil or algae.
8. Transport-related CO_2 ______ are a major environmental concern.
9. Highway ______ increases both travel time and pollution.
10. Many countries invest in the ______ of truck fleets.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Електричні вантажівки ідеальні для доставки на останній милі.
2. Водневе паливо не створює викидів CO_2.
3. Модальна зміна означає перехід із автошляхів на залізницю.
4. Оптимізація маршрутів знижує витрати й покращує екологічність.
5. Біопаливо виготовляють із відходів сільського господарства.
6. Часткові вантажі об'єднують для зменшення кількості рейсів.
7. Великий вантажний потяг замінює 50 вантажівок.
8. Мікрохаби в містах сприяють екологічній логістиці.
9. Поведінка водіїв впливає на споживання пального.
10. ЄС вимагає декарбонізації транспорту до 2030 року.

B. Translate from English into Ukrainian:

1. Hydrogen trucks offer long range and fast refueling.
2. Cargo bikes are becoming a popular solution for city deliveries.
3. LNG is cleaner than diesel but still emits carbon.
4. Rail freight consumes less energy per ton than road transport.
5. Route optimization tools use real-time traffic data.
6. Combining shipments improves efficiency and reduces waste.
7. Green corridors promote clean fuel usage across borders.
8. Smart Freight Centre provides emissions calculation frameworks.
9. Urban delivery is shifting toward low-noise, low-emission models.
10. Electrification of fleets supports long-term emission goals.

TEXT 3: SUSTAINABLE WAREHOUSING – ENERGY EFFICIENCY, WASTE MANAGEMENT, AND GREEN CERTIFICATION

While transport often receives the most attention in discussions about emissions, warehouses and distribution centers also contribute significantly to a company's environmental footprint. **Sustainable warehousing** focuses on reducing energy consumption, minimizing waste, and improving overall efficiency within storage and fulfillment facilities. As sustainability becomes a core priority, companies must redesign not only what they move, but **how and where they store it**.

One of the key areas of green warehousing is **energy efficiency**. Warehouses often consume large amounts of energy for lighting, heating, cooling, and automation systems. To reduce this footprint, companies are implementing:

- **LED lighting** with motion and daylight sensors
- **High-performance insulation** to regulate internal temperature
- **Natural ventilation and skylights** to reduce reliance on HVAC systems
- **Energy-efficient forklifts** (electric or hydrogen-powered)
- **Smart energy meters and monitoring systems** to track usage in real time

Some facilities are even being equipped with **solar panels** on roofs, allowing them to produce their own electricity and reduce dependency on fossil-based grids. In certain regions, excess energy can be sold back to the grid –making green warehousing both environmentally and economically attractive.

Another major focus is **waste reduction**. Warehouses generate packaging waste, damaged goods, and materials like shrink wrap, pallets, cardboard, and batteries. Green logistics teams are working to:

- Implement **waste sorting and recycling stations**
- Introduce **reusable packaging systems** (e.g., totes, bins, returnable pallets)
- Monitor breakage rates and train staff on gentle handling
- Use **digital documentation** to reduce paper waste
- Collaborate with suppliers on minimal packaging

A growing number of warehouses are seeking **green building certifications**, such as:

- **LEED (Leadership in Energy and Environmental Design)**
- **BREEAM (Building Research Establishment Environmental Assessment Method)**

- **ISO 14001 (Environmental Management System)**

These certifications evaluate energy efficiency, material use, pollution control, indoor environment quality, and operational sustainability. A certified warehouse sends a strong message to clients and investors about the company's commitment to environmental responsibility.

Warehouse automation also plays a role in sustainability. Robotic systems can increase storage density, reduce energy-intensive forklift operations, and minimize labor-related emissions. However, these technologies must also be powered efficiently – which reinforces the need for renewable energy integration.

Water management is another often overlooked area. Rainwater harvesting systems, low-flow fixtures, and water-efficient landscaping reduce water consumption, especially in large regional hubs.

The shift toward **urban warehousing** also supports green goals. By locating fulfillment centers closer to city centers, companies reduce last-mile distances, emissions, and delivery times. These sites are often smaller, more automated, and connected to low-emission delivery fleets like e-vans or bikes.

In conclusion, sustainable warehousing is essential to any company's green logistics strategy. It combines smart design, efficient operations, and waste-conscious practices to reduce environmental impact while maintaining productivity. By investing in certified green buildings, clean energy, and responsible waste policies, companies not only lower their ecological footprint but also build a logistics system that is **resilient, compliant, and future-ready**.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What are the main sources of energy use in traditional warehouses?
2. How does LED lighting contribute to warehouse sustainability?
3. What are the advantages of using solar panels in warehousing?

4. What waste types are most commonly generated in warehouses?
5. How can reusable packaging systems reduce warehouse waste?
6. What is the purpose of green building certifications like LEED and BREEAM?
7. In what ways does automation contribute to warehouse sustainability?
8. Why is water management important in green logistics facilities?
9. How does urban warehousing support environmental goals?
10. What overall message does a certified green warehouse send to stakeholders?

II. True or False?

1. Warehouses are not a significant source of carbon emissions.
2. Smart energy meters allow real-time energy usage tracking.
3. Paper waste is a major environmental concern in digital warehouses.
4. LEED certification focuses only on air conditioning systems.
5. Solar panels can help warehouses become energy independent.
6. Forklifts in green warehouses should run on diesel fuel.
7. Waste sorting stations help improve recycling rates.
8. Water-efficient fixtures are irrelevant in storage facilities.
9. Urban fulfillment centers reduce last-mile transport emissions.
10. Green-certified buildings improve investor perception.

III. Fill in the gaps using the words from the box below:

insulation, shrink wrap, solar, LEED, automation,
ventilation, returnable, rainwater, ISO, forklifts

1. Proper warehouse ______ reduces heating and cooling needs.
2. ______ packaging like bins and totes reduces single-use waste.
3. Smart ______ systems help control temperature and airflow.
4. ______ panels allow buildings to generate clean electricity.
5. ______ is commonly used to secure pallets but adds to plastic waste.

6. Green-certified buildings often meet ______ 14001 standards.
7. ______ harvesting systems are installed to conserve water.
8. ______ trucks produce fewer emissions than gas-powered models.
9. ______ helps warehouses increase efficiency and reduce energy use.
10. The facility recently received ______ certification for sustainability.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Склади споживають багато енергії для освітлення та охолодження.
2. Сонячні панелі дозволяють зменшити залежність від електромережі.
3. Упаковка, що повертається, зменшує кількість відходів.
4. Сертифікати LEED і BREEAM підтверджують екологічність будівель.
5. Електрокари і роботизовані системи знижують викиди.
6. Ізоляція та природна вентиляція покращують енергоефективність.
7. Автоматизація підвищує щільність зберігання.
8. На складі впроваджено цифрове відстеження енерговитрат.
9. Урбанізація складів скорочує останній кілометр доставки.
10. Зелений склад покращує репутацію компанії на ринку.

B. Translate from English into Ukrainian:

1. Sustainable warehouses use motion sensors and smart lighting.
2. Returnable containers replace single-use cardboard boxes.
3. ISO 14001 ensures that environmental practices are documented.
4. Rainwater systems reduce dependence on municipal supplies.
5. Shrink wrap is being replaced by reusable securing methods.
6. Warehouses closer to cities help reduce delivery time and emissions.
7. Employees are trained to handle goods with minimal breakage.
8. Natural skylights reduce the need for artificial lighting.
9. Smart meters allow constant monitoring of power usage.

10. A certified green warehouse aligns with global climate goals.

TEXT 4: ECO-FRIENDLY PACKAGING AND REVERSE LOGISTICS IN SUSTAINABLE SUPPLY CHAINS

Packaging plays a crucial role in both product protection and environmental impact. In green logistics, packaging must go beyond functionality and contribute to **sustainability, waste reduction, and resource efficiency**. As public awareness grows and governments tighten regulations, companies are rethinking packaging as a **strategic environmental component** of their logistics systems.

One of the main principles in eco-packaging is the use of **recyclable and biodegradable materials**. Corrugated cardboard, molded pulp, and compostable films made from starch or cellulose are replacing traditional plastic and foam. Additionally, **minimalist design**, **monomaterials** (e.g. using only one type of polymer or fiber), and **water-based inks** make recycling easier and reduce chemical waste.

Many logistics providers now invest in **returnable packaging systems**, where containers, pallets, bins, and crates are returned, cleaned, and reused in closed-loop operations. This model is especially popular in automotive, food service, and electronics industries, where standardized packaging flows between consistent partners. Although the initial cost of returnable units is higher, the **long-term cost savings and environmental benefits** are significant.

Another important area is **reverse logistics**, which refers to the movement of goods and materials from the customer back to the origin point. In green logistics, reverse flows include:

- Returning used or damaged products
- Collecting recyclable materials and packaging
- Managing recalls or end-of-life equipment
- Reusing protective materials like foam, separators, or containers

Reverse logistics is key to **closing the material loop** and reducing landfill. However, it requires additional planning, infrastructure, and coordination. Successful reverse logistics depends on **clear labeling, efficient return channels**, and **customer incentives** such as return credits or discounts.

Eco-packaging also focuses on **volume and weight reduction**. Lightweight designs lower transportation emissions and fuel costs. For example, using thinner plastic film, flat-pack boxes, or inflatable air cushions reduces shipping volume while maintaining protection. Many companies now use **automated packaging systems** that create right-sized boxes on demand, minimizing excess space and filler material.

To ensure sustainability claims are valid, companies seek **third-party certifications** such as:

- **FSC** (Forest Stewardship Council) – for responsibly sourced paper and cardboard
- **OK Compost / EN 13432** – for biodegradable packaging
- **Blue Angel / EcoLabel / Cradle to Cradle** – for overall environmental impact
- **GS1 barcode standards** – for clear, scannable labeling during returns

Moreover, many global brands now print **carbon footprint data** or **eco-badges** directly on packaging to inform consumers and support transparency.

Digital tools also support sustainable packaging. **Packaging lifecycle analysis (LCA) software**, waste reporting systems, and return tracking platforms help companies measure, optimize, and communicate their packaging sustainability.

In conclusion, green packaging is not only about material choice – it's about **system design, recovery logistics, and measurable impact**. Eco-packaging and reverse logistics allow businesses to reduce waste, engage customers, and build a circular supply chain. When implemented effectively, they transform packaging from a disposal problem into a sustainable advantage.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What are the key principles of eco-friendly packaging design?
2. Which materials are commonly used in sustainable packaging today?
3. Why are monomaterials beneficial for recycling?
4. What are returnable packaging systems and where are they used?
5. How does reverse logistics support circular supply chains?
6. What types of goods are typically returned or reused in reverse flows?
7. Why is proper labeling important in reverse logistics?
8. How does reducing packaging weight contribute to green logistics?
9. What third-party certifications validate packaging sustainability?
10. What role does digital technology play in packaging optimization?

II. True or False?

1. Foam and multilayer plastic are ideal for recycling.
2. Returnable crates reduce long-term packaging costs.
3. Reverse logistics only handles defective product returns.
4. Lightweight packaging increases transport emissions.
5. FSC certification applies to sustainable wood and paper.
6. Carbon footprint labels are illegal in most supply chains.
7. Lifecycle analysis tools help optimize packaging design.
8. Recyclable materials are never used in protective packaging.
9. Digital systems can track reusable packaging across shipments.
10. Water-based inks make packaging less eco-friendly.

III. Fill in the gaps using the words from the box below:

monomaterials, returnable, biodegradable, lifecycle,
cushioning, labeling, reverse, FSC, excess, footprint

1. Packaging made of ______ materials is easier to recycle.

2. Many companies now use ______ packaging in closed loops.
3. ______ logistics refers to goods moving back to the origin.
4. ______ containers can be cleaned and reused multiple times.
5. Right-sized boxes reduce ______ packaging and waste.
6. ______ packaging breaks down naturally and safely.
7. Proper ______ is essential for tracking returns.
8. Paper packaging from ______ sources meets sustainability standards.
9. Inflatable ______ protects items while reducing material weight.
10. Lifecycle analysis calculates a product's environmental ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Повертаєма тара зменшує витрати на упаковку та кількість відходів.
2. Зворотна логістика дозволяє повторно використовувати матеріали.
3. Біорозкладні плівки не шкодять навколишньому середовищу.
4. Для переробки краще використовувати упаковку з одного матеріалу.
5. Еко-пломби та етикетки допомагають споживачам робити вибір.
6. Використання автоматичних машин для пакування зменшує надлишки.
7. Правильне маркування полегшує повернення товару.
8. Деякі компанії друкують вуглецевий слід прямо на упаковці.
9. Сертифікат FSC підтверджує відповідальне походження паперу.
10. Програмне забезпечення допомагає контролювати цикл упаковки.

B. Translate from English into Ukrainian:

1. Molded pulp trays are replacing traditional plastic inserts.
2. Biodegradable packaging is certified under EN 13432.
3. Return incentives encourage customers to send back containers.
4. Reverse logistics includes damaged goods, packaging, and recycling.
5. Right-sized packaging reduces filler and transport emissions.

6. Lifecycle software calculates environmental impact per shipment.
7. The Blue Angel label certifies eco-packaging in Germany.
8. Monomaterials simplify separation and increase recycling rates.
9. Reusable bins are common in the electronics supply chain.
10. Water-based inks reduce harmful chemicals in packaging waste.

TEXT 5: GREEN LOGISTICS PERFORMANCE AND INNOVATION

Green logistics performance refers to how effectively companies reduce the environmental footprint of transport, warehousing, packaging, and supply-chain operations while maintaining cost efficiency and service quality. Today, sustainability is no longer optional: global climate policy frameworks shaped by organizations such as United Nations and trade standards promoted by the World Trade Organization push logistics providers toward measurable decarbonization and transparency.

One of the primary constraints on green transformation is financial. The transition to electric or alternative-fuel fleets, on-site renewable energy for warehouses, smart meters, and energy-efficient equipment requires significant upfront capital. Return on investment is often long-term and depends on energy prices, government incentives, and carbon pricing mechanisms. Smaller carriers face higher relative costs, while global integrators can leverage economies of scale. Regulatory uncertainty further complicates planning: evolving customs procedures and emissions reporting regimes – such as those influenced by the European Union's climate legislation – force firms to design flexible compliance strategies and scenario-based budgeting.

Data quality is a structural enabler of sustainability management. Without accurate, granular, and auditable data per shipment, firms cannot quantify emissions, benchmark performance, or demonstrate compliance. Consequently, environmental KPIs (e.g., CO_2 emission per ton-kilometer, fuel intensity, packaging waste rates, warehouse energy intensity) are increasingly embedded into ERP platforms and operational dashboards. Digitalization enables near real-time visibility across multimodal networks, mitigating the opacity created by supply-chain complexity and fragmented subcontracting.

Recent innovations accelerate green logistics performance. AI-driven routing reduces empty miles and energy use; warehouse automation cuts waste and errors; blockchain-based registries enhance the integrity of emissions verification; and smart sensors enable continuous monitoring of energy and fuel consumption. Electric last-mile delivery, alternative fuels for long-haul transport, and carbon-tracking modules integrated into enterprise systems convert sustainability from a reporting burden into an operational optimization tool.

Customer expectations now shape sustainability strategy. B2B clients demand auditable transparency, while end-consumers reward credible eco-labels and low-carbon delivery options. This market pressure, combined with regulatory scrutiny, makes cultural change inside organizations essential. Leadership must embed sustainability into governance, procurement criteria, and performance management. Over time, firms that institutionalize green KPIs, invest in innovation, and professionalize emissions reporting can transform sustainability into a competitive advantage – reducing lifecycle costs, strengthening trust, and securing access to green finance and preferred-supplier status in global value chains.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What are the main financial barriers to adopting green logistics technologies?
2. Why is accurate data important for managing sustainability in logistics?
3. List at least four KPIs used to evaluate environmental logistics performance.
4. How does supply chain complexity affect green logistics efforts?
5. What role does regulatory uncertainty play in planning?
6. What are some recent innovations that support green logistics?

