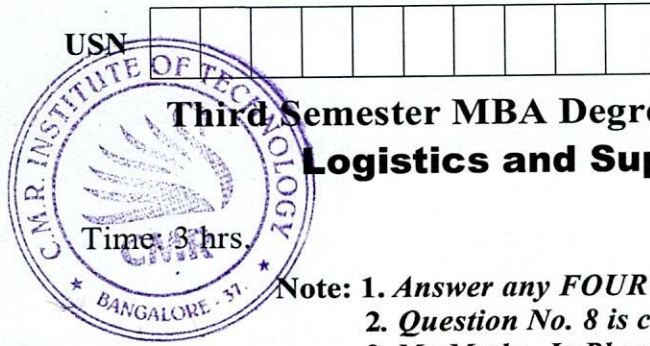


CBCS SCHEME

22MBA301

USN



Third Semester MBA Degree Examination, Dec.2024/Jan.2025

Logistics and Supply Chain Management

Max. Marks: 100

Note: 1. Answer any FOUR full questions from Q.No.1 to Q.No.7.
2. Question No. 8 is compulsory.
3. M : Marks, L: Bloom's level, C: Course outcomes.

			M	L	C
Q.1	a.	Define Logistics concepts.	3	L1	CO1
	b.	Examine the key challenges of supply chain.	7	L4	CO1
	c.	Identify the operating objectives of logistics planning.	10	L3	CO1
Q.2	a.	Define Inventory management concept.	3	L1	CO4
	b.	Explain various types of logistics.	7	L2	CO1
	c.	Examine in brief the cycle view of push/pull view in supply chain.	10	L4	CO2
Q.3	a.	Define order/setup cost.	3	L2	CO4
	b.	Determine the approaches to analyse logistics system.	7	L5	CO3
	c.	What is meant by stock out cost and list out the consequences of stock out cost on your business?	10	L3	CO1
Q.4	a.	Define Benchmarking.	3	L1	CO1
	b.	Explain the components of Inventory Decision.	7	L5	CO4
	c.	Examine the functions of transportation.	10	L4	CO4
Q.5	a.	What is meant by VMI (Vendor Managed Inventory)?	3	L2	CO1
	b.	Define MRP in supply chain and why it is important.	7	L3	CO4
	c.	Examine any 3 inventory management techniques.	10	L4	CO4
Q.6	a.	Identify the 5 drivers of supply chain.	3	L3	CO2
	b.	Examine the factors impacting Road transport cost.	7	L4	CO4
	c.	Analyze the Role of IT (Information Technology) in SCM (Supply Chain Management)	10	L5	CO4

22MBA301

Q.7	a.	Define F.O.B Pricing in Logistics.	3	L1	CO3
	b.	Identify the factors influencing distribution network design.	7	L3	CO4
	c.	Explain the methods and tools facilitating international logistics.	10	L5	CO4
Q.8	Case Study [Compulsory] : <p>India is going to be a 5 trillion \$ economy very soon in another 5 years. And it is observed in recent days, that all manufacturing and service industry in India are doing good. There is lot of opportunities for Indian companies to build "Vocal for Local" statement.</p> <p>Indian supply chain processes are reaching heights in terms of quality and experience. Most of the companies both public and private are engaged in quality SCM services. There are many private agencies like VRL, Sharma roadways, NAVTA travels are working towards successful logistics support.</p> <p>There are multiple challenges for Indian companies when it comes to speedy delivery proper packaging, AI handling and technology implementation in SCM activities. However, huge investment is happening in SCM due to Indian govt, positive actions towards infrastructure in recent days.</p> <p>2029 will be the Era of Indian Logistic System, where the country has pledged to reach higher heights in Global supply chain Network.</p> <p>Questions :</p>				
	a.	What are the major challenges that Indian Logistics is facing?	10	L1	CO2
	b.	How developing countries like India can implement new technology in SCM to overcome supply chain cost.	10	L1	CO2

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

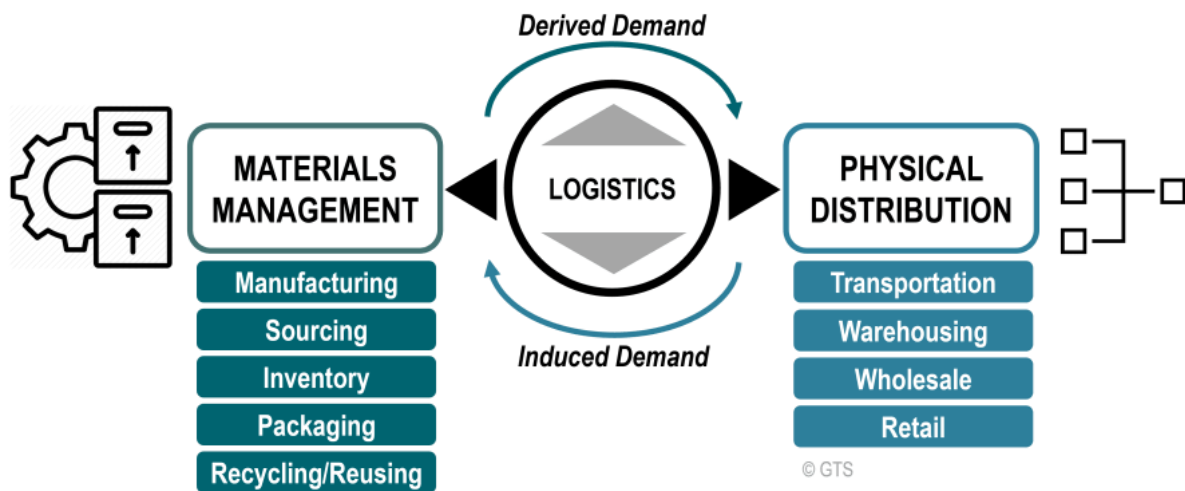
SUB CODE: 22MBA301

APRIL-2025

1. A : DEFINE LOGISTICS CONCEPTS

3 MARKS

Logistics refers to the overall process of managing how resources are acquired, stored, and transported to their final destination. Logistics management involves identifying prospective distributors and suppliers and determining their effectiveness and accessibility. Logistics managers are referred to as logisticians.



1. B. EXAMINE THE KEY CHALLENGES OF SUPPLY CHAIN 7 MARKS

- 1 Material Shortages:** One of the key issues with supply chain management is that there is a material shortage when demand from customers suddenly increases. The problem is further aggravated by reliance on a few suppliers with a lack of other alternatives.
- 2 Rising Costs:** Labour, raw materials, and transportation are necessary for continuing operations. The challenge lies in increasing costs associated with these activities, which have made it difficult to maintain operations or product quality.
- 3 Multiple Sales Channels:** For customers, they may find it easy selecting from different sales channels like online stores, mobile apps and physical stores where they purchase their products but for companies this has become a major source of concern in managing

their supply chains. This complicates the entire process since each channel requires distinct supply chain strategies.

- 4 **Longer Delivery Timelines:** Companies must do whatever they can to keep their customers pleased as well as to stay competitive. One of the key steps is ensuring that customers get deliveries quickly. However, long lead times always disturb the balance between demand and supply making it difficult for businesses to fulfil customer requirements on time.
- 5 **Managing Data:** In today's business world, data is everything. Various tools facilitate data collection, however, consolidating and interpreting this data is not an easy task, thus posing a great challenge in relation to supply chain management.
- 6 **Hiring Qualified Staff:** Supply chain management faces a shortage of skilled professionals. This remains an ongoing problem because finding workers with the relevant skills and experiences is a Herculean task.
- 7 **Providing Quality Customer Service:** Customer tastes and preferences change rapidly. Hence, supply chain strategies have to be quick enough to change and adapt as well. The ability to meet these changing customer preferences while offering excellent service at low cost remains a continuous battle.
- 8 **Lack of Visibility:** Inadequate visibility in the supply chain, including the lack of proper visibility of inventory levels, create delays and disruptions that might lead to overstocking or shortages. Poor visibility also affects brand image and customer relations because the products are often untraceable.
- 9 **Technology Adoption:** Many businesses have yet to adopt new technologies to improve their supply chain operations. Due to this slow adoption, businesses have come to find it difficult to get an edge over other firms in warehousing and delivery logistics.

1. C . Identify the operative objectives of logistics planning 10 MARKS

Logistics planning involves designing and managing efficient processes to ensure the smooth flow of goods, services, and information from origin to consumption. The operative objectives of logistics planning focus on execution-level goals that enhance performance, reduce costs, and improve customer satisfaction. Key operative objectives include:

1. Cost Efficiency

Minimize transportation, warehousing, and handling costs.