7. How do customer expectations influence company sustainability strategy?
8. Why is a cultural shift necessary for long-term sustainability?
9. What future changes are predicted in customs and emissions reporting?
10. How can companies turn sustainability from a challenge into an advantage?

II. True or False?

1. Green logistics will likely remain optional for most companies.
2. Renewable energy in warehouses lowers operational costs over time.
3. Plastic tax regulations may affect packaging decisions.
4. Without good data, environmental performance cannot be measured.
5. Emissions reporting is usually managed manually by drivers.
6. Blockchain technology can support emissions verification.
7. Customers increasingly ignore sustainability claims.
8. AI may help forecast real-time emissions in multimodal transport.
9. Only large companies are required to use green KPIs.
10. Carbon credit markets allow firms to offset emissions.

III. Fill in the gaps using the words from the box below:

emissions, transparency, automation, dashboards, AI, plastic, ERP, blockchain, investment, KPIs

1. Environmental ______ must be tracked per shipment.
2. Companies need ______ in data to gain customer trust.
3. Logistics ______ allow real-time KPI monitoring.
4. Fleet renewal requires major capital ______.
5. Smart ______ tools optimize routing and energy use.
6. A new ______ tax may raise packaging costs.
7. Warehouse ______ reduces energy waste and human error.
8. ______ platforms can secure emission reporting.

9. Green ______ measure fuel, packaging, and carbon outputs.
10. ______ systems may include carbon tracking modules soon.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Висока початкова вартість – основна перешкода для зеленої логістики.
2. Без точних даних неможливо виміряти вплив на довкілля.
3. Основні показники включають викиди, споживання пального й обсяг відходів.
4. Ускладнені ланцюги постачання ускладнюють узгодження екоініціатив.
5. Нестабільні закони можуть впливати на логістичні витрати.
6. Автономні електромобілі – це тренд у доставці майбутнього.
7. Блокчейн забезпечує прозорість у верифікації викидів.
8. Споживачі обирають бренди з екосертифікацією.
9. IT-системи включають модулі з розрахунку вуглецевого сліду.
10. Стійкість – це не тягар, а конкурентна перевага.

B. Translate from English into Ukrainian:

1. Environmental KPIs track emissions, fuel, and warehouse energy use.
2. Uncertain regulations force logistics firms to plan flexible strategies.
3. Plastic taxes encourage the use of recyclable packaging.
4. Customer demand for transparency shapes corporate behavior.
5. Green dashboards allow real-time sustainability monitoring.
6. Investment in electric fleets can reduce long-term transport costs.
7. ERP platforms will soon include carbon data tracking.
8. Companies that lead in green innovation gain market trust.
9. Blockchain helps secure and verify sustainability claims.
10. Sustainability is a business opportunity – not just a regulatory burden.

LEXICAL EXERCISES

Exercise 1. Match the terms to their definitions:

1. Reverse logistics	**A.** A delivery method that produces no net carbon emissions
2. Biodegradable	**B.** Warehouse powered by photovoltaic systems
3. Carbon-neutral delivery	**C.** Packaging or product that breaks down naturally
4. Renewable energy	**D.** Process of moving goods back from customer to supplier
5. Returnable system	**E.** Legal or regulatory alignment with environmental laws
6. Lifecycle analysis	**F.** Fuel that produces water as its only emission
7. Hydrogen fuel	**G.** Energy from wind, water, or sunlight
8. Environmental compliance	**H.** Evaluation of total environmental impact over time
9. Solar-powered warehouse	**I.** Official label showing eco-standards are met
10. Green certification	**J.** System where containers are reused in cycles

Exercise 2: Fill in the gaps using the words from the box:

recyclable, electric, footprint, offset, reverse, efficiency, emissions, transparency, biodegradable, certification

1. All new packaging must be ______ or reusable.
2. ______ delivery vans reduce air pollution in cities.

3. The company prints its packaging ______ on every box.
4. Carbon credits are used to ______ excess CO_2 output.
5. ______ logistics helps close the material loop.
6. Energy ______ is a key focus in modern warehousing.
7. The system allows real-time ______ of every shipment.
8. ______ materials are becoming common in food logistics.
9. ISO 14001 is an example of green ______.
10. Low ______ levels are now a competitive advantage.

Exercise 3. Translate into English:

1. Зелена логістика зменшує вплив на навколишнє середовище.
2. Електротранспорт не має вихлопних викидів.
3. Біопакування підлягає компостуванню або розкладу.
4. Зворотна логістика дозволяє повторно використовувати ресурси.
5. Сонячні панелі забезпечують енергією складські комплекси.
6. Клієнти очікують прозорості у звітах про викиди.
7. Пакування має бути придатним до переробки.
8. Водневе паливо є чистою альтернативою дизелю.
9. Вуглецеве компенсування допомагає досягти нейтральності.
10. Комплаєнс з екостандартами важливий для митного контролю.

Exercise 4. Translate into Ukrainian:

1. Green logistics combines efficiency with environmental responsibility.
2. All vehicles in the city fleet are now electric.
3. Biodegradable packaging reduces landfill waste.
4. Reverse logistics is key to a circular economy.
5. Warehouses with solar power cut energy bills and emissions.
6. The company tracks emissions using blockchain technology.
7. Carbon-neutral delivery is a strong marketing advantage.

8. Recyclable materials must be separated from general waste.
9. Green certification improves reputation and compliance.
10. Customers demand climate transparency and measurable impact.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Equivalent
alternative fuels	альтернативні види пального
biodegradable material	біорозкладний матеріал
biofuels	біопаливо
carbon emissions	викиди вуглецю
carbon footprint	вуглецевий слід
carbon offset	вуглецеве компенсування
carbon-neutral delivery	вуглецево-нейтральна доставка
electric vehicle (EV)	електротранспорт
emissions reporting	звітність про викиди
emissions tracking	відстеження викидів
energy efficiency	енергоефективність
energy efficiency	енергоефективність
environmental compliance	відповідність екологічним стандартам
green certification	екологічна сертифікація
green logistics	зелена логістика
hydrogen fuel	водневе паливо
lifecycle analysis	оцінка життєвого циклу
packaging footprint	екологічний слід упаковки
recyclable packaging	упаковка, що підлягає переробці

English Term	Ukrainian Equivalent
renewable energy	відновлювана енергія
returnable container	багаторазова тара
returnable system	система багаторазового використання
reverse logistics	зворотна логістика
reverse logistics	зворотна логістика
solar-powered warehouse	склад, що працює на сонячній енергії
supply chain transparency	прозорість ланцюга постачання
sustainable packaging	стале пакування
sustainable transport	сталий транспорт
waste management	управління відходами
zero-emission vehicle	транспорт без викидів

GRAMMAR FOCUS :
MODAL VERBS + PASSIVE VOICE IN GREEN LOGISTICS

I. Modal Verbs in Sustainability Context

Modal Verb	Use case	Example
must	obligation / regulation	*Emissions **must be reported** annually.*
should	recommendation	*Warehouses **should be powered** by solar.*
can	possibility / option	*Green energy **can be used** in logistics.*

Modal Verb	Use case	Example
have to	external obligation	*Companies* ***have to follow*** *EU standards.*
may	permission / uncertainty	*Biofuels* ***may be applied*** *in shipping.*
might	possibility	*Some routes* ***might be optimized*** *by AI.*

II. Passive Voice with Modals

Structure:

modal + be + past participle

Examples:

- Regulations **must be followed** by all logistics firms.
- New technology **can be integrated** into existing systems.
- CO_2 data **should be tracked** for every shipment.
- Diesel trucks **may be banned** after 2030.
- Packaging waste **has to be minimized** to meet targets.

GRAMMAR EXERCISES

Exercise 1. Complete with the correct modal + passive form:

1. All delivery emissions ______ (must/report) to the environmental agency.
2. Energy consumption ______ (should/monitor) monthly.
3. Old diesel vehicles ______ (might/replace) in the next five years.
4. Solar panels ______ (can/install) on warehouse roofs.
5. Packaging ______ (must/design) to be recyclable.
6. Biofuel trucks ______ (may/use) on regional routes.
7. Supply chain data ______ (have to/share) with customs officials.
8. New emission rules ______ (should/implement) gradually.

9. Driver training ______ (can/provide) via e-learning.
10. Dangerous waste ______ (must/handle) according to ISO standards.

Exercise 2. Translate into English:

1. Викиди парникових газів повинні бути задокументовані.
2. Склади мають бути побудовані з урахуванням енергоефективності.
3. Біопаливо може використовуватись у вантажному транспорті.
4. Маршрути мають бути оптимізовані для зменшення викидів.
5. Вся упаковка повинна бути перероблюваною.
6. Водії мають проходити навчання з екологічного водіння.
7. Дані про поставки можуть бути збережені в хмарі.
8. Зворотна логістика повинна бути інтегрована в ланцюг постачання.
9. Відходи мають бути утилізовані належним чином.
10. Зелена стратегія повинна впроваджуватись на всіх рівнях.

Exercise 3. Translate into Ukrainian:

1. CO_2 emissions must be reduced in every part of the supply chain.
2. Electric fleets should be deployed in city logistics.
3. Warehouse energy use can be monitored remotely.
4. Plastic packaging may be replaced with biodegradable alternatives.
5. Solar energy has to be integrated into warehouse systems.
6. Fuel data must be tracked by all freight carriers.
7. Carbon credits can be purchased on certified platforms.
8. Low-impact materials should be used in transport packaging.
9. New green KPIs may be introduced next year.
10. AI-based routing systems might be adopted in urban delivery.

SPEAKING TASKS

Task 1. Personal Experience & Opinion

Topic: *How environmentally responsible is logistics in your region or workplace?*

Prompts:

- Have you seen any examples of sustainable transport or packaging?
- Do companies in your area use green warehouses or EVs?
- What improvements are still needed?
- How important is sustainability for customers or partners?

Task 2. Pair Interview – Green Strategy Planning

Scenario: *You and your partner work at a logistics company planning to reduce carbon emissions by 40% in 5 years.*

Questions to ask each other:

- What changes should we implement first?
- Should we invest in electric vehicles or improve routing?
- How can we make our packaging more sustainable?
- What KPIs should we monitor?
- How can we involve employees and clients in our green strategy?

Goal:

Prepare a summary of the 3 top-priority actions.

Task 3. Mini-Presentation (3–5 minutes)

Choose one topic:

1. Benefits and challenges of adopting green logistics
2. Future technologies shaping sustainable transport
3. Reverse logistics as a tool for circular economy
4. Green packaging: trends, risks, and real impact

Structure:

- Introduction → Key Points → Case or Example → Conclusion
- Use professional terms: reverse logistics, carbon-neutral, recyclable, optimization, emission data, fleet, compliance

Task 4. Group Discussion – Sustainable Warehouse Design

Scenario: *Your team must design a new urban warehouse with a focus on sustainability.*

Discuss:

- What energy systems will you use (solar, insulation, automation)?
- How will you reduce waste and packaging?
- Will your warehouse qualify for LEED/BREEAM certification?
- What transport connections are needed?
- Can reverse logistics be integrated?

Goal:

Present a short pitch of your warehouse concept with green features.

Task 5. Debate

Statement: *Green logistics increases cost without improving logistics efficiency.*

Instructions:

Form two teams:

- **Affirmative:** Argue that green logistics is expensive and slows operations.
- **Negative:** Argue that sustainability improves long-term performance, reduces risk, and meets modern customer expectations.

UNIT 12: LOGISTICS SAFETY AND RISK MANAGEMENT

TEXT 1: COMPREHENSIVE INTRODUCTION TO LOGISTICS SAFETY AND RISK MANAGEMENT

In the contemporary logistics industry, safety and risk management are not optional add-ons – they are essential pillars of operational integrity. As supply chains become increasingly interconnected, digitized, and time-sensitive, the variety and frequency of potential threats are expanding rapidly. A single weak point – whether it be a physical failure, human mistake, or cyber vulnerability – can result in financial losses, reputational damage, legal penalties, and in some cases, danger to human life. Therefore, building a strong, proactive, and system-wide safety and risk management framework has become a strategic necessity for every logistics provider.

1. The Scope of Risk in Logistics

The logistics sector is exposed to multiple categories of risk, each with its own causes, consequences, and control strategies:

- **Operational Risks**: These involve internal failures in logistics operations such as mechanical breakdowns of vehicles, malfunctioning loading equipment, human errors in inventory handling, and unsafe working conditions in warehouses.
- **Security Risks**: These include theft, vandalism, piracy, sabotage, hijacking of cargo vehicles, and unauthorized access to restricted areas. These risks are especially relevant in high-value freight, cross-border trade, and urban distribution.
- **Environmental Risks**: Natural hazards like storms, floods, fires, earthquakes, and extreme temperatures may disrupt deliveries, damage cargo, or endanger infrastructure. Climate change has intensified the unpredictability and frequency of such events.
- **Compliance and Legal Risks**: These emerge from non-compliance with laws, transport regulations, customs procedures, and safety codes. Failure to meet

standards for hazardous materials (ADR, IMDG, IATA DGR) or improper documentation may lead to fines, delays, or shipment rejection.

- **Cyber Risks**: As logistics becomes more digital, threats such as hacking, data theft, system disruption, ransomware, and manipulation of tracking systems are rising sharply.

Each of these categories requires dedicated strategies and must be considered within a holistic risk management system.

2. Risk Assessment and Identification

Effective safety management begins with **risk identification** – mapping every stage of the logistics process to locate potential vulnerabilities. This includes evaluating:

- Infrastructure (warehouses, ports, terminals)
- Transportation assets (trucks, ships, rail, aircraft)
- Digital systems (WMS, TMS, GPS, ERP)
- Human resources (drivers, handlers, managers)
- Goods in transit (value, sensitivity, handling requirements)

Following identification, the next step is **risk assessment**, which evaluates two main criteria:

- **Probability** – the likelihood of the event occurring
- **Impact** – the scale of damage or disruption it could cause

A standard tool used here is the **risk matrix**, which classifies risks as low, moderate, high, or critical – helping managers prioritize them.

3. Preventive Measures and Control Systems

Once risks are assessed, companies implement **preventive measures** to reduce the likelihood of occurrence. These may include:

- **Vehicle inspections** and predictive maintenance schedules to avoid mechanical failure
- **Occupational safety protocols**: PPE usage, safety signage, emergency exits, and forklift training

- **Surveillance systems** with CCTV, motion detectors, and access control
- **Cargo monitoring** through smart tags, GPS tracking, and temperature sensors
- **Employee training** programs on emergency response, cybersecurity, and SOP adherence
- **Supplier audits** to ensure safety compliance across the supply chain
- **Warehouse design improvements**: fireproof materials, automated sprinklers, and zoning

Additionally, proper **packaging and labeling** of dangerous goods is regulated under ADR, IATA DGR, and IMDG codes – which include specifications for UN numbers, hazard symbols, container types, and shipping documentation.

4. Response Planning and Incident Management

Despite prevention, incidents can still occur – making **emergency preparedness** essential. A proper response plan must contain:

- **Crisis management teams** with defined roles and responsibilities
- **Clear communication protocols** for alerting staff, clients, authorities, and media
- **Pre-approved evacuation and first-aid procedures**
- **Insurance coverage**: cargo insurance, liability protection, and vehicle insurance
- **Data backup and IT recovery systems** in case of cyberattacks or power outages
- **Disruption mitigation strategies** (e.g., rerouting, substitute carriers, alternate suppliers)

Companies must also conduct **drills and simulations** to evaluate readiness and correct weak points in response protocols.

5. Risk Monitoring and Performance Indicators

Risk management must be **continuous**, not reactive. Many logistics firms now use **risk management software** and **control dashboards** that provide real-time updates and alerts.

Key Performance Indicators (KPIs) used in logistics safety include:

- Frequency of road accidents per million kilometers
- Number of warehouse incidents per employee per year
- Percentage of successful incident resolutions within 24 hours
- Percentage of on-time deliveries without damage
- Number of cybersecurity alerts resolved without system shutdown

These indicators allow firms to monitor progress, compare sites, and adjust strategies based on performance trends.