Optimize inventory levels to reduce holding costs.

Leverage economies of scale in procurement and distribution.

2. Service Level Optimization

Ensure on-time deliveries (OTIF – On Time In Full).

Maintain high order accuracy and fulfillment rates.

Provide reliable and flexible customer service.

3. Inventory Management

Reduce excess stock while avoiding stockouts (JIT – Just-in-Time).

Improve inventory turnover ratios.

Implement demand forecasting for better stock planning.

4. Transportation Efficiency

Optimize route planning to reduce fuel costs and transit times.

Select the best transport modes (road, rail, air, sea).

Consolidate shipments to maximize load utilization.

5. Warehouse & Storage Optimization

Improve space utilization and layout design.

Enhance picking, packing, and sorting processes.

Implement automation (e.g., WMS – Warehouse Management Systems).

6. Supply Chain Visibility & Coordination

Track shipments in real-time (IoT, GPS, RFID).

Improve communication between suppliers, manufacturers, and distributors.

Use data analytics for proactive decision-making.

7. Risk Mitigation & Resilience

Identify and manage supply chain disruptions.

Diversify suppliers and logistics partners.

Implement contingency planning (e.g., backup routes, safety stock).

8. Sustainability & Compliance

Reduce carbon footprint through eco-friendly logistics (green logistics).

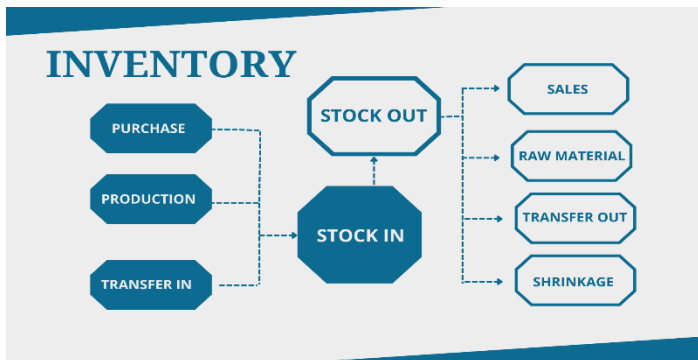
Ensure compliance with regulations (e.g., customs, safety standards).

Adopt reverse logistics for returns and recycling.

Conclusion: The operative objectives of logistics planning aim to balance cost, speed, reliability, and flexibility while ensuring seamless operations across the supply chain. Effective logistics planning enhances competitiveness, customer satisfaction, and long-term business success.

2. A Define inventory management concept ? 3 MARKS

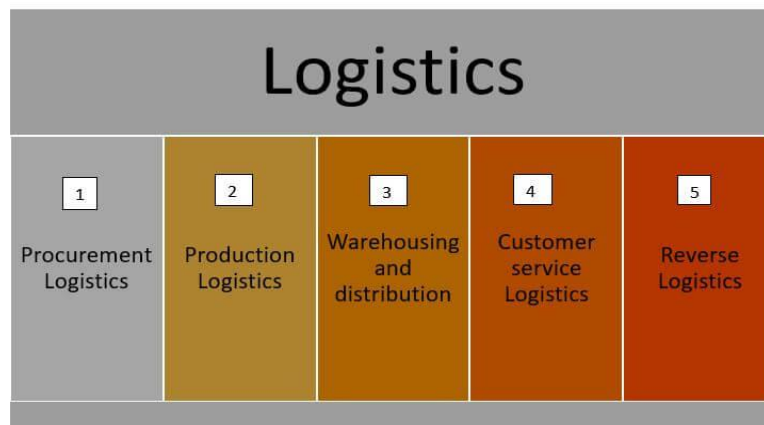
Inventory management is the **systematic process of ordering, storing, tracking, and controlling inventory**—which includes raw materials, work-in-progress (WIP), and finished goods. The primary objective is to ensure that the right quantity of inventory is available at the right time and at the right cost, to meet customer demand without overstocking or understocking.



2. B Explain Various types of Logistics? 7MARKS

Types of Logistics-01

ennilogistics.com



Procurement Logistics

- **Definition:** Procurement logistics involves all activities related to **obtaining raw materials, components, or services** from suppliers to meet production needs.

2. Production Logistics

- **Definition:** Production logistics focuses on the **movement and storage of materials within the production process**.

3. Warehousing and Distribution Logistics

- **Definition:** This involves the **storage of goods in warehouses** and the **distribution of products to customers or retailers**.

4. Customer Service Logistics

- **Definition:** This type of logistics focuses on providing excellent **after-sales support** and meeting customer delivery expectations.

5. Inbound Logistics

- Refers to the movement of materials and goods from suppliers to the company.

6. Outbound Logistics

- Deals with the flow of finished products from the company to the customers or distribution centers.

7. Third-Party Logistics (3PL)

- Involves outsourcing logistics functions to a third-party provider.

8. Fourth-Party Logistics (4PL)

- A step above 3PL, 4PL providers manage the entire supply chain on behalf of the company.

9. Reverse Logistics

- Concerned with the return of goods from customers back to the company.

2.C Explain in brief the cycle view of pull/push view in supply chain. 10MARKS

A **supply chain** is a network of suppliers, manufacturers, distributors, retailers, and customers involved in producing and delivering a product or service. Efficient supply chain management helps organizations meet customer demands while minimizing costs.

1. Cycle View of Supply Chain

Definition:

The **cycle view** of the supply chain breaks down the supply chain into **processes or cycles** performed at the interface between two successive stages. Each cycle represents the interaction between a buyer and a supplier.

Key Cycles in the Supply Chain:

- 1. Customer Order Cycle**
 - Occurs between **customer and retailer**.
 - Involves receiving, processing, and fulfilling customer orders.
- 2. Replenishment Cycle**
 - Between **retailer and distributor**.
 - Retailer orders products to replenish stock.
- 3. Manufacturing Cycle**
 - Between **distributor and manufacturer**.
 - Manufacturer plans production based on distributor's orders.
- 4. Procurement Cycle**
 - Between **manufacturer and supplier**.
 - Manufacturer procures raw materials or components.

Advantages of Cycle View:

- **Clarity** in understanding roles and responsibilities.
- Helps in **process optimization**.
- Easier to **assign performance metrics** to each cycle.

2. Push/Pull View of Supply Chain

Definition:

The **push/pull view** categorizes supply chain processes based on the **timing of demand information**.

Key Concepts:

- **Pull Process:**
 - Initiated **in response to actual customer demand**.
 - Activities are demand-driven.
 - Example: Assembling a laptop only after receiving a customer order.
- **Push Process:**
 - Executed **in anticipation of customer orders**.
 - Based on demand forecasting.
 - Example: Manufacturing smartphones based on predicted sales.

Push/Pull Boundary:

The **boundary** separates processes that are executed in advance (push) from those triggered by demand (pull).

Diagram (Optional for written exam):

Supplier → Manufacturer → Distributor → Retailer → Customer
[Push Processes] | [Pull Processes]
Push/Pull Boundary

Advantages of Push/Pull View:

- Helps in **strategic planning** and **inventory control**.
- Aids in deciding where to place the **decoupling point**.
- Improves **customer responsiveness** and **cost-efficiency**.

Both **cycle view** and **push/pull view** are essential perspectives in supply chain management. The **cycle view** helps in analyzing and improving individual supply chain processes, while the **push/pull view** supports strategic decisions related to **demand forecasting**, **inventory**, and **customer service**. Understanding and integrating both views leads to a more **responsive and efficient supply chain**.

3 A Define order/setup cost ?

3MARKS

In a business context, a setup cost is the money spent to get ready to make a product or start a service, including things like getting machines ready, training workers, or preparing a shop. It's essentially the initial investment needed before production can begin.

3.B Determine the approaches to analyse logistics system?

7MARKS

A **logistics system** involves the planning, implementation, and control of the flow of goods, services, and information from the point of origin to the point of consumption. To optimize logistics performance, it is essential to analyze the system using structured approaches.

Approaches to Analyze Logistics System:

1. Total Cost Approach

- Focuses on minimizing the **total logistics cost** rather than individual costs.

- Includes costs like **transportation, warehousing, inventory, and order processing**.
- Helps in identifying trade-offs (e.g., higher transport cost may reduce inventory cost).

2. Trade-off Analysis

- Evaluates **cost-service trade-offs** in logistics decisions.
- For example, **faster delivery** may increase transport cost but improve customer satisfaction.
- Used to **balance service levels and cost efficiency**.

3. Systems Approach

- Views logistics as an **interconnected system** rather than isolated functions.
- Emphasizes coordination between **procurement, warehousing, transportation, and distribution**.
- Aims for overall **system optimization**.