6. Global Safety Standards and Certifications

For international operations, compliance with **global standards** is crucial. Key frameworks include:

- **ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road)**
- **IMDG Code (International Maritime Dangerous Goods)**
- **IATA DGR (Dangerous Goods Regulations for Air Transport)**
- **ISO 28000** – Security management systems for the supply chain
- **TAPA (Transported Asset Protection Association)** – certifications for secure freight handling and facilities
- **C-TPAT (Customs-Trade Partnership Against Terrorism)** – U.S.-based voluntary program for cross-border security

Meeting these standards demonstrates due diligence, improves reputation, and avoids border delays or penalties.

7. The Rise of Digital and Cyber Risk

Digital transformation brings speed and efficiency – but also vulnerability. Logistics software, cloud databases, warehouse automation, and IoT devices are all potential attack vectors. *Cyber risks include*:

- **Hacking of vehicle tracking systems**
- **Theft of sensitive shipment or client data**
- **Ransomware freezing warehouse operations**

- **Fake delivery updates sent to customers**
- **Unauthorized access to inventory control systems**

Cybersecurity strategies now involve:

- Multi-factor authentication
- Data encryption
- Role-based access control
- Network segmentation
- Security audits and staff awareness training

Cyber resilience is now as important as physical security in logistics.

8. Conclusion

Safety and risk management in logistics is a multidimensional task. It spans physical security, regulatory compliance, environmental protection, digital defense, and emergency response. A successful strategy must be integrated, data-driven, and supported by all levels of the organization – from drivers and warehouse staff to top management. By proactively managing risks, logistics companies not only protect their assets and people but also ensure the resilience, trust, and long-term competitiveness of their operations.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. Why is risk management considered a strategic necessity in modern logistics?
2. What are the five main categories of logistics risks, and how do they differ?
3. What is the purpose of a risk matrix, and how is it used in logistics?
4. Describe at least five preventive safety measures used in warehouses or during transport.
5. What role does staff training play in maintaining safety across the supply chain?
6. What types of incidents require a structured emergency response plan?

7. Name and explain three key performance indicators (KPIs) used to monitor logistics safety.
8. Why is compliance with international standards like ADR or IATA DGR critical for global transport?
9. What cybersecurity threats affect logistics operations today?
10. How does integrated safety management support long-term business resilience?

II. True or False?

1. Risk management in logistics is only about physical safety.
2. The risk matrix helps companies prioritize threats based on impact and likelihood.
3. Cybersecurity is not relevant in logistics because it's not an IT industry.
4. GPS tracking is a useful tool for cargo safety and theft prevention.
5. Dangerous goods do not require special documentation during shipment.
6. Employee training reduces the number of accidents in warehouses.
7. All logistics risks can be fully eliminated with good planning.
8. TAPA and ISO 28000 relate to safety and security management in logistics.
9. Reverse logistics is part of cyber risk management.
10. Safety KPIs help monitor performance and adjust strategies.

III. Fill in the gaps using the words from the box below:

surveillance, compliance, simulation, SOPs, encryption, mitigation, hazard, hijacking, assessment, resilience

1. Fire is a common environmental ______ in warehouse operations.
2. Risk ______ helps determine the probability and impact of threats.
3. Transport ______ occurs when goods are forcibly stolen in transit.
4. Companies must follow safety ______ such as ADR and IMDG.

5. ______ plans are essential for handling emergencies effectively.
6. Continuous monitoring and ______ of risks is part of good management.
7. CCTV and ______ systems improve cargo security.
8. Cybersecurity measures like data ______ help prevent theft.
9. Standard Operating Procedures, or ______, reduce human error.
10. Organizational ______ ensures stability after safety incidents.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Управління ризиками в логістиці охоплює фізичну та цифрову безпеку.
2. Ризики класифікуються за ймовірністю та рівнем впливу.
3. Кіберзагрози включають крадіжку даних і злом систем стеження.
4. Навчання персоналу зменшує кількість нещасних випадків.
5. Для небезпечних вантажів обов'язкове маркування та спеціальна тара.
6. Системи відеонагляду підвищують рівень безпеки складів.
7. План реагування має включати список контактів і евакуацію.
8. ISO 28000 – це стандарт управління безпекою ланцюга постачання.
9. KPI допомагають відстежувати кількість аварій і порушень.
10. Безперервний моніторинг – основа стійкої логістики.

B. Translate from English into Ukrainian:

1. Safety risks must be identified and assessed before transport begins.
2. Staff must follow standard operating procedures to ensure safety.
3. GPS trackers and temperature sensors protect sensitive cargo.
4. Compliance with global safety standards avoids border delays.
5. Incident response plans include communication and recovery strategies.
6. Fire suppression systems must be installed in large warehouses.
7. Cyberattacks can disable inventory systems and cause delivery failures.
8. A risk matrix helps prioritize which threats to address first.

9. Vehicle inspections reduce operational and legal risks.
10. Resilience means continuing operations even after disruptions.

TEXT 2: TRANSPORT SAFETY AND CARGO PROTECTION IN LOGISTICS OPERATIONS

Transporting goods from one location to another may seem routine, but in logistics, each movement introduces a set of serious risks. Whether goods are moved by truck, rail, air, or sea, there is always the potential for accidents, theft, damage, delays, or even total cargo loss. Managing these risks during transportation is a core part of logistics safety and requires a combination of technological tools, legal compliance, proper packaging, and well-trained personnel.

1. Common Transport Risks and Threats

Different types of transport present different safety concerns. Road transport, which is the most common, is especially vulnerable to:

- **Traffic accidents** caused by weather, driver fatigue, or mechanical failure
- **Cargo theft or hijacking**, particularly in high-risk regions or during night travel
- **Load shifting** due to poor securing or incorrect weight distribution
- **Vehicle breakdowns** that cause delivery delays or exposure to theft

Rail freight is generally safer but may be affected by derailments, strikes, or vandalism. Maritime transport faces risks such as:

- **Rough seas** damaging containers
- **Container loss overboard**
- **Piracy** in specific international waters
- **Delays due to port congestion or customs inspection**

Air cargo, though highly secure, can be delayed by **weather**, **security alerts**, or **airport handling errors**.

2. Cargo Damage: Causes and Consequences

One of the most common and costly transport risks is **cargo damage**. This may result from:

- **Improper packaging** or insufficient cushioning
- **Vibrations, shocks, or tilting** during transit
- Extreme temperatures or humidity
- Mishandling during loading or unloading
- Stacking pressure causing deformation or collapse of boxes

Consequences include financial losses, insurance claims, customer dissatisfaction, and waste. Repeated damage incidents can harm business reputation and increase operating costs.

3. Cargo Protection Measures

To reduce transport risks, logistics companies implement several layers of **protection and control**. These include:

a) Packaging and Load Securing

Proper packaging is the first line of defense. It must be tailored to the nature of the goods – fragile, perishable, hazardous, or sensitive to moisture.

- **Palletization**, **shrink-wrapping**, **cushioning**, and **shock-absorbing inserts** help maintain cargo integrity.
- **Load securing equipment** such as straps, bracing bars, anti-slip mats, and corner protectors prevent movement.
- For dangerous goods, packaging must comply with international regulations like **ADR**, **IMDG**, and **IATA DGR**.

b) Vehicle Safety Equipment

Trucks and transport units must be equipped with:

- **Anti-lock braking systems (ABS)**
- **Cargo compartment seals and locks**
- **Fire extinguishers and hazard kits**
- **Onboard cameras and rear-view sensors**
- **Temperature and humidity monitors** for cold chain cargo

c) Tracking and Monitoring Systems

Modern logistics uses real-time tracking to improve safety:

- **GPS-based fleet management systems** show vehicle location, speed, and route in real time
- **Geo-fencing alerts** trigger warnings when vehicles deviate from designated routes
- **Cargo condition sensors** report temperature, shock, tilt, or humidity anomalies
- **Telematics systems** send alerts about mechanical issues or risky driving behavior

4. Staff Training and Procedures

Even with advanced equipment, transport safety depends on people. Logistics companies must invest in:

- **Driver training programs** focused on defensive driving, emergency procedures, and cargo handling
- **Checklists for pre-trip inspections** of vehicles and loads
- **Clear communication protocols** between drivers, dispatchers, and security staff
- **Guidelines for parking in secure, well-lit areas** during long-haul trips
- **Incident reporting procedures** that include photos, timestamps, and location data

5. Cargo Theft and Prevention

Cargo theft remains a serious concern, especially in high-density or high-value logistics corridors. Criminals target:

- Electronics, pharmaceuticals, fashion goods, and alcohol
- Poorly guarded trailers parked overnight
- Drivers using predictable routes or stopping at unsecured rest areas

Preventive strategies include:

- Route planning to avoid high-risk zones
- Coordinating with law enforcement in case of incidents

- Using **tamper-evident seals** and **electronic locks**
- Staggering shipment times and vehicles to reduce predictability
- Limiting driver access to sensitive cargo data

6. Transport Insurance and Liability

Even with precautions, accidents happen. That is why all logistics operators must have ***comprehensive transport insurance***, including:

- **Cargo insurance** for theft, damage, or loss
- **Third-party liability insurance** for accidents involving other vehicles or pedestrians
- **Environmental insurance** for hazardous goods that may cause pollution in case of an incident

Shippers and logistics firms must also understand **INCOTERMS** and **contractual responsibilities** to clarify who bears the risk and cost at different stages of transport.

7. Legal and Regulatory Compliance

Every country and mode of transport has its own safety regulations. Failing to comply may result in:

- Fines
- Seizure of cargo
- Revocation of licenses
- Delays and legal proceedings

Important frameworks include:

- **ADR** – for dangerous road cargo
- **IATA DGR** – for air freight
- **IMDG Code** – for maritime cargo
- **CMR Convention** – for international road transport documentation
- **Customs security programs** like AEO or C-TPAT

8. Conclusion

Safe transport is a balance between proactive risk reduction and emergency readiness. Companies that combine proper packaging, secure transport units, trained staff, digital tracking, and legal compliance create a strong defense system around their cargo. As logistics becomes more complex and fast-paced, investing in transport safety is not a cost – it is a commitment to quality, reliability, and client trust.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What types of transport-related risks are common in road, rail, sea, and air logistics?
2. What are the main causes of cargo damage during transportation?
3. How can proper packaging and securing prevent cargo loss or damage?
4. What technical equipment is used in trucks to improve cargo safety?
5. How do tracking and monitoring systems support safe delivery?
6. What topics should be included in driver safety training programs?
7. What strategies help prevent cargo theft during long-distance transport?
8. Why is transport insurance essential in modern logistics operations?
9. How do international regulations like ADR and IATA DGR influence packaging and labeling?
10. What are the consequences of failing to comply with transport safety standards?

II. True or False?

1. Air cargo is more vulnerable to cargo theft than road transport.
2. Load shifting can be caused by incorrect weight distribution.
3. Telematics systems provide real-time route and engine condition data.
4. Packaging is not considered a safety element in cargo transport.
5. Geo-fencing allows dispatchers to receive alerts if vehicles go off route.

6. Shrink-wrapping is used to protect goods from UV radiation.
7. Seals and electronic locks help prevent unauthorized cargo access.
8. Insurance is optional in international transport agreements.
9. All drivers are responsible for inspecting vehicles before departure.
10. Using predictable delivery routes increases the risk of theft.

III. Fill in the gaps using the words from the box below:

tamper-evident, derailment, humidity, telematics, pallets, training, CMR, GPS, shock, compliance

1. Packaging must protect cargo from ______, vibration, and tilt.
2. ______ systems monitor both vehicle condition and driver behavior.
3. ______ labels and seals show if a package has been opened.
4. Wooden ______ help stabilize goods and allow forklift use.
5. Staff ______ includes emergency response and cargo handling.
6. ______ sensors help control temperature-sensitive shipments.
7. Drivers must carry ______ documents during cross-border road transport.
8. The company uses ______ tracking for every high-value vehicle.
9. Poor ______ with safety regulations can result in cargo seizure.
10. A train ______ can cause significant delays and cargo loss.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Вантажні перевезення супроводжуються ризиками викрадення, аварій і псування.
2. Неправильне закріплення вантажу може призвести до зсуву й пошкодження.
3. Захисне пакування включає плівку, прокладки та кутники.
4. Моніторинг маршруту здійснюється через супутникову навігацію.

5. Температурні датчики необхідні для холодного ланцюга постачання.
6. Використання одних і тих самих маршрутів підвищує ризик пограбування.
7. ADR регулює перевезення небезпечних вантажів автошляхами.
8. Страхування покриває збитки у разі аварії або крадіжки.
9. Диспетчер має отримати сигнал при відхиленні маршруту.
10. Кожен водій повинен пройти інструктаж із безпеки.

B. Translate from English into Ukrainian:

1. Road accidents are the leading cause of cargo damage.
2. Electronic locks reduce unauthorized access to the trailer.
3. Warehouse staff must load and secure cargo properly.
4. Piracy is a security risk for maritime transport in some regions.
5. Packaging must be marked according to international standards.
6. Geo-fencing allows real-time location control for every vehicle.
7. Thermal insulation is used to protect temperature-sensitive cargo.
8. All goods must be covered by a valid insurance policy.
9. Customs may inspect CMR documents at the border.
10. Drivers are trained to react in case of fire or robbery.

TEXT 3: WAREHOUSE SAFETY – RISK PREVENTION, INCIDENT MANAGEMENT, AND DIGITAL CONTROL

Warehouses are critical nodes in every logistics network. They function as the central hubs for receiving, storing, picking, packing, and dispatching goods. However, they are also zones of high operational intensity – with moving vehicles, equipment, materials, and people all interacting in real time. This dynamic environment presents numerous safety challenges, from physical injuries and equipment accidents to fire hazards and unauthorized access. As logistics volumes grow, companies must invest in **robust warehouse safety systems** that combine procedures, technology, and staff involvement.

1. Common Safety Risks in Warehousing

Warehouse operations face a variety of **internal and external risks**, such as:

- **Slips, trips, and falls**, often due to spilled liquids, uneven flooring, or cluttered aisles
- **Forklift collisions** with racking, other vehicles, or personnel
- **Falling objects** from shelves or improperly stacked pallets
- **Fire hazards** caused by faulty wiring, flammable materials, or overheating machinery
- **Manual handling injuries** due to improper lifting or repetitive strain
- **Unauthorized entry**, leading to theft or sabotage
- **IT or power failure**, disrupting warehouse management systems (WMS)

These risks not only endanger employees but also threaten inventory, equipment, and operations.

2. Warehouse Safety Protocols and Prevention Measures

An effective safety strategy includes both **physical controls** and **behavioral measures**. Among the most common preventive actions are:

- **Clear marking of walkways, hazard zones, and fire exits**
- **Anti-slip flooring** and routine cleaning procedures
- **Regular inspection of racking systems and forklifts**
- **Weight limits on shelves and secure pallet stacking**
- **Fire detection and suppression systems**, including sprinklers and smoke detectors
- **First-aid kits** and trained responders on-site
- **Mandatory use of personal protective equipment (PPE)** – gloves, helmets, steel-toe boots, vests
- **Barcode scanning and automation**, which reduce manual handling

- **Standard operating procedures (SOPs)** for equipment use and emergency response

Forklift safety is especially important. Operators must be licensed, and zones must be separated from pedestrian traffic. Loading docks require caution signage, guard rails, and wheel locks.

3. Digital Monitoring and Control Systems

Modern warehouses rely on **digital technologies** to enhance safety. These systems allow for real-time monitoring and early detection of hazards:

- **Warehouse Management Systems (WMS)** track inventory and workflows, helping prevent congestion or misplacement
- **Automated sensors and IoT devices** monitor temperature, air quality, equipment function, and motion
- **Security cameras (CCTV)** record access, theft attempts, or unsafe behavior
- **Access control systems** limit who can enter sensitive areas
- **AI-driven analytics** detect abnormal patterns (e.g., frequent near-misses at a certain aisle)

Data from these systems feeds into **central dashboards**, where managers can evaluate safety metrics and respond quickly.

4. Staff Training and Engagement

Warehouse safety depends heavily on employee behavior. That's why **ongoing safety training** is essential. Effective programs include:

- **Onboarding sessions** for new hires covering warehouse rules, emergency plans, and PPE usage
- **Practical workshops** on lifting techniques, equipment operation, and hazard recognition
- **Emergency drills** for fire, chemical spills, or electrical outages
- **Incident reporting protocols**, encouraging staff to log every accident or near-miss
- **Incentive systems** for reporting safety issues and proposing improvements

When workers feel responsible for safety and see their concerns addressed, overall awareness and performance improve.

5. Incident Response and Post-Accident Procedures

Despite prevention, incidents may still occur. That's why every warehouse must maintain:

- A clear **incident response protocol**, with steps for containment, treatment, reporting, and recovery
- **Accident logbooks** and digital incident records
- **Medical assistance procedures** or access to nearby clinics
- **Root cause analysis (RCA)** investigations after every serious event
- **Corrective action plans** to prevent recurrence
- **Insurance documentation** for liability, workers' compensation, and property damage

Regular review of incident reports helps identify risk clusters or recurring errors.

6. Legal Compliance and Certifications

Warehouses must comply with national labor codes and international standards. Key regulations include:

- **ISO 45001** – Occupational health and safety management systems
- **OSHA standards** (for U.S.-based facilities)
- **Local fire, building, and electrical codes**
- **Insurance inspections** from third-party assessors

Some companies pursue **voluntary certifications** or safety awards to demonstrate commitment to best practices. This improves brand image, client trust, and employee satisfaction.

7. Future Trends in Warehouse Safety

The future of warehouse safety lies in **automation and predictive technologies**. Key trends include:

- **Autonomous forklifts** with obstacle detection

- **Wearable devices** that monitor fatigue or detect risky posture
- **Digital twins** to simulate safety scenarios and optimize layout
- **AI risk scoring** to predict where incidents may occur next
- **Voice-guided picking systems** that reduce errors and distractions

As logistics shifts toward higher speed and volume, companies must adapt safety systems to remain proactive and scalable.

Conclusion

Warehouse safety is more than compliance – it is a strategic element of efficient, uninterrupted operations. By combining physical safeguards, smart technology, well-trained staff, and a responsive safety culture, logistics providers can reduce incidents, protect assets, and ensure that warehouses remain productive and secure environments. In an age of automation and constant pressure for speed, smart safety is smart business.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What are the most common physical risks found in warehouse environments?
2. How do poor housekeeping practices contribute to warehouse incidents?
3. What types of digital systems are used to monitor safety conditions in modern warehouses?
4. Why is forklift safety considered a major component of warehouse risk management?
5. How does staff training influence the frequency and severity of warehouse incidents?
6. What is the purpose of root cause analysis (RCA) after an accident?
7. Which types of personal protective equipment (PPE) are commonly used in warehousing?
8. What role do access control systems play in preventing unauthorized entry?

9. What international and local standards regulate warehouse health and safety?
10. How can predictive technologies improve warehouse risk prevention in the future?

II. True or False?

1. CCTV systems are used only for theft prevention in warehouses.
2. Emergency drills must be performed regularly to ensure readiness.
3. Forklift zones should be clearly separated from pedestrian paths.
4. Employees don't need training if the warehouse is automated.
5. ISO 45001 is a standard for warehouse inventory control.
6. AI can help predict safety incidents before they occur.
7. Manual handling is no longer relevant due to automation.
8. First-aid kits and trained responders are essential in every warehouse.
9. Wearable safety tech helps track body strain and fatigue.
10. Staff involvement in safety reporting improves overall risk management.

III. Fill in the gaps using the words from the box below:

sensors, onboarding, stacking, fire exits, automation, PPE, WMS, forklift, root cause, inspection

1. Poor ______ of pallets can cause them to collapse.
2. ______ software tracks inventory and warehouse operations.
3. All new employees must go through safety ______ training.
4. ______ must be visible, unlocked, and well-marked at all times.
5. ______ devices can monitor temperature, gas levels, and motion.
6. Improper ______ driving is a leading cause of warehouse accidents.
7. ______ like gloves and helmets protect employees from injury.
8. Regular ______ of racking and storage systems is required.
9. Warehouse ______ is increasing safety and reducing physical strain.

10. After a major accident, a ______ analysis must be performed.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Склади мають дотримуватися чітких процедур безпеки та евакуації.
2. Камери спостереження дозволяють відслідковувати порушення правил.
3. Автоматизовані системи знижують кількість ручної обробки вантажу.
4. Працівники повинні носити захисний одяг і взуття.
5. Усі інциденти фіксуються в електронному журналі.
6. Доступ до небезпечних зон обмежений за допомогою пропусків.
7. Роботодавці мають регулярно проводити інструктаж із техніки безпеки.
8. ISO 45001 встановлює вимоги до охорони праці.
9. У разі пожежі працюють спринклери та сигналізація.
10. Аналіз першопричини дозволяє уникнути повторення нещасного випадку.

B. Translate from English into Ukrainian:

1. Warehouse injuries often result from improper manual lifting.
2. Sprinkler systems are required in most high-volume facilities.
3. PPE must be worn in designated hazard zones.
4. AI cameras can detect risky behavior on the warehouse floor.
5. Forklift operators must be certified and regularly retrained.
6. Digital dashboards show safety incidents and KPI trends.
7. Fire extinguishers must be inspected and accessible at all times.
8. Access control systems prevent theft and internal sabotage.
9. Fatigue monitoring wearables are used in high-speed logistics centers.
10. Warehouse safety improves productivity and staff morale.

TEXT 4: CYBERSECURITY IN LOGISTICS – PROTECTING DATA, INFRASTRUCTURE, AND DIGITAL OPERATIONS

As logistics operations become increasingly automated and data-driven, they also become more vulnerable to cyber threats. The digital transformation of the supply chain – through cloud-based platforms, real-time tracking, warehouse management systems, and IoT devices – has created a vast network of entry points for cybercriminals. As a result, **cybersecurity in logistics** is no longer an IT concern alone; it is a mission-critical part of safety and risk management.

1. The Digital Exposure of Modern Logistics

Modern logistics systems rely on numerous connected platforms:

- **Transport Management Systems (TMS)**
- **Warehouse Management Systems (WMS)**
- **Enterprise Resource Planning (ERP)** tools
- **Internet of Things (IoT)** sensors and devices
- **Customer portals and e-commerce APIs**
- **Blockchain for traceability**
- **Cloud storage and remote access tools**

These technologies improve efficiency, transparency, and customer satisfaction – but they also expose operations to threats such as:

- **Ransomware attacks**
- **Data theft and leaks**
- **System manipulation and false routing**
- **Service denial (DDoS)**
- **Unauthorized access to client or cargo data**

A single attack can delay deliveries, paralyze warehouse automation, erase inventory records, or leak sensitive customer and financial information.

2. Common Cyber Threats in Logistics

The logistics sector faces unique digital risks due to its complexity and reliance on third-party providers. The most frequent threats include:

- **Phishing and social engineering**, where attackers trick employees into giving access credentials
- **Malware infections**, often via email attachments or USB devices
- **Unsecured wireless networks** at warehouses, terminals, or mobile devices
- **Fake shipment updates** or tracking portals that mislead customers
- **Credential stuffing**, where stolen passwords from other breaches are reused to hack logistics accounts
- **Exploiting outdated software** in vehicles, scanners, or servers

These threats often come through **human error** – weak passwords, untrained staff, or ignored security alerts.

3. Core Elements of Cybersecurity Strategy

To secure digital logistics infrastructure, companies must implement **layered protection systems**, including:

a) Access Management

- Role-based permissions: limit access by job function
- Multi-factor authentication (MFA): login requires more than a password
- Automatic logout and session timeout features
- Privileged account monitoring

b) Data Protection

- End-to-end encryption of sensitive data
- Regular data backups, stored in secure and separated locations
- Real-time monitoring of data transfers and API calls
- Cloud storage with high-grade security certifications (e.g., ISO 27001)

c) Network Security

- Firewalls, intrusion detection systems (IDS), and anti-malware tools
- Virtual Private Networks (VPNs) for remote access
- Segmentation between operations, finance, and guest networks
- Device authentication for IoT scanners and vehicle trackers

d) Incident Response Planning

- Cyber incident playbooks with predefined actions and roles
- Isolation protocols for infected systems
- Internal and external communication templates
- Reporting obligations to authorities or clients
- Post-incident recovery and forensic analysis

4. Staff Training and Awareness

Technology alone cannot stop cyberattacks – people must be trained to identify and respond to threats. Logistics employees should receive:

- **Cyber hygiene training** (password creation, device updates, suspicious links)
- **Simulated phishing tests**
- **Emergency contact protocols** in case of a suspected breach
- **Clear rules for remote access, mobile device use, and file sharing**

Creating a "security culture" means treating every employee as a cybersecurity stakeholder.

5. Third-Party and Supply Chain Risk

Logistics companies rarely operate alone – they rely on **carriers, customs brokers, IT vendors, and warehouse partners**. Each partner adds potential vulnerabilities. Therefore, firms must:

- Vet vendors for cybersecurity compliance
- Use cybersecurity clauses in contracts
- Audit third-party platforms and APIs
- Segment integrations to avoid full system exposure

Cyber risk must be assessed **across the entire supply chain**, not just internally.

6. Compliance, Regulation, and Certifications

Depending on the country and industry, companies may be subject to:

- **GDPR** – General Data Protection Regulation (EU)
- **NIS2 Directive** – Cyber resilience for critical sectors
- **ISO/IEC 27001** – Information security management system
- **TISAX** – Data security in automotive logistics

- **SOC 2 / CSA STAR** – Cloud security certifications
- **C-TPAT and AEO** – with growing digital security requirements

These frameworks require documentation of controls, audits, and reporting mechanisms.

7. Future Trends in Logistics Cybersecurity

Cyber threats will grow as logistics becomes more digital. Future defense strategies will involve:

- **AI-driven threat detection systems** that learn from behavior patterns
- **Blockchain-based identity verification**
- **Zero-trust architecture** – every user and device must continuously prove identity
- **Cyber insurance** – protection against financial losses from attacks
- **Cross-border cybersecurity cooperation** between customs and logistics providers

As predictive tools and connected fleets become the norm, cybersecurity will evolve from a back-office IT function into a core logistics competency.

Conclusion

In an industry where speed and reliability are everything, **cybersecurity is essential for operational continuity and customer trust**. Logistics companies must move beyond basic firewalls and adopt holistic, scalable, and proactive strategies. The digital supply chain can only function safely if every endpoint – from driver app to cloud API – is protected. Cyber resilience is not an optional feature of modern logistics. It is the backbone of sustainable, secure global trade.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. Why is cybersecurity now considered a critical part of logistics safety management?

2. What types of technologies and platforms expose logistics to cyber risks?
3. Describe five common cyber threats affecting logistics operations.
4. What is the role of multi-factor authentication (MFA) in access control?
5. How can encryption and backups help protect sensitive logistics data?
6. Why is staff training essential in preventing digital breaches?
7. What risks do third-party vendors pose to cybersecurity in the supply chain?
8. Which international standards regulate cybersecurity and data protection in logistics?
9. How does the "zero-trust" model differ from traditional security approaches?
10. What are the consequences of a successful cyberattack on a logistics company?

II. True or False?

1. Cybersecurity is mostly relevant for financial and banking sectors, not logistics.
2. Phishing is a method of tricking users into revealing sensitive information.
3. All cybersecurity responsibilities lie with the IT department.
4. Segmentation of networks limits the spread of cyberattacks.
5. Passwords are enough to protect logistics software systems.
6. Cyber hygiene training reduces human error vulnerabilities.
7. GDPR affects logistics companies that handle EU citizens' data.
8. Blockchain is only used for cryptocurrencies, not logistics.
9. TMS and WMS systems must be included in cyber protection strategies.
10. Cyber insurance can help cover losses after an attack.

III. Fill in the gaps using the words from the box below:

phishing, firewall, endpoint, encryption, ransomware, segmentation, TMS, credentials, audit, zero-trust

1. Logistics systems are often targeted by ______ attacks disguised as shipping updates.

2. A ______ is used to block unauthorized access to network traffic.
3. Strong ______ policies prevent hackers from accessing employee accounts.
4. Sensitive client data must be protected using end-to-end ______.
5. ______ locks companies out of their systems until payment is made.
6. Transport data stored in the ______ must be regularly backed up.
7. Network ______ ensures that a breach doesn't affect the whole system.
8. Access to the ______ system must be restricted to authorized users only.
9. A security ______ helps identify gaps in digital protection.
10. In a ______ architecture, no device is automatically trusted.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Кібербезпека є обов'язковою складовою сучасної логістики.
2. Системи управління складом мають бути захищені від атак.
3. Витік даних клієнтів може призвести до штрафів та втрати довіри.
4. Двофакторна автентифікація забезпечує додатковий рівень захисту.
5. Вразливості часто виникають через людські помилки.
6. Компанії повинні перевіряти постачальників на відповідність кібервимогам.
7. Шифрування даних захищає інформацію під час передачі.
8. Співробітників навчають розпізнавати фішингові повідомлення.
9. Резервне копіювання важливе для відновлення після збоїв.
10. Архітектура нульової довіри не допускає автоматичного доступу жодного пристрою.

B. Translate from English into Ukrainian:

1. Logistics companies must prepare cyber incident playbooks in advance.
2. Firewalls and VPNs are essential for protecting remote access.
3. Employees should avoid using public Wi-Fi for internal systems.

4. TMS and WMS platforms must be continuously updated and patched.
5. AI systems detect unusual login behavior across multiple locations.
6. Clients expect their shipping data to remain confidential.
7. Contract clauses should include digital risk responsibility.
8. ISO/IEC 27001 sets the global standard for information security.
9. Mobile devices must be secured to prevent unauthorized access.
10. Real-time monitoring alerts managers of any suspicious activity.

TEXT 5: THE FUTURE OF LOGISTICS SAFETY – EMERGENCY PLANNING, CRISIS MANAGEMENT, AND RISK INNOVATION

As global supply chains become faster, leaner, and more interdependent, logistics faces an increasing variety of high-impact risks. Natural disasters, geopolitical disruptions, cyberattacks, and public health crises such as pandemics have demonstrated that even the most advanced logistics systems are vulnerable. In this context, **future-focused safety and risk management** must shift from reactive strategies to **resilient, predictive, and adaptive systems**. The ability to anticipate and manage crises has become a strategic advantage for modern logistics providers.

1. Emerging Threats to Logistics Safety

Traditional risks such as traffic accidents, warehouse injuries, and cargo theft remain present, but new categories of threats are reshaping the risk landscape:

- **Climate-driven events**: hurricanes, floods, wildfires, and heatwaves disrupting infrastructure and transport
- **Pandemics and public health crises**: workforce shortages, border closures, and medical supply chain surges
- **Geopolitical instability**: trade sanctions, armed conflict, terrorism, and border delays
- **Cyber disruption**: attacks on digital infrastructure, data systems, or transport control units

- **Systemic vulnerabilities**: dependence on single suppliers, just-in-time inventory, and fragile global routes

These risks are often **interconnected**, making crisis planning more complex and urgent.

2. Business Continuity and Emergency Preparedness

To ensure survival during crises, logistics companies must develop **Business Continuity Plans (BCPs)**. These plans define how operations will continue under abnormal conditions. Key components include:

- **Risk scenarios and impact forecasts**
- **Critical process mapping** (e.g., warehouse access, customs clearance, last-mile delivery)
- **Emergency response teams and designated roles**
- **Redundancy strategies**: backup suppliers, alternative routes, substitute carriers
- **Remote work systems** and cloud-based access to key platforms
- **Pre-positioned inventory** for essential goods
- **Crisis communication plans** for employees, customers, authorities, and media

Simulation exercises or "war games" help test these plans under realistic pressure.