4. Cost-Benefit Analysis

- Compares the **costs and benefits** of alternative logistics strategies.
- Helps in making decisions like **outsourcing logistics** or investing in **automation**.
- Useful for **capital investment decisions**.

5. Network Analysis

- Analyzes the **logistics network structure** (locations of warehouses, distribution centers, routes).
- Helps optimize **routing, location, and allocation**.
- Often supported by software tools like **GIS or linear programming**.

6. Simulation Modeling

- Uses computer-based **simulation models** to test logistics scenarios.
- Helps evaluate "**what-if**" situations without real-world implementation.
- Useful for **complex and dynamic environments**.

7. Benchmarking

- Compares logistics performance with **industry standards or competitors**.
- Helps in identifying **best practices** and areas of **improvement**.
- Metrics may include **delivery lead time, order accuracy, cost per order**, etc.

Analyzing a logistics system requires a **comprehensive and multi-dimensional approach**. Techniques like **total cost analysis, trade-offs, and network modeling** help organizations make **data-driven decisions** to enhance efficiency, reduce costs, and improve customer satisfaction.

3.C what is meant by stock out cost and list out the consequences of stock out cost on your business?
10MARKS

Stock-out cost refers to the **economic loss or negative impact** a business suffers when it **runs out of inventory or stock** and is unable to meet customer demand.

Stock-outs can occur due to:

- Poor demand forecasting
- Supply chain disruptions
- Delayed deliveries
- Inventory mismanagement

Consequences of Stock-out Cost on Business:

1. Revenue Loss

Inability to fulfill customer orders leads to **direct financial loss**.

Frequent stock-outs reduce overall **sales volume**.

2. Decline in Customer Satisfaction

Customers expect timely availability of products.

Stock-outs cause **frustration**, leading to **negative reviews** and **complaints**.

3. Damage to Brand Image

Repeated stock-outs affect the company's **credibility and reliability**.

Brand value and **customer perception** may suffer.

4. Increase in Operating Costs

Businesses may need to place **rush orders** or use expensive transport to replenish stock quickly.

Increases **logistics and procurement costs**.

5. Shift in Customer Loyalty

Customers may switch to **competitors** if their needs are not met.

It becomes difficult to **regain lost customers**.

6. Disruption in Production

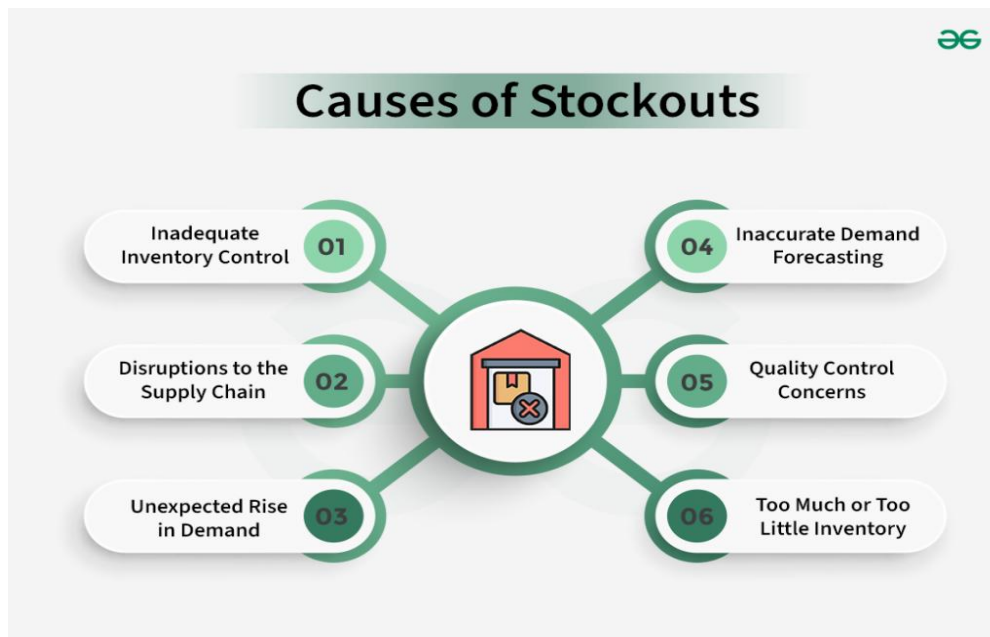
In manufacturing, stock-out of raw materials halts production.