3. Crisis Management Structures

When an incident occurs, fast and structured response is essential. Effective crisis management includes:

- **Incident Command Centers (ICCs)**: hubs for decision-making and resource allocation
- **Unified communication** channels between logistics, finance, legal, and public relations departments
- **Dynamic dashboards** showing real-time updates on affected shipments, warehouse status, staff availability
- **Legal and insurance teams** ready to handle claims and regulatory inquiries

- **Post-incident reviews** to evaluate responses and revise strategies

Time is critical. Studies show that the first 24–48 hours of a logistics disruption define the scale of its consequences.

4. Predictive Technologies and Smart Risk Analytics

The future of logistics safety will be shaped by **real-time risk data, predictive modeling, and AI tools**. Key innovations include:

- **AI-powered risk forecasting engines** that analyze weather data, social unrest signals, or supply chain bottlenecks
- **IoT networks** that provide instant alerts from vehicles, warehouses, and shipping containers
- **Digital twins** – virtual models of logistics systems used to simulate disruptions and test responses
- **Blockchain** for verifying the integrity of goods, documents, and supplier networks
- **Geospatial intelligence** for route selection and risk profiling

These tools enable companies to move from “incident response” to “risk anticipation.”

5. Resilience through Redundancy and Flexibility

Resilience is the ability to absorb shocks and continue functioning. Logistics companies must build **redundancy and flexibility** into their operations:

- **Multi-sourcing strategies** instead of relying on one supplier or transport lane
- **Cross-trained employees** who can shift roles in emergencies
- **Flexible warehousing contracts** for fast relocation
- **Cloud-based logistics platforms** accessible from anywhere
- **Local and regional buffers** to avoid over-dependence on global routes

Agile organizations outperform rigid ones when faced with unpredictable disruptions.

6. Safety Culture and Leadership

Sustainable safety requires more than technology and procedures – it demands a strong **safety culture**:

- **Leaders must prioritize risk awareness** at the strategic level
- **Frontline employees should feel empowered** to report risks or propose solutions
- **Safety performance must be measured**, rewarded, and continually improved
- **Post-crisis debriefings** must be standard, not optional

Embedding safety into company values creates an organization that learns from disruptions rather than being defeated by them.

7. Regulatory Trends and Global Cooperation

Governments and international agencies are moving toward more rigorous requirements for logistics safety, especially in:

- Pandemic response logistics and essential goods delivery
- Climate adaptation and low-emission safety infrastructure
- Cyber resilience standards for critical infrastructure
- Harmonization of customs safety inspections and digital documentation

In the near future, **logistics licenses and cross-border access may depend on documented safety performance and crisis readiness**.

Conclusion

The future of logistics safety is not about avoiding all risks – it is about **embracing intelligent preparation and continuous adaptation**. Companies that invest in predictive analytics, flexible operations, cross-trained teams, and transparent communication will not only survive future crises – they will lead in a world where reliability is the most valuable currency. In an age of disruption, the safest supply chains will be those built to evolve.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What are the emerging global risks that affect logistics operations?
2. How are modern risks interconnected, and why does this complicate crisis planning?
3. What is a Business Continuity Plan (BCP), and what are its key components?
4. How do companies prepare for emergency situations through simulations or "war games"?
5. What role do Incident Command Centers (ICCs) play during logistics crises?
6. Describe at least four predictive or digital tools used to forecast and manage risks.
7. What does operational resilience mean in the logistics context?
8. How can redundancy and flexibility strengthen a logistics company's ability to manage disruption?
9. Why is a strong safety culture important for long-term crisis management?
10. What are some regulatory trends shaping the future of logistics safety and compliance?

II. True or False?

1. Most logistics disruptions are isolated and unrelated.
2. Crisis management should be led only by the IT department.
3. Redundant supply chains are better equipped to handle unexpected delays.
4. Post-crisis debriefings are optional in professional logistics environments.
5. Predictive tools like AI and digital twins help prevent supply chain failure.
6. Real-time dashboards are unnecessary during large-scale disruptions.
7. Blockchain can be used to verify the security of cargo during emergencies.
8. Risk culture begins at the executive level and includes every employee.
9. Cross-trained employees contribute to flexibility in crisis response.
10. Regulatory standards for logistics safety are becoming more relaxed.

III. Fill in the gaps using the words from the box below:

redundancy, digital twin, BCP, resilience, dashboard,
disruption, AI, simulation, debriefing, predictive

1. A ______ allows logistics companies to continue operating under crisis conditions.
2. ______ modeling helps forecast risks before they happen.
3. Companies perform ______ exercises to prepare for real-life incidents.
4. The team reviewed the emergency ______ to monitor cargo flow and delays.
5. The ability to recover quickly from shocks is known as operational ______.
6. After each incident, a structured ______ is conducted to identify lessons learned.
7. ______ engines analyze risk patterns and propose early warnings.
8. A ______ provides a virtual model of warehouse or transport systems.
9. To avoid delays, the company added ______ carriers to its network.
10. Political instability can cause severe supply chain ______.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Стійкість логістичної системи залежить від гнучкості та планування.
2. План безперервності бізнесу охоплює критичні функції компанії.
3. У перші 48 годин кризи визначається масштаб наслідків.
4. Віртуальні моделі дозволяють моделювати сценарії ризиків.
5. Кіберстійкість стає обов’язковою вимогою для транспортних операторів.
6. Компанія впровадила резервних постачальників і додаткові маршрути.
7. Аналітика в реальному часі допомагає приймати рішення в надзвичайних ситуаціях.
8. Керівники мають підтримувати культуру безпеки на всіх рівнях.
9. Після кожної події проводиться аналіз ефективності реагування.

10. Нові правила вимагають задокументованих планів дій у разі надзвичайних ситуацій.

B. Translate from English into Ukrainian:

1. Business continuity ensures stable logistics even under abnormal conditions.
2. A crisis command center coordinates all decisions during emergencies.
3. Predictive AI tools help avoid bottlenecks and delays.
4. Resilient supply chains depend on flexibility and redundancy.
5. Emergency teams must be trained and assigned specific roles.
6. Regulations are shifting toward digital safety certification.
7. Leadership must invest in training and scenario-based planning.
8. Logistics operations now use cloud platforms for crisis access.
9. Geopolitical risks are growing in complexity and frequency.
10. Real-time data visualizations improve emergency response.

LEXICAL EXERCISES

Exercise 1. Match the terms to their definitions:

TERM	DEFINITION
1. Business continuity plan	**A.** Step-by-step rules to ensure workplace safety
2. Predictive tools	**B.** Practice run for emergency procedures
3. Root cause	**C.** Secondary plan to address unexpected situations
4. Emergency drill	**D.** Main reason behind a problem or failure
5. Dashboard	**E.** Analysis of weaknesses in a system or process

6. Contingency plan	**F.** Strategy for maintaining critical operations during crises
7. Threat intelligence	**G.** Real-time visual summary of performance or risk metrics
8. Safety protocol	**H.** Tools used to anticipate future problems or threats
9. Operational disruption	**I.** Temporary interruption of daily logistics processes
10. Vulnerability assessment	**J.** Data collection and analysis related to potential risks

Exercise 2. Fill in the gaps using the active vocabulary:

1. Every warehouse must follow a detailed ______ to prevent injuries.
2. We conducted an ______ last week to test our evacuation plan.
3. The storm caused major ______ across our distribution network.
4. After the accident, we identified the ______ and revised procedures.
5. The company updated its ______ to improve response during pandemics.
6. Real-time updates are now shown on our interactive ______.
7. We're developing a ______ in case the main server fails.
8. The IT department completed a ______ of the new cloud system.
9. Advanced ______ help detect risks before they escalate.
10. The team uses ______ from multiple sources to monitor cyber threats.

Exercise 3. Translate into English:

1. Протокол безпеки вимагає обов'язкового використання касок.
2. Після атаки було проведено аналіз першопричин.
3. План безперервності бізнесу був активований негайно.
4. Навчання з евакуації проводиться щоквартально.
5. Система відображає всі події на інформаційній панелі в реальному часі.

6. Компанія підготувала альтернативний план у разі відключення серверів.
7. Ми використовуємо аналітику загроз для оцінки кіберризиків.
8. Всі вразливості були виявлені під час технічної перевірки.
9. Порушення в операційній діяльності спричинило затримки поставок.
10. Інструменти прогнозування попередили нас про ризик повені.

Exercise 4. Translate into Ukrainian:

1. The safety protocol requires all forklift operators to be certified.
2. A full vulnerability assessment was conducted on the logistics hub.
3. The root cause of the data breach was weak password protection.
4. Emergency drills help prepare staff for real-world scenarios.
5. A new contingency plan will be implemented for high-risk regions.
6. Our dashboard tracks incidents across all warehouses.
7. Predictive tools flagged a spike in security alerts last night.
8. Threat intelligence helps prevent ransomware attacks.
9. Business continuity planning reduces financial losses during crises.
10. Operational disruptions must be reported immediately.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Translation
business continuity	безперервність бізнесу
business continuity plan	план безперервності бізнесу
contingency plan	альтернативний (резервний) план
contingency planning	резервне/альтернативне планування
crisis management	управління кризовими ситуаціями
crisis simulation	моделювання кризової ситуації
cyber resilience	кіберстійкість

English Term	Ukrainian Translation
dashboard	інформаційна панель
digital twin	цифровий двійник
emergency drill	навчання на випадок надзвичайної ситуації
emergency response	реагування на надзвичайну ситуацію
hazard zone	небезпечна зона
incident response	реагування на інцидент
operational disruption	порушення в операційній діяльності
operational resilience	операційна стійкість
predictive analytics	аналітика прогнозування
predictive tools	інструменти прогнозування
real-time dashboard	інформаційна панель у реальному часі
response team	команда реагування
risk exposure	схильність до ризику
risk forecasting	прогнозування ризику
root cause	першопричина
safety protocol	протокол безпеки
threat intelligence	аналітика загроз
vulnerability assessment	оцінка вразливості

GRAMMAR FOCUS: FUTURE FORMS IN LOGISTICS RISK MANAGEMENT

I. Overview of Future Forms and Their Use

Tense/Structure	Use Case in Logistics	Example
Will	Instant decisions, predictions, formal reports	*The system **will alert** the team in case of breach.*
Be going to	Planned actions with clear intention	*We **are going to implement** a new tracking solution.*
Present Continuous	Fixed future arrangements	*The audit team **is arriving** next Friday.*
Shall *(formal)*	Offers, suggestions (mostly in UK English)	***Shall we schedule** a safety drill next week?*

II. Grammar Structures + Logistics Contexts

1. Will

Used for predictions or spontaneous decisions.

- The system **will shut down** if unauthorized access is detected.
- We **will review** the incident report tomorrow.

2. Be going to

Used for planned actions.

- The company **is going to install** new fire suppression systems.
- We **are going to train** all drivers in emergency protocols.

3. Present Continuous for Future

Used when something is arranged and scheduled.

- The external safety inspection **is taking place** on Monday.
- Our team **is meeting** the port authorities next week.

4. Shall

Used for formal proposals (less frequent in American English).

- **Shall we begin** the risk simulation at 10:00?
- The management **shall approve** the new safety budget by next quarter.

GRAMMAR EXERCISES

Exercise 1. Complete the sentences with the correct future form:

1. The logistics platform ______ (automatically/send) alerts if a threat is detected.
2. We ______ (review) the emergency stock levels this afternoon.
3. The team ______ (test) the fire alarm system next Monday.
4. Our IT department ______ (upgrade) the cybersecurity system next week.
5. The manager ______ (not/attend) the debriefing due to travel.
6. I think the storm ______ (delay) the incoming shipment.
7. We ______ (not/launch) the new dashboard until final approval.
8. The contractor ______ (deliver) the safety equipment by Friday.
9. Our partners ______ (join) the crisis simulation next month.
10. Shall we ______ (finalize) the continuity plan before the audit?

Exercise 2. Translate into English:

1. Команда запустить нову систему реагування наступного тижня.
2. Ми збираємося оновити всі процедури безпеки.
3. Перевірка пожежної системи відбудеться в середу.
4. Ми не зможемо завершити аудит до п’ятниці.
5. Компанія встановить нові камери відеоспостереження.
6. Я думаю, що вони відмовляться від паперових журналів найближчим часом.
7. Чи підготуємо ми тренінг для водіїв до понеділка?
8. Вони запланували тестування системи евакуації на 3 липня.
9. Партнери не приєднаються до навчання з кіберзагроз.
10. Зустріч із службою охорони відбудеться наступного ранку.

Exercise 3. Translate into Ukrainian:

1. We are going to update all safety protocols after the audit.

2. The emergency team will arrive in less than 30 minutes.
3. We shall include digital risk simulations in the next quarter.
4. The logistics center is launching a new crisis dashboard next week.
5. Cybersecurity specialists will monitor all API access points.
6. Will you test the lockdown system before the external inspection?
7. The new forklift training is starting on Monday.
8. I think suppliers will delay their shipments during the storm.
9. Are we going to review the KPIs after the incident?
10. The insurance provider will send the updated terms tomorrow.

SPEAKING TASKS

Task 1. Personal Experience & Opinion

Topic: *How prepared is your workplace or region for logistics emergencies?*

Prompts:

- Have you ever experienced a logistics-related disruption (e.g. delay, accident, cyberattack)?
- What safety measures are commonly used in warehouses or during transport?
- Do companies in your region invest in risk prevention or only react to problems?
- How do you personally feel about the importance of business continuity?

Task 2. Pair Interview – Risk Scenario Simulation

Scenario: *You and your partner work in a logistics company. A cyberattack has shut down your warehouse management system. Together, you must prepare a response strategy.*

Roles to discuss:

- Who contacts IT support and clients?
- What backup systems or alternatives can be used?

- How will drivers and warehouse staff receive instructions?
- Should operations be paused or redirected?

Goal:

Create a short emergency action plan and present it to your team.

Task 3. Mini-Presentation (3–5 minutes)

Choose one topic:

1. Key safety risks in modern warehousing and how to prevent them
2. Cybersecurity in logistics: tools, threats, and best practices
3. Business continuity planning: why every logistics company needs one
4. Predictive technologies in risk forecasting

Structure:

- Introduction → Main points (3–4) → Example or case → Conclusion
- Use topic-specific vocabulary: disruption, incident response, predictive tools, dashboard, protocol, BCP

Task 4. Group Problem Solving – Post-Incident Review

Scenario: *Your company recently faced a warehouse fire caused by electrical overload. You are the post-incident committee reviewing what went wrong and how to prevent it.*

Discuss and decide:

- What safety systems failed?
- What improvements are needed?
- How will you retrain staff and update protocols?
- Should new technology (e.g., sensors, dashboards) be added?

Goal:

Prepare a short report with your findings and recommendations.

Task 5. Debate

Statement: *Investing in logistics safety is too expensive and slows down operations.*

Instructions:

Split into two groups:

- **Affirmative:** Argue that safety investments reduce efficiency and are difficult to justify financially.
- **Negative:** Argue that long-term safety improves resilience, reputation, and prevents greater costs.

UNIT 13: INTERMODAL AND MULTIMODAL TRANSPORTATION

TEXT 1: INTRODUCTION TO INTERMODAL AND MULTIMODAL TRANSPORTATION

In the modern logistics landscape, where speed, efficiency, and global integration are essential, the movement of goods using more than one mode of transport has become a core strategy for supply chain optimization. Two frequently used concepts in this field are **intermodal** and **multimodal transportation**. Though often used interchangeably, they refer to distinct systems of cargo movement, each with its own structure, documentation, and operational model.

1. Defining the Terms

- **Intermodal transportation** involves the movement of cargo using two or more different modes of transport (e.g., truck, train, ship) **without handling the freight itself** when changing modes. The goods remain in the same loading unit (usually a container) throughout the journey. Each leg of the trip is handled by a separate carrier under separate contracts.
- **Multimodal transportation** also involves multiple modes of transport, but the **entire journey is managed under a single contract** with one logistics provider (known as the multimodal transport operator, or MTO). The cargo may still remain in a single container, but legally and administratively, it is a unified operation.