Results in **idle labor**, **machine downtime**, and **missed deadlines**.

7. Impact on Supplier Relationships

Last-minute or emergency orders can **strain relationships with suppliers**.

May lead to **higher prices** or **penalties**.



4.A Define Benchmarking? **3MARKS**

Benchmarking is a strategic process where an organization compares its performance, practices, and processes with those of other companies, particularly those considered to be industry leaders or top performers. It's used to identify areas for improvement, set performance targets, and implement effective strategies to enhance overall organizational performance.

4.B Explain the components of Inventory decision? **7MARKS**

Inventory decision refers to determining how much inventory to hold, when to reorder, and how to manage stock efficiently. It plays a crucial role in ensuring **uninterrupted production**, **customer satisfaction**, and **cost control** in the supply chain.

Components of Inventory Decision:

1. Demand Forecasting

- Estimating future customer demand for products.
- Accurate forecasts help determine **how much inventory to order** and **when**.
- Prevents both **stock-outs** and **overstocking**.

2. Order Quantity (Economic Order Quantity - EOQ)

- Determines the **optimal order size** that minimizes total inventory costs.
- Balances **ordering costs** (like delivery fees) and **holding costs** (like storage).
- Helps avoid frequent ordering or excessive stock.

3. Reorder Point (ROP)

- The inventory level at which a new order should be placed.
- Depends on **lead time** and **average demand** during that period.

- Ensures timely replenishment and avoids **stock-out situations**.

4. Safety Stock

- Extra inventory kept as a buffer against **uncertainty in demand or supply delays**.
- Reduces the risk of **service disruptions**.
- Critical in industries with unpredictable demand patterns.

5. Lead Time

- Time between placing an order and receiving the goods.
- Longer lead times require **higher inventory levels** to meet demand.
- Must be considered when setting reorder points.

6. Inventory Carrying Cost

- The total cost of holding inventory, including:
 - **Storage**
 - **Insurance**
 - **Depreciation**
 - **Obsolescence**
- Affects decisions on how much inventory to keep on hand.

7. Service Level

- The desired probability of **not running out of stock**.
- Higher service levels require **more safety stock**, increasing holding costs.
- Businesses must balance **customer satisfaction** and **inventory costs**.

Effective inventory decision-making requires careful consideration of components such as **demand forecasting, order quantity, reorder points, safety stock, lead time, carrying cost, and service levels**. Optimizing these elements helps in **reducing costs, avoiding stock-outs, and ensuring customer satisfaction**.

4.C Examine the functions of transportation?

10MARKS

Transportation is a critical component of supply chain and logistics management. It involves the **movement of goods and materials** from one location to another—such as from suppliers to manufacturers, manufacturers to distributors, and finally to customers. Effective transportation ensures **timely delivery, cost-efficiency, and customer satisfaction**.

Functions of Transportation in Supply Chain:

1. Product Movement

- The primary function of transportation is to **move goods** from origin to destination.

- Involves modes like **road, rail, air, water, and pipeline**.
- Ensures the **physical flow** of materials and finished products.

2. Product Storage (In-Transit)

- Transportation can serve as **temporary storage** when goods are in transit.
- Helps reduce the need for **warehouse space** at the destination.
- Especially useful for long-distance shipments.

3. Timely Delivery

- Ensures goods are delivered **on time** to meet customer demand and production schedules.
- Critical for **just-in-time (JIT)** systems and **perishable products**.

4. Facilitates Place Utility

- Transportation **adds value** by making products available **at the right place** where customers need them.
- Enhances **market reach** and **accessibility**.

5. Supports Economic Utilities

- Transportation contributes to **place utility** and **time utility** by delivering products at the right location and time.
- Enables **mass production** and **distribution over large markets**.

6. Cost Management

- Plays a major role in the **total cost** of the product.
- Choosing the right mode and route helps in **minimizing logistics costs**.

7. Facilitates Specialization and Trade

- Efficient transportation allows businesses to **source materials globally** and **sell products in wider markets**.
- Encourages **regional specialization** and **international trade**.

Transportation is more than just moving goods—it plays a **strategic role** in supply chain success. Its functions include **product movement, storage, timely delivery, cost control**, and creating **place and time utility**. Efficient transportation systems lead to **better service levels, reduced costs**, and **competitive advantage**.

5.A What is meant by VMI Vendor Managed Inventory?

3MARKS

Vendor Managed Inventory (VMI) is a supply chain strategy where a supplier manages and maintains the inventory of their products at a customer's location. Essentially, the vendor takes responsibility for stocking products at the customer's site and replenishing them as needed. This approach aims to improve efficiency, reduce costs, and minimize stockouts for both the supplier and the customer.

5.B Define MRP in supply chain management and why it is Important? 7MARKS

MRP stands for Material Requirements Planning. It is a computer-based inventory management system used in supply chain management to ensure that:

- The right materials are available at the right time,
- In the right quantity,
- To support production schedules and customer demand.

Importance of MRP in Supply Chain Management:

1. Ensures Timely Availability of Materials

- Avoids production delays by ensuring materials are ordered and received on time.

2. Improves Inventory Management

- Helps maintain **optimal inventory levels**, reducing **stock-outs** and **excess inventory**.

3. Enhances Production Efficiency

- Streamlines production scheduling and planning.
- Prevents interruptions due to material shortages.

4. Reduces Operational Costs

- Minimizes **waste, holding costs, and urgent purchases**.

5. Facilitates Better Decision-Making

- Provides accurate data for planning procurement, scheduling labor, and allocating resources.

6. Supports Customer Satisfaction

- On-time production and delivery ensure **higher service levels** and **customer satisfaction**.

5.C Examine any 3 Inventory Management Techniques. 10MARKS

Inventory management techniques help businesses control and optimize the ordering, storing, and usage of inventory. Efficient inventory management ensures the right products are available at the right time, in the right quantity, minimizing both excess stock and stock-outs.

1. Economic Order Quantity (EOQ)

- Definition:
EOQ is the ideal order quantity that minimizes the total cost of ordering and holding inventory.
- Purpose:
Balances ordering costs (e.g., purchase orders) and carrying costs (e.g., storage, insurance).
- Formula:

$$EOQ = \sqrt{\frac{2DS}{H}}$$

Where:

DD = Demand,

SS = Ordering cost,

HH = Holding cost per unit

- Benefits:
 - Reduces total inventory cost
 - Prevents over-ordering or under-ordering

2. ABC Analysis

- Definition:
ABC analysis classifies inventory into three categories based on their value and usage:
 - A-items: High value, low quantity (critical items)
 - B-items: Moderate value and quantity
 - C-items: Low value, high quantity (less important)
- Purpose:
Focuses management attention on the most valuable items.
- Benefits:
 - Prioritizes control on A-items
 - Optimizes resource allocation
 - Reduces overall inventory cost

3. Just-In-Time (JIT)

- Definition:
JIT is an inventory strategy where materials and products are ordered only when needed, minimizing inventory holding.
- Purpose:
Eliminate waste, reduce storage costs, and improve efficiency.
- Benefits:
 - Reduces inventory carrying costs
 - Improves cash flow
 - Minimizes wastage and obsolescence
- Risk:
Highly dependent on supplier reliability and accurate demand forecasting.

Inventory management techniques like EOQ, ABC Analysis, and JIT help businesses optimize their stock levels, reduce costs, and improve operational efficiency. Choosing the right technique depends on the nature of the business, product type, and supply chain dynamics.

6.A Identify the 5 Drives of Supply chain.

3MARKS

The five key drivers of a supply chain are:

1. **Production** – Decisions related to what, how, and where to produce goods.
2. **Inventory** – Managing stock levels to balance demand and supply.
3. **Transportation** – Movement of goods across the supply chain efficiently and cost-effectively.
4. **Information** – Sharing real-time data for better planning and coordination.
5. **Sourcing** – Selecting suppliers and managing procurement strategies.

These drivers help optimize **cost, service level, and responsiveness** in the supply chain.

6.B Examine the Factors Impacting Road Transport cost.

7MARKS



Road transport is one of the most widely used modes of transportation in supply chain logistics. However, its cost is influenced by several internal and external factors that affect overall efficiency, pricing, and profitability.

Factors Impacting Road Transport Cost:

1. Fuel Costs

- One of the largest cost components in road transport.
- Fluctuations in petrol or diesel prices directly impact the overall cost of transportation.

2. Vehicle Maintenance and Depreciation

- Includes repair, servicing, spare parts, and depreciation of trucks or vans.
- Poor vehicle condition leads to higher maintenance costs and breakdowns.