In short:

- **Intermodal = multiple modes + multiple contracts**
- **Multimodal = multiple modes + one contract**

2. Key Characteristics and Structure

Both systems combine transport modes such as:

- **Road** (short-haul trucking for pickup or delivery)
- **Rail** (efficient for long inland distances)
- **Sea** (cost-effective for international trade)
- **Air** (fastest option for urgent goods)

- **Inland waterways** (used in specific regions like Europe or China)

These transport combinations allow logistics providers to **leverage the strengths of each mode**, optimize costs, reduce environmental impact, and improve delivery reliability.

In intermodal logistics, **transshipment points** – intermodal terminals, ports, dry ports, and freight villages – play a critical role. Cargo is transferred between modes using cranes, gantries, and automated systems, but the container remains sealed. This system increases cargo security and reduces handling damage.

Multimodal systems, on the other hand, require more **centralized planning**. The MTO assumes responsibility for the cargo from origin to destination, coordinating subcontractors, routes, insurance, and timing. This simplifies management for the client but places more operational risk on the provider.

3. Advantages and Disadvantages

Intermodal Transport – Advantages:

- Greater flexibility in choosing carriers and modes
- High cargo safety due to limited handling
- Standardized containers simplify loading and tracking
- Promotes competition and cost transparency

Intermodal – Disadvantages:

- Requires more coordination between carriers
- Complex documentation across transport modes
- Risk of delays at terminals due to handling interfaces

Multimodal Transport – Advantages:

- Single point of contact and contract
- Simplified paperwork and liability structure
- Easier tracking and communication
- Suitable for global logistics providers with integrated services

Multimodal – Disadvantages:

- Less flexibility in mode or route changes

- Higher reliance on one service provider
- May be more expensive in regions with weak infrastructure

4. Industry Use and Examples

Intermodal logistics is widely used in **containerized shipping** and rail-to-sea corridors (e.g., China–Europe rail via Kazakhstan and Poland, or U.S. rail networks feeding ports like Los Angeles and Houston). Major seaports (Rotterdam, Hamburg, Shanghai) are intermodal hubs handling millions of TEUs (twenty-foot equivalent units).

Multimodal systems are more common in **door-to-door services** offered by major logistics integrators (DHL, Maersk, DB Schenker) where air, sea, and land transport are bundled under one service agreement.

5. The Role of Containerization

The growth of both systems is largely driven by **containerization** – the use of standard shipping containers that can be easily moved between trucks, trains, and ships without unloading the goods. Containerization:

- Reduces theft and damage
- Speeds up transfers at ports and terminals
- Allows for automation and digital tracking
- Supports environmentally efficient logistics by maximizing capacity

6. Environmental and Economic Aspects

Combined transportation reduces emissions by minimizing the use of high-emission trucks and increasing the use of rail and sea. Governments and the EU promote **intermodal corridors** as part of green logistics goals. Multimodal providers are also increasingly offering **carbon-neutral delivery options**, using data to calculate and offset emissions.

Both intermodal and multimodal systems are fundamental to modern logistics. Choosing between them depends on cargo type, route complexity, regulatory environment, customer preference, and provider capability. Understanding the difference allows logistics professionals to select the most efficient, cost-effective, and sustainable solution for each shipment. In a future defined by speed, precision, and sustainability, **combined transport systems are not just a trend – they are the infrastructure of global commerce**.

ASSIGNMENTS FOR TEXT 1

I. Give full answers to the following questions:

1. What is the key legal and operational difference between intermodal and multimodal transportation?
2. Why is containerization important for both intermodal and multimodal logistics?
3. What are the typical modes involved in combined transport systems?
4. How do transshipment points function in intermodal logistics?
5. Why might a company choose a multimodal transport provider over managing multiple carriers?
6. What are the environmental advantages of combined transport systems?
7. What are some disadvantages or risks associated with intermodal transport?
8. How does the responsibility of a multimodal transport operator differ from that of individual intermodal carriers?
9. Give examples of real-world routes or services using intermodal transport.
10. In what types of industries or trade flows is multimodal transport most commonly used?

II. True or False?

1. Intermodal transport always involves air cargo.
2. Multimodal transport has a single point of responsibility.
3. Containerization reduces handling time and cargo damage.
4. Intermodal logistics is limited to Europe.
5. Multimodal transport is typically cheaper than intermodal for complex routes.

6. Ports are critical nodes in intermodal transport chains.
7. Clients must deal with multiple contracts in multimodal transport.
8. A single container can be moved across several modes without being opened.
9. Governments often promote intermodal corridors for environmental reasons.
10. Intermodal transport never uses rail networks.

III. Fill in the gaps using the words from the box below:

transshipment, containerization, multimodal, MTO, emissions, route, contract, terminals, flexibility, tracking

1. In ______ transport, the customer signs only one unified contract.
2. A logistics provider offering multimodal services is called an ______.
3. ______ points are where cargo shifts from one mode to another.
4. Standardized ______ allows smooth movement across modes.
5. Intermodal transport offers greater ______ by combining different carriers.
6. Multimodal providers ensure real-time cargo ______ across the whole journey.
7. Combined transport can reduce transport-related CO_2 ______.
8. Most major ports operate intermodal ______ with cranes and automation.
9. Clients using intermodal transport often have more control over ______ selection.
10. The use of a single ______ helps clarify insurance and legal liability.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Інтермодальні перевезення включають декілька видів транспорту з окремими договорами.
2. Мультимодальні перевезення забезпечуються одним логістичним оператором.

3. Контейнеризація зменшує ризик пошкодження вантажу під час перевалки.
4. Вузли перевалки є ключовими у побудові інтермодальних маршрутів.
5. Вибір мультимодального перевізника спрощує управління поставками.
6. Поєднання морського і залізничного транспорту сприяє зниженню викидів.
7. Порти, інтермодальні термінали та вантажні селища є важливими елементами інфраструктури.
8. Європейський Союз активно підтримує зелені транспортні коридори.
9. Автоматизоване відстеження маршруту доступне при мультимодальній доставці.
10. Стандартизовані контейнери дозволяють не розпаковувати вантаж при зміні транспорту.

B. Translate from English into Ukrainian:

1. Intermodal transport uses multiple contracts, one per mode or carrier.
2. A multimodal transport operator is responsible for the entire shipment.
3. Modern ports are built with high-efficiency transshipment terminals.
4. Rail-sea combinations are common in Europe–Asia freight corridors.
5. Containerization enables automation and faster cross-docking.
6. Multimodal transport reduces paperwork and simplifies insurance claims.
7. Environmental concerns are pushing companies toward intermodal systems.
8. Route optimization is easier when multiple modes are available.
9. Clients choose multimodal options for time-sensitive, global shipments.
10. One of the risks of intermodal transport is coordination delays between modes.

TEXT 2: INFRASTRUCTURE, CONTAINERS, AND TECHNOLOGY IN COMBINED TRANSPORT SYSTEMS

Efficient intermodal and multimodal transportation is impossible without a strong foundation of **specialized infrastructure and container systems**. From sea ports to rail terminals, from trucks to cranes, the entire process depends on seamless coordination between physical assets and digital platforms. As trade flows become faster and more globalized, **logistics nodes and transport interfaces** must evolve to support high volumes, automation, and real-time visibility.

1. Intermodal Hubs and Terminals

At the heart of intermodal and multimodal operations lie **transfer nodes** – points where cargo changes its mode of transport. These may include:

- **Seaports** (e.g., Rotterdam, Singapore, Shanghai)
- **Dry ports** (inland facilities connected to ports by rail)
- **Rail terminals** (used for transferring containers between trucks and trains)
- **Freight villages** (clusters combining terminals, warehouses, customs zones, and services)
- **Inland depots** (container storage and sorting facilities closer to final destination)

Each of these facilities requires **precise scheduling, powerful handling equipment, and integrated communication systems** to reduce delays and congestion. Delays at one terminal can disrupt the entire supply chain.

2. Standardized Containers and Units

Containerization is a cornerstone of combined transport. The use of **standard ISO containers** (20-foot, 40-foot, high cube, reefer) allows goods to be loaded once and moved across various transport modes without repackaging.

Other intermodal loading units include:

- **Swap bodies** – used in Europe for road/rail interchange
- **Unit Load Devices (ULDs)** – for air freight (LD3, LD7)
- **Tank containers** – for liquids, chemicals, and food products

- **Flat racks and open-top containers** – for oversized cargo

Standardization ensures compatibility with cranes, ships, trains, and storage systems across the world. Each unit is tracked using **BIC codes**, RFID tags, and GPS for monitoring location, temperature, or vibrations.

3. Handling Equipment and Automation

Efficient terminal operation depends on modern machinery and **automated cargo-handling systems**, including:

- **RTG (Rubber-Tyred Gantry) cranes** – mobile cranes used in container yards
- **RMG (Rail-Mounted Gantry) cranes** – fixed equipment for rail terminals
- **Reach stackers and straddle carriers** – for moving containers in tight spaces
- **Automated guided vehicles (AGVs)** – driverless shuttles operating in large hubs
- **Conveyor systems and robotics** – for pallet and parcel handling in warehouses

Automation speeds up operations, reduces labor dependency, and improves accuracy. Some of the world's largest ports already operate **fully automated terminals**, such as Maasvlakte II in Rotterdam or Qingdao in China.

4. Digital Technologies Supporting Combined Transport

Modern combined logistics relies heavily on **digital tools** to integrate physical infrastructure with virtual control systems. These include:

- **Terminal Operating Systems (TOS)** – coordinate loading/unloading, yard planning, gate control
- **Real-Time Locating Systems (RTLS)** – monitor container position and movement
- **Electronic Data Interchange (EDI)** – enables fast, standardized communication between carriers and clients
- **Blockchain logistics platforms** – provide tamper-proof tracking of documents and cargo
- **Digital twins** – simulate terminal operations for optimization and forecasting

- **Port Community Systems (PCS)** – centralize information from all actors: port authorities, customs, carriers, and terminal operators

These technologies improve visibility, reduce paper-based processes, and support decision-making.

5. Intermodal Infrastructure Challenges

Despite advances, infrastructure still faces challenges:

- **Congestion and bottlenecks** at major terminals
- **Incompatibility of rail gauges or container standards** across countries
- **Lack of automation or digitization in smaller ports**
- **High infrastructure investment costs**
- **Geopolitical barriers** affecting cross-border corridor development

To address these issues, governments and international organizations (e.g., EU, UNECE, UNCTAD) invest in **green corridors, smart terminals, and standardized digital platforms**.

6. Future Developments

Innovations in infrastructure and smart transport will define the future of combined logistics. Trends include:

- **Autonomous trucks and cranes**
- **Hyperloop container movement** (pilot projects in UAE and Netherlands)
- **Smart sensors in containers** for condition monitoring
- **5G networks for ultra-fast data exchange**
- **AI-powered demand forecasting for terminal scheduling**

These innovations aim to create **intelligent logistics nodes** that are not just places of cargo transfer – but fully connected ecosystems enabling real-time optimization, sustainability, and global efficiency.

Conclusion

Modern intermodal and multimodal logistics are built on much more than vehicles and routes – they rely on a vast ecosystem of infrastructure, standard containers, and smart technologies. A well-designed terminal, equipped with advanced equipment and digital systems, becomes a strategic asset in the supply chain. As global trade expands, investment in these nodes will define the competitiveness of entire regions and companies alike.

ASSIGNMENTS FOR TEXT 2

I. Give full answers to the following questions:

1. What types of logistics nodes are used for transferring cargo in intermodal systems?
2. Why are standardized containers essential for combined transport?
3. What are swap bodies and ULDs, and where are they commonly used?
4. How does automation improve the efficiency of intermodal terminals?
5. What types of cranes and machines are typically used in container handling?
6. How do Terminal Operating Systems (TOS) and RTLS enhance visibility?
7. What is the role of Port Community Systems (PCS) in smart logistics?
8. What infrastructure challenges still exist in global intermodal transport?
9. Name at least three digital innovations currently shaping terminal operations.
10. What is meant by a digital twin in the context of logistics infrastructure?

II. True or False?

1. Dry ports are used for transferring air cargo near seaports.
2. Containers reduce handling risks by remaining sealed during transfer.
3. AGVs are autonomous vehicles used in container yards.
4. EDI systems are mostly paper-based.
5. Tank containers are designed for hazardous liquid cargo.
6. Port congestion has been fully solved thanks to digitalization.
7. Digital twins help simulate and optimize terminal performance.
8. Blockchain platforms help track documents and reduce fraud.
9. Most global terminals are already fully automated.

10. Rail gauge incompatibility is a common barrier in intermodal corridors.

III. Fill in the gaps using the words from the box below:

dry port, PCS, containerization, AGV, RTG crane, terminal, ULD, blockchain, compatibility, congestion

1. ______ allows cargo to move across modes without unpacking.
2. A ______ operates inland but is connected to a seaport by rail.
3. ______ systems centralize information from all port actors.
4. A(n) ______ is used to lift containers in open yards.
5. Many ports now use ______ vehicles to move containers automatically.
6. A ______ is where containers are loaded, unloaded, or transferred.
7. ______ platforms secure documentation and trace cargo identity.
8. Air freight uses special containers known as ______.
9. Rail system ______ is a challenge for international shipments.
10. Port ______ can cause delays in multimodal supply chains.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Контейнерні термінали забезпечують швидке перевантаження вантажу між транспортами.
2. Стандартизовані контейнери полегшують транспортування, знижуючи втрати та ризики.
3. Сухі порти розташовані вглиб країни та з’єднані з морськими портами.
4. Платформи на основі блокчейну забезпечують надійне відстеження вантажів.
5. Автоматизовані крани та роботизовані системи зменшують залежність від людської праці.
6. Вузькі місця в інфраструктурі можуть спричинити затримки доставки.

7. Платформи PCS об’єднують митницю, перевізників та операторів терміналів.
8. Несумісність залізничної колії створює бар’єри для міжнародної логістики.
9. Технологія цифрових двійників дозволяє моделювати роботу терміналу.
10. Сучасні термінали використовують RTG крани та безпілотні транспортери.

B. Translate from English into Ukrainian:

1. Containerization improves cargo safety and reduces transfer time.
2. A dry port acts as an inland extension of a seaport.
3. Automated guided vehicles (AGVs) are reshaping terminal operations.
4. Swap bodies are mostly used in European road-rail systems.
5. RTLS helps track the exact location of containers in real time.
6. Port Community Systems improve data exchange and reduce paperwork.
7. Tank containers must meet strict safety standards for chemicals.
8. Intermodal terminals are investing in AI-powered scheduling software.
9. ULDs are unit containers designed specifically for air freight.
10. Global infrastructure projects aim to build smart intermodal corridors.

TEXT 3: COMPARING INTERMODAL AND MULTIMODAL SYSTEMS – EFFICIENCY, RISKS, AND SUSTAINABILITY

As global trade evolves, logistics professionals must choose between different models of combined transport to balance **cost, speed, flexibility, and sustainability**. The most widely used models – **intermodal** and **multimodal** transport – offer different benefits depending on the type of cargo, trade route, infrastructure, and customer expectations. While they may seem similar in practice, their operational characteristics produce **distinct advantages and risks** across key logistics metrics.

1. Operational Efficiency and Control

Intermodal systems are highly efficient when used in corridors with well-developed infrastructure, particularly when the same container can be seamlessly transferred across long rail, sea, and short road segments. The use of standardized units reduces physical handling and helps maintain product integrity. However, intermodal transport often requires **more coordination**, as each leg is managed by a separate carrier. This can result in fragmented communication and delays if one link fails.

Multimodal systems, on the other hand, centralize control. A single operator handles the entire shipment under one contract, streamlining scheduling, tracking, and communication. For clients, this reduces administrative complexity. However, reliance on a single provider limits flexibility, especially when disruptions occur and rerouting or carrier substitution is needed.

Summary:

- Intermodal: higher flexibility, more coordination needed
- Multimodal: simpler control, less flexibility

2. Cost Comparison

Intermodal transport can be **more cost-efficient** when large volumes are moved along optimized routes, especially when rail and sea are involved. Clients can negotiate separate contracts with each carrier, sometimes reducing total cost.

However, managing multiple contracts and documents increases administrative overhead.

Multimodal providers offer a **"one-stop shop"** solution that simplifies invoicing and logistics planning – though this may come at a premium. In many cases, clients pay more for convenience, global reach, and integrated services.

Cost influencers include:

- Distance and number of modes
- Infrastructure quality
- Cargo volume and frequency
- Customs clearance and border complexity

- Insurance and liability terms

3. Risk and Liability

Intermodal shipments involve multiple contracts and service providers, which can create disputes over **who is liable** in case of delay, damage, or loss. Each carrier is responsible only for its segment, and cargo owners may need to deal with several insurers or legal frameworks.

Multimodal systems place full liability on the **multimodal transport operator (MTO)**. This simplifies legal claims but puts higher responsibility on the MTO. Clients generally find it easier to resolve disputes under multimodal contracts, especially in cross-border logistics.

Moreover, **cargo tracking** in intermodal systems may vary between carriers, while multimodal providers often offer **integrated tracking dashboards**.

4. Sustainability and Environmental Impact

Both systems contribute to sustainable logistics by reducing the use of long-haul trucking and shifting more freight to **rail and sea** – which have a lower carbon footprint.

Intermodal systems are especially efficient in **green corridors**, such as EU-supported rail–sea networks. Governments often incentivize intermodal solutions through infrastructure investment and tax benefits.

Multimodal providers increasingly offer **carbon reporting**, green certifications, and offset options for environmentally conscious clients. Some operate **electric delivery fleets** for first and last-mile logistics.

Environmental comparison:

- Intermodal: ideal for standardized, low-emission corridors
- Multimodal: efficient in offering full-cycle green solutions under one provider

5. Practical Use Cases

Use Case	Intermodal	Multimodal
Europe–Asia rail corridors	Highly efficient with fixed rail–sea nodes	Managed by global providers (e.g., Maersk)
Retail supply chains (e.g., IKEA)	Combines sea, rail, truck via standard containers	May use 3PLs for door-to-door delivery
Humanitarian aid logistics	Not optimal due to flexibility limits	Preferred for central coordination and delivery in remote areas
Time-sensitive pharmaceutical delivery	Less suitable due to timing variation	Offers control, tracking, and handling guarantees

6. Decision Criteria for Logistics Professionals

To select the most suitable model, supply chain managers consider:

- **Shipment complexity** – Multimodal for sensitive cargo, intermodal for standardized goods
- **Customs procedures** – Multimodal may simplify international movement
- **Client preferences** – Some prefer full visibility and control, others delegate
- **Infrastructure availability** – Intermodal works best in well-developed corridors
- **Sustainability goals** – Both systems can support green logistics if well implemented

Conclusion

Intermodal and multimodal transportation are not competitors – they are **complementary tools** in modern supply chain strategy. Each has its strengths, and the choice depends on context, cargo, and strategic priorities. Logistics professionals who understand these models deeply can design transport solutions that deliver on **speed, cost, compliance, and sustainability** – a competitive advantage in the global economy.

ASSIGNMENTS FOR TEXT 3

I. Give full answers to the following questions:

1. What are the key differences in operational control between intermodal and multimodal transport?
2. How does the contractual structure of each system affect risk management and liability?
3. Which cost factors influence the choice between intermodal and multimodal logistics?
4. What are the main advantages of intermodal systems in green transport corridors?
5. Why might multimodal transport be better suited for time-sensitive shipments?
6. How do tracking and communication differ between the two systems?
7. In what way do multimodal providers simplify international logistics for clients?
8. What role does infrastructure quality play in selecting a transport model?
9. Describe a real-life use case where intermodal transport is most efficient.
10. When would a company prefer a multimodal solution over intermodal – and why?

II. True or False?

1. Multimodal transport offers more flexibility for last-minute route changes.
2. Intermodal transport uses multiple carriers under a single contract.
3. Multimodal contracts simplify customer experience and liability claims.
4. Intermodal systems are typically more sustainable than pure road transport.
5. Tracking cargo in multimodal logistics often involves several systems.
6. Multimodal delivery is ideal for standardized cargo only.
7. Intermodal transport depends heavily on container standardization.
8. One weakness of intermodal systems is poor visibility across modes.

9. Multimodal operators take full responsibility for the shipment.
10. Humanitarian logistics prefers intermodal systems due to high flexibility.

III. Fill in the gaps using the words from the box below:

liability, corridor, coordination, premium, integrated, dashboard, emissions, flexibility, contract, routing

1. Intermodal transport requires more ______ between independent carriers.
2. Multimodal shipments are handled under a single ______.
3. Many multimodal providers offer an ______ tracking platform.
4. Green transport ______ in the EU promote intermodal rail–sea flows.
5. Clients pay a ______ for simplified management in multimodal contracts.
6. One key advantage of intermodal is high modal ______.
7. When a delay occurs, multimodal systems may face limited ______ options.
8. Multimodal logistics centralizes all legal and insurance ______.
9. Combined systems help reduce CO_2 ______ in long-haul freight.
10. A real-time ______ helps logistics managers monitor critical shipments.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Інтермодальні перевезення зазвичай ефективніші на стандартизованих маршрутах.
2. Мультимодальний оператор несе повну відповідальність за вантаж.
3. Високий рівень гнучкості – перевага інтермодальних систем.
4. Компанії часто платять більше за централізоване управління перевезенням.
5. Системи мультимодального моніторингу забезпечують єдиний інтерфейс для клієнта.
6. Вибір моделі залежить від типу вантажу, відстані й інфраструктури.

7. Транспортні коридори з низьким рівнем викидів підтримуються державними програмами.
8. Ризик втрати або пошкодження часто розподілений між декількома перевізниками.
9. Мультимодальні контракти спрощують оформлення митних документів.
10. Ключова проблема інтермодальних ланцюгів – це затримки на стику модальностей.

B. Translate from English into Ukrainian:

1. Intermodal transport provides better carrier flexibility along fixed routes.
2. Multimodal solutions are ideal when clients need full-cycle coordination.
3. Legal disputes are easier to resolve under multimodal contracts.
4. Rail and sea are greener alternatives to road-only freight.
5. Infrastructure plays a key role in choosing a combined transport model.
6. Integrated tracking systems increase customer trust and satisfaction.
7. Intermodal corridors in Asia–Europe trade continue to expand.
8. Each carrier in an intermodal chain handles its own liability.
9. Multimodal transport may cost more due to value-added services.
10. Green logistics goals can be achieved by combining smart transport systems.

TEXT 4: LEGAL FRAMEWORKS AND DOCUMENTATION IN INTERMODAL AND MULTIMODAL TRANSPORT

Combined transport, which integrates several modes of transportation, also involves a complex **legal and regulatory environment**. Whether cargo is moved using intermodal or multimodal systems, it must comply with multiple legal frameworks, each tied to the transport mode, geographic region, cargo type, and contractual terms. Understanding the rules that govern responsibility, liability, and documentation is critical for logistics managers, especially in **cross-border or international trade operations**.

1. Modal-Specific Legal Conventions

Each mode of transport operates under a separate set of international rules:

- **Road Transport**: Governed by the **CMR Convention** (Convention on the Contract for the International Carriage of Goods by Road, 1956). It applies to international shipments by road and outlines carrier liability, documentation (CMR waybill), and procedures in case of damage or delay.
- **Rail Transport**: In Europe and parts of Asia, two main agreements apply:
  - **CIM (Uniform Rules Concerning the Contract of International Carriage of Goods by Rail)** — under the **COTIF** convention, used primarily in EU countries.
  - **SMGS (Agreement on International Goods Transport by Rail)** — applied across CIS countries, China, and parts of Eastern Europe.
- **Air Transport**: Governed by the **Warsaw Convention (1929)** and later the **Montreal Convention (1999)**, which regulate liability, cargo documentation (Air Waybill), and compensation in case of loss, delay, or damage.
- **Maritime Transport**: Regulated by the **Hague-Visby Rules**, **Hamburg Rules**, and **Rotterdam Rules** (not yet fully enforced globally). These rules govern bills of lading, carrier obligations, and time limitations.

Each of these regimes differs in how they define liability caps, responsibilities, and documentation requirements.

2. Multimodal Transport and the MTD

Multimodal transport, with a single contract covering multiple modes, faces a legal gap: there is no universal convention that governs it comprehensively. Instead, most multimodal shipments rely on:

- The **UNCTAD/ICC Model Rules** for Multimodal Transport Documents (MTDs)
- Regional guidelines and national laws of the country where the contract is issued

- Legal clauses in the multimodal contract (standard terms set by logistics providers or freight forwarders)

The **Multimodal Transport Document (MTD)** replaces separate mode-specific documents and assigns liability to the **Multimodal Transport Operator (MTO)** for the entire journey. The MTD includes:

- Details of cargo, route, handling instructions
- One party responsible for the full chain
- Coverage of force majeure, delay clauses, and liability limits

The legal challenge arises when cargo damage occurs – it is often unclear which mode's rules apply, especially if the damage location is unknown. This is known as the **"network principle"** vs **"uniform liability" debate**.

3. Documentation in Intermodal Chains

In **intermodal systems**, the carrier changes at each leg, and with that, so does the documentation. A typical container shipment might involve:

- **CMR Waybill** (truck)
- **Rail Consignment Note** (CIM or SMGS)
- **Ocean Bill of Lading** (sea leg)
- **Delivery Receipt or POD** (last-mile confirmation)

Each document serves as evidence of contract, receipt of goods, and may be required for customs clearance or insurance claims. The lack of standardization creates complexity, delays, and legal uncertainty if documents are lost or inconsistent.

To address this, many freight forwarders now offer **electronic transport documents (eDocs)** – digital versions of traditional documents, validated with e-signatures and supported by **blockchain or EDI platforms**.

4. Liability, Insurance, and Disputes

Liability is a key concern in combined transport. The following concepts are central:

- **Carrier Liability**: Under mode-specific rules, each carrier has different limits. For instance, CMR limits are calculated per kilogram of lost cargo; maritime rules set per package or unit limits.
- **Multimodal Liability**: MTO assumes full liability – but must define in contracts whether it follows **uniform liability** (one rule applies regardless of mode) or **network liability** (each mode's rule applies separately).

Insurance is used to fill liability gaps:

- **Cargo Insurance**: Paid by the cargo owner to cover full value.
- **Carrier's Liability Insurance**: Covers the carrier's legal obligations.
- **Comprehensive Multimodal Policies**: Offered by insurers to MTOs to handle through-coverage.

In disputes, courts examine:

- Place of damage
- Governing law in the contract
- Transport segment in question
- Applicable international convention

Cross-border claims may take years to resolve, particularly when jurisdictions conflict or when carriers are based in different legal systems.

5. Standardization and Legal Innovation

In recent years, the logistics industry has pushed for:

- **Global harmonization of transport documents** (e.g., FIATA eBL – electronic Bill of Lading)
- **Digital legal platforms** for documentation and liability tracking
- **Smart contracts** (based on blockchain) that auto-trigger claims or payments upon delivery failures
- **Integration of legal compliance checks** into Terminal Operating Systems (TOS)
- **Global registries for insurance and cargo coverage**

Organizations like the **International Chamber of Commerce (ICC)** and **UNCITRAL** promote legal reforms to adapt to digitized, multimodal logistics.

Conclusion

Legal frameworks are both a backbone and a challenge for combined transport. While each transport mode has clear legal structures, their interaction in multimodal or intermodal operations creates complexity, especially for international trade. Logistics professionals must understand the basics of documentation, liability, and legal systems to manage risk and ensure compliance. As transport evolves digitally, so must the legal infrastructure – toward global standards, smart contracts, and simplified claims management.

ASSIGNMENTS FOR TEXT 4

I. Give full answers to the following questions:

1. What international conventions govern road, rail, air, and sea transport?
2. How does the legal responsibility differ between intermodal and multimodal transport?
3. What is the role of the Multimodal Transport Document (MTD)?
4. Explain the difference between network liability and uniform liability.
5. Why does multimodal transport lack a unified global legal framework?
6. What are the typical documents used in an intermodal chain?
7. How do electronic documents (eDocs) improve document handling in logistics?
8. What types of insurance are common in combined transport operations?
9. How are cross-border disputes in multimodal transport typically resolved?
10. What legal innovations are emerging to support digital combined logistics?

II. True or False?

1. CMR governs international air shipments.

2. The MTO is responsible for the entire shipment under multimodal contracts.
3. Rail shipments in the EU follow SMGS documentation rules.
4. The Warsaw and Montreal Conventions relate to air transport.
5. Blockchain platforms help automate claims and track documentation.
6. Uniform liability means that each transport mode has its own rule.
7. A POD is a required document in container sea shipping.
8. Courts typically apply the rules of the country where damage occurred.
9. Digital documents cannot be used in multimodal claims.
10. Insurance is optional in multimodal transport but highly recommended.

III. Fill in the gaps using the words from the box below:

MTD, SMGS, Hague Rules, insurance, eDocs, CMR, multimodal, uniform, cargo claim, liability

1. A ______ system assigns one legal framework regardless of transport mode.
2. The ______ governs road transport across Europe and parts of Asia.
3. In ______ transport, a single contract covers all transport modes.
4. The ______ convention governs sea cargo documentation and liability.
5. ______ are digital versions of traditional shipping papers.
6. The ______ applies to rail shipments in post-Soviet and Asian regions.
7. The ______ transport document unifies the shipment under one provider.
8. When goods are lost, a ______ is filed with the carrier or MTO.
9. Maritime ______ is limited by package weight or number.
10. Logistics companies purchase ______ to cover damage and legal disputes.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Мультимодальні перевезення здійснюються за єдиним договором.
2. Конвенція CMR регулює міжнародні автомобільні вантажоперевезення.

3. Універсальної міжнародної угоди для мультимодальних перевезень не існує.
4. Відповідальність у випадку пошкодження вантажу визначається місцем інциденту.
5. Документи, як-от CMR-накладна чи коносамент, є юридичними доказами перевезення.
6. Смарт-контракти на основі блокчейну можуть автоматично запускати страхові виплати.
7. У багатьох випадках суди розглядають претензії згідно з правом країни відправника.
8. Електронні документи зменшують затримки та паперову роботу.
9. Страхування вантажу потрібне для покриття ризиків при пошкодженні.
10. Визначення відповідального перевізника є складним у ланцюгах з кількома етапами.

B. Translate from English into Ukrainian:

1. The multimodal transport operator assumes full responsibility under the contract.
2. The Warsaw and Montreal conventions set air cargo liability limits.
3. A bill of lading serves as both a receipt and a title to the goods.
4. The network liability principle applies different rules to each transport leg.
5. Courts must determine which convention governs a particular damage claim.
6. Insurance policies help reduce the legal exposure of carriers.
7. Digital compliance checks are now integrated into TOS platforms.
8. Most multimodal contracts include force majeure and delay clauses.
9. Legal harmonization efforts support global electronic transport documentation.
10. MTOs use standard terms to define responsibilities across borders.

TEXT 5: THE FUTURE OF INTERMODAL AND MULTIMODAL LOGISTICS – SMART CORRIDORS, SUSTAINABILITY, AND DIGITAL TRANSFORMATION

As global trade becomes faster, more digital, and increasingly influenced by sustainability goals, the future of logistics lies in **intelligent, integrated, and low-emission transport systems**. Intermodal and multimodal logistics are central to this transformation, offering scalable, eco-friendly, and technologically advanced solutions for modern supply chains. Governments, logistics providers, and international organizations are now investing in **smart transport corridors**, green hubs, and autonomous infrastructure – shifting from reactive delivery systems to **predictive, optimized global networks**.

1. Smart Intermodal Corridors

A smart corridor is a digitally enhanced logistics route designed to optimize freight movement through automation, real-time data sharing, and performance monitoring. These corridors integrate:

- **High-capacity railways and ports**
- **Connected terminals and logistics hubs**
- **Digital customs and border control**
- **IoT-powered cargo tracking**
- **AI-based predictive maintenance**
- **Integrated multimodal platforms**

Examples include:

- The **China–Europe Rail Corridor** using blockchain for cross-border visibility
- The **EU's TEN-T Network**, connecting ports and inland terminals with harmonized standards
- **North American inland trade routes** connecting Mexico–US–Canada under the USMCA framework

These corridors improve cargo predictability, reduce congestion, and support modal shift from road to rail or inland waterway.

2. Automation and Autonomous Infrastructure

Automation is shaping the next generation of terminals and transport nodes. Advanced hubs now use:

- **Automated cranes and stacking systems**
- **Driverless trucks and AGVs (Automated Guided Vehicles)**
- **Digital twins** for terminal layout and operations simulation
- **AI-based yard and berth planning tools**
- **Robotic parcel sorters** for last-mile distribution

Autonomous logistics chains aim to reduce labor dependency, improve precision, and minimize safety risks. Ports like **Rotterdam**, **Hamburg**, and **Qingdao** are leading this transition with AI-integrated terminal operating systems (TOS).

3. Green Logistics and Climate Goals

Governments and major logistics operators are prioritizing environmental responsibility through:

- Emission-based pricing and tax credits
- Modal shift policies (incentivizing rail and sea use)
- Zero-emission delivery zones in urban centers
- Electrification of fleets and port equipment
- CO_2 tracking dashboards and carbon calculators
- Green certificates and voluntary offsetting schemes

The EU's Green Deal, China's Dual Carbon Goals, and the IMO's carbon reduction targets are pushing companies to redesign transport strategies around sustainability.

4. Digital Ecosystems and Interoperability

Digital integration across platforms is essential for real-time control and visibility. Key innovations include:

- **Digital logistics corridors**, linking ports, carriers, customs, and shippers on unified platforms
- **Smart contracts** that trigger payments or penalties automatically

- **Blockchain-based eBL (electronic Bill of Lading)** reducing fraud and delays
- **API-based systems** connecting intermodal platforms, insurers, and compliance databases
- **Cybersecurity systems** safeguarding connected supply chains

The shift from isolated legacy systems to **open digital ecosystems** enhances transparency, agility, and trust in multimodal operations.

5. Resilience and Risk Management

After disruptions like the COVID-19 pandemic, the Suez Canal blockage, and geopolitical shocks, resilience has become a top priority. Smart logistics now includes:

- Scenario-based route simulation and crisis planning
- Distributed warehousing and multiple entry/exit points
- AI-powered forecasting for bottlenecks or delays
- Integrated insurance and risk tracking platforms
- Decentralized, modular transport structures

These features protect supply chains from single-point failures and support continuity even under extreme pressure.

6. The Role of International Cooperation

The future of intermodal and multimodal systems depends on **cross-border collaboration**. Key efforts include:

- Standardizing transport documents and data protocols
- Joint infrastructure development (e.g., EU-African corridors)
- Trade agreements with logistics provisions
- Global emission reporting standards
- Interoperability of transport systems across continents

Organizations like **UNECE**, **WCO**, and **FIATA** are working to align digital, legal, and operational frameworks globally.

Conclusion

The logistics of tomorrow will not be defined only by physical movement – but by the intelligence, automation, and sustainability embedded in every link of the chain. Intermodal and multimodal systems are evolving into **smart, green, and globally harmonized solutions**, where real-time data, resilient infrastructure, and predictive planning drive competitive advantage. For logistics professionals, embracing these transformations is not an option – it is a strategic imperative.

ASSIGNMENTS FOR TEXT 5

I. Give full answers to the following questions:

1. What defines a smart intermodal corridor and what technologies are involved?
2. How does automation improve the performance of logistics hubs?
3. What are the goals of green logistics strategies implemented by governments?
4. How do digital ecosystems enhance the efficiency of multimodal transport?
5. What is the role of blockchain and smart contracts in future supply chains?
6. How can predictive tools improve resilience in transport operations?
7. What does a "digital twin" do in the context of logistics terminals?
8. How are climate policies such as the EU Green Deal influencing transport planning?
9. Why is cross-border interoperability crucial for global supply chains?
10. What actions are international organizations taking to support digital logistics?

II. True or False?

1. A smart corridor operates only within one country.
2. AI is now used for berth scheduling and container yard planning.
3. Electrification of port equipment is part of green logistics.
4. Smart contracts require paper signatures for legal enforcement.
5. Intermodal automation reduces accident risks and increases throughput.
6. The Suez Canal incident showed that multimodal systems are crisis-proof.

7. CO_2 tracking is becoming mandatory in many global corridors.
8. Data integration between platforms slows down operations.
9. Blockchain helps prevent document fraud in shipping.
10. Modular transport structures help adapt to disruption.

III. Fill in the gaps using the words from the box below:

automation, smart contract, resilience, digital twin, corridor, blockchain, emission, IoT, forecasting, ecosystem

1. A ______ allows a terminal to simulate operations and improve layout.
2. The China–Europe rail ______ is one of the longest in the world.
3. Modern ports invest in ______ to reduce manual crane operations.
4. Logistics ______ now include terminals, customs, carriers, and cloud tools.
5. A ______ triggers actions automatically based on predefined logistics events.
6. Advanced ______ sensors track container location and condition.
7. Predictive ______ systems reduce bottlenecks and optimize delivery.
8. Carbon ______ calculators are used to reduce supply chain impact.
9. ______ platforms prevent manipulation of bills of lading.
10. Supply chain ______ refers to its ability to continue under stress.

IV. Translation Tasks

A. Translate from Ukrainian into English:

1. Смарт-коридори поєднують цифрову інфраструктуру з фізичними маршрутами.
2. Автоматизовані крани і транспортери пришвидшують обробку вантажів.
3. Сталий розвиток передбачає скорочення викидів та енергоспоживання.
4. Блокчейн-системи забезпечують прозорість та безпечність перевезень.
5. Цифрові екосистеми з’єднують операторів, митницю і перевізників на одній платформі.

6. Смарт-контракти можуть автоматично запускати оплату або штрафи.
7. Платформи з прогнозуванням попереджають про затори та ризики.
8. Електричні вантажівки застосовуються для доставки в містах.
9. Пандемія продемонструвала важливість гнучких та стійких ланцюгів поставок.
10. Міжнародні організації працюють над уніфікацією цифрових стандартів логістики.

B. Translate from English into Ukrainian:

1. Smart corridors improve transparency and reduce cross-border delays.
2. Digital twins allow logistics hubs to test layouts and workflows virtually.
3. Automated systems reduce labor dependency and improve precision.
4. Blockchain ensures the authenticity of cargo documentation.
5. Carbon reporting is becoming a standard requirement in multimodal contracts.
6. Resilient transport networks can recover faster after disruptions.
7. Cloud-based dashboards offer real-time visibility of cargo flows.
8. Governments are introducing tax incentives for low-emission fleets.
9. AI forecasting tools help prevent overbooking and congestion.
10. Global trade will rely on integrated, intelligent, and sustainable supply chains.

LEXICAL EXERCISES

Exercise 1. Match the terms with their definitions:

TERM	DEFINITION
1. Digital twin	**A.** A digitally enhanced route integrating modes, data, and infrastructure
2. Smart corridor	**B.** A system that forecasts delays, bottlenecks, or demand spikes
3. Green logistics	**C.** A digital agreement that executes automatically

4. AGV	**D.** An autonomous vehicle used to transport containers at terminals
5. Freight village	**E.** A digital system to securely track cargo and documents
6. Multimodal operator	**F.** A location combining warehouses, customs, terminals, and services
7. Predictive analytics	**G.** A real-time model simulating physical logistics operations
8. Smart contract	**H.** A logistics firm managing shipments under a single multimodal contract
9. Cargo visibility	**I.** An eco-oriented approach to reducing transport's environmental impact
10. Blockchain platform	**J.** The ability to see the location and condition of cargo throughout the route

Exercise 2. Fill in the blanks using the active vocabulary:

1. The terminal uses ______ to move containers without human drivers.
2. A ______ simulates port operations to improve layout and flow.
3. Governments promote ______ to cut emissions in logistics.
4. ______ ensures that shippers know where their cargo is at every stage.
5. A ______ connects rail, sea, and road hubs across Europe.
6. ______ tools help avoid congestion at intermodal junctions.
7. Companies use ______ to digitize legal agreements across borders.
8. The ______ is responsible for the entire multimodal shipment.
9. A ______ contains customs offices, terminals, and logistics firms.
10. Many supply chains now operate on ______ for document transparency.

Exercise 3. Translate into English:

1. Цифрові двійники допомагають оптимізувати роботу терміналів.

2. Смарт-контракти автоматично фіксують порушення умов доставки.
3. Вантажне селище об'єднує склади, пункти митного оформлення і перевізників.
4. Блокчейн-платформи запобігають підробці документів.
5. Автоматизовані візки перевозять контейнери на терміналах.
6. Мультимодальний оператор керує всім ланцюгом поставок.
7. Відстеження в реальному часі є стандартною опцією в сучасних перевезеннях.
8. Смарт-коридори сприяють швидкому та безпечному переміщенню вантажів.
9. Зелені логістичні рішення мінімізують вуглецевий слід.
10. Аналітика прогнозування попереджає про потенційні затримки.

Exercise 4. Translate into Ukrainian:

1. A multimodal operator arranges the full transport route under one contract.
2. Real-time tracking systems improve delivery reliability.
3. Smart corridors reduce transit time and customs delays.
4. Predictive analytics tools are used in modern terminal planning.
5. Green logistics includes electric vehicles and modal shift strategies.
6. Blockchain platforms help track high-value cargo securely.
7. A digital twin is used to test warehouse layout before construction.
8. Freight villages improve efficiency by clustering logistics services.
9. AGVs are safer and more consistent than manned forklifts.
10. Smart contracts reduce paperwork and dispute resolution time.

MINI GLOSSARY: ENGLISH – UKRAINIAN

English Term	Ukrainian Translation
AGV (automated guided vehicle)	автоматичний транспортний візок

English Term	Ukrainian Translation
automated terminal	автоматизований термінал
autonomous terminal	автономний термінал
blockchain platform	блокчейн-платформа
carbon emissions	викиди вуглецю
cargo visibility	відстеження вантажу / прозорість вантажопотоку
digital twin	цифровий двійник
emission reduction	скорочення викидів
freight village	вантажне селище
green logistics	зелена логістика
green logistics	екологічна логістика
integrated platform	інтегрована платформа
intermodal hub	інтермодальний вузол
intermodal transport	інтермодальні перевезення
last-mile delivery	останній етап доставки
multimodal contract	мультимодальний контракт
multimodal operator	оператор мультимодальних перевезень
multimodal transport	мультимодальні перевезення
predictive analytics	аналітика прогнозування
predictive analytics	аналітика прогнозування
real-time tracking	відстеження в реальному часі
smart contract	смарт-контракт
smart corridor	смарт-коридор

English Term	Ukrainian Translation
smart corridor	смарт-коридор

GRAMMAR FOCUS : ADJECTIVES. DEGREES OF COMPARISON IN LOGISTICS CONTEXT

I. Use in Logistics Context

Structure	Use in Logistics	Example
Comparative	Compare two systems, options, modes	*Rail is **more efficient** than road for bulk freight.*
Superlative	Highlight the best/worst among several choices	*Maersk is one of the **largest** multimodal providers.*
Less / Least	Describe reduced performance or suitability	*Air freight is **less sustainable** than rail.*
As…as / Not as…as	Show equal or unequal characteristics	*Intermodal is **not as flexible** as multimodal.*

II. Examples in Use

Comparatives:

- Intermodal is **faster** than traditional road transport.
- Multimodal systems are **more integrated** than intermodal ones.
- Blockchain is **safer** than traditional paper-based documentation.

Superlatives:

- Rotterdam is the **busiest** port in Europe.
- Rail is the **least polluting** mode of long-haul transport.
- Automation offers the **highest** efficiency gains.

Irregular forms:

- good → **better → the best**
- bad → **worse → the worst**
- far → **farther/further → the farthest/furthest**

GRAMMAR EXERCISES

Exercise 1. Complete with the correct form:

1. Multimodal transport is usually ______ (simple) than managing multiple contracts.
2. This corridor is one of the ______ (long) in Eurasia.
3. Road freight is ______ (cheap) but ______ (polluting) than rail.
4. Smart terminals are becoming ______ (common) than traditional ones.
5. Rotterdam is ______ (busy) than most European ports.
6. Intermodal cargo handling is ______ (safe) when containers remain sealed.
7. This route is ______ (efficient) of all the options.
8. Paper documents are ______ (secure) than blockchain-based platforms.
9. Rail is ______ (reliable) than inland waterway in winter.
10. Digital twins provide the ______ (accurate) simulation of terminal flow.

Exercise 2. Translate into English:

1. Мультимодальні системи є простішими у використанні, ніж інтермодальні.
2. Цей маршрут є найдовшим серед усіх запропонованих.
3. Автомобільний транспорт дешевший, але менш екологічний.
4. Паперові накладні не такі безпечні, як цифрові документи.
5. Порт Гамбурга зайнятіший, ніж Лісабон.
6. Річкові шляхи взимку менш надійні, ніж залізниця.
7. Це найбільш гнучкий варіант доставки.
8. Складська автоматизація є більш ефективною за ручну обробку.

9. Мультимодальні перевезення менш залежні від одного маршруту.
10. Цифрові панелі забезпечують найточніше відображення логістичного процесу.

Exercise 3. Translate into Ukrainian:

1. Rail is more environmentally friendly than road transport.
2. Intermodal networks are becoming faster and more cost-effective.
3. This is the most advanced terminal in the region.
4. Blockchain is more secure than traditional systems.
5. The dry port in Warsaw is larger than the one in Prague.
6. This corridor is less reliable during winter storms.
7. The new smart platform is not as flexible as the old one.
8. Green logistics is becoming more important than ever.
9. This option is the least expensive for small volumes.
10. The cargo was handled better than expected.

SPEAKING TASKS

Task 1. Personal Experience & Opinion

Topic: *Which transport system do you consider more efficient: intermodal or multimodal?*

Prompts:

- What do you know about each system?
- Which one would you choose for high-value cargo and why?
- Which is more common in your country or region?
- How important is green logistics in decision-making?

Task 2. Pair Interview – Logistics Company Simulation

Scenario: *You and your partner are logistics specialists in a shipping company. A client needs to transport medical equipment from Germany to Kazakhstan. You must choose between intermodal and multimodal systems.*

Discuss:

- Route selection and modes involved
- Time, risk, and cost factors
- Legal and documentation aspects
- Environmental impact and tracking tools

Goal:

Present a final recommendation and justify your choice.

Task 3. Mini-Presentation (3–5 minutes)

Choose one topic:

1. Advantages and limitations of smart transport corridors
2. How automation and digital twins are changing global logistics
3. Green logistics strategies in multimodal supply chains
4. Blockchain and smart contracts in cargo documentation

Structure:

- Introduction → 3 main points → Example/case study → Conclusion
- Use domain-specific vocabulary from grammar and lexical blocks.

Task 4. Group Problem Solving – Crisis Logistics Planning

Scenario: *A major intermodal hub was shut down due to flooding. Your group must reroute cargo using alternative solutions and design a temporary multimodal plan.*

Tasks:

- Identify new modes and transfer points
- Consider documentation, liability, and delays
- Propose digital tools to support your plan
- Evaluate environmental and financial impacts

Goal: Create a new delivery strategy that is fast, legal, and cost-efficient.

Task 5. Debate

Statement: *Digital automation and green corridors will fully replace traditional logistics in the next 10 years.*

Instructions:

Divide into two teams:

- **Team A (Pro):** Support the idea – refer to smart systems, sustainability, AI, and efficiency.
- **Team B (Con):** Argue that full replacement is unrealistic – focus on infrastructure gaps, human factor, and global inequality.

Use in discussion: predictive analytics, automated terminals, multimodal vs. intermodal, cost, global challenges.

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