3. Driver Wages and Labor Charges

- Salaries, overtime, and other benefits paid to drivers and helpers.
- Varies based on experience, route distance, and legal regulations.

4. Toll and Road Taxes

- Costs incurred for using highways, expressways, or state/national roads.
- Includes toll charges, entry permits, and road taxes, which vary by region.

5. Type and Weight of Cargo

- Heavier or hazardous goods require special handling, increasing cost.
- Oversized or temperature-controlled goods (e.g., cold storage) also incur additional expenses.

6. Distance and Route Conditions

- Longer distances and poor road conditions lead to higher fuel consumption and vehicle wear.
- Traffic congestion and delays add to time and fuel costs.

7. Loading and Unloading Time

- Idle time during loading/unloading affects vehicle utilization.
- Demurrage charges may apply if delays occur at warehouses or customer sites.

Several factors such as fuel price, vehicle maintenance, labor charges, tolls, cargo type, and road conditions significantly affect road transport costs. Understanding and managing these factors is essential for improving transport efficiency and cost control in logistics operations.

6.C Analyze the Role of IT (Information Technology) in SCM (supply chain management) 10MARKS



Information Technology (IT) plays a vital role in modern Supply Chain Management (SCM) by enabling efficient coordination, communication, and data management across the entire supply chain network.

Role of IT in SCM:

1. Enhances Communication and Collaboration

- IT tools like emails, ERP systems, and cloud platforms enable seamless communication between suppliers, manufacturers, distributors, and retailers.
- Promotes real-time information sharing, reducing delays and errors.

2. Improves Demand Forecasting and Planning

- Advanced software uses data analytics and AI to analyze historical data and predict future demand.
- Helps in better production planning and inventory management, reducing stock-outs and excess inventory.

3. Real-Time Tracking and Visibility

- Technologies like GPS, RFID, and IoT sensors allow tracking of goods during transit.
- Provides end-to-end visibility, enabling proactive management of delays, risks, and disruptions.

4. Automates Operations

- Automation in order processing, procurement, and inventory control through ERP and SCM software reduces manual errors and speeds up processes.
- Enhances operational efficiency and accuracy.

5. Enables Data-Driven Decision Making

- IT systems collect and analyze vast amounts of data.
- Supports management with insights and reports for strategic decisions on sourcing, production, and distribution.

6. Facilitates Integration Across Supply Chain Partners

- IT connects different entities within the supply chain to work as a cohesive system.
- Promotes collaborative planning, forecasting, and replenishment (CPFR).

Information Technology is the backbone of effective Supply Chain Management. It enhances communication, planning, tracking, automation, and decision-making, enabling companies to build responsive, efficient, and competitive supply chains.

7.A Define FOB Pricing in Logistics. 3MARKS

FOB, or Free on Board, is a common shipping term in international trade that defines when the responsibility for goods and their associated costs transfers from the seller to the buyer. Specifically, the seller's responsibilities end when the goods are loaded onto a vessel for transport, and the buyer assumes responsibility from that point onwards.

7.B Identify the factors Influencing Distribution network design.

7MARKS

Distribution network design refers to the structure and strategy a company uses to store, handle, and deliver products to customers. Several factors influence the design of this network to ensure cost efficiency, service quality, and customer satisfaction.

Key Factors Influencing Distribution Network Design:

1. Customer Service Requirements

- The level of responsiveness, delivery speed, and service availability expected by customers.
- High service levels may require more warehouses located closer to customers.

2. Product Characteristics

- Perishable, fragile, or high-value items may need special storage and faster delivery.
- Bulky products may require regional distribution centers to reduce transportation costs.

3. Transportation Costs

- Distribution design must minimize total transportation costs from plants to warehouses to customers.
- Affects decision on centralized vs. decentralized networks.

4. Inventory Costs

- Includes holding, ordering, and storage costs.
- More distribution centers may lead to higher inventory holding costs.

5. Facility Costs

- The cost of setting up and operating warehouses, distribution centers, and retail outlets.
- Includes land, labor, utilities, and maintenance.

6. Demand Variability and Market Locations

- Geographic distribution and fluctuation of demand across regions impact the location and number of warehouses needed.
- High variability may require flexible network design.

7. Technological Capabilities

- Use of automation, warehouse management systems (WMS), and real-time tracking can improve efficiency and reduce dependency on multiple facilities.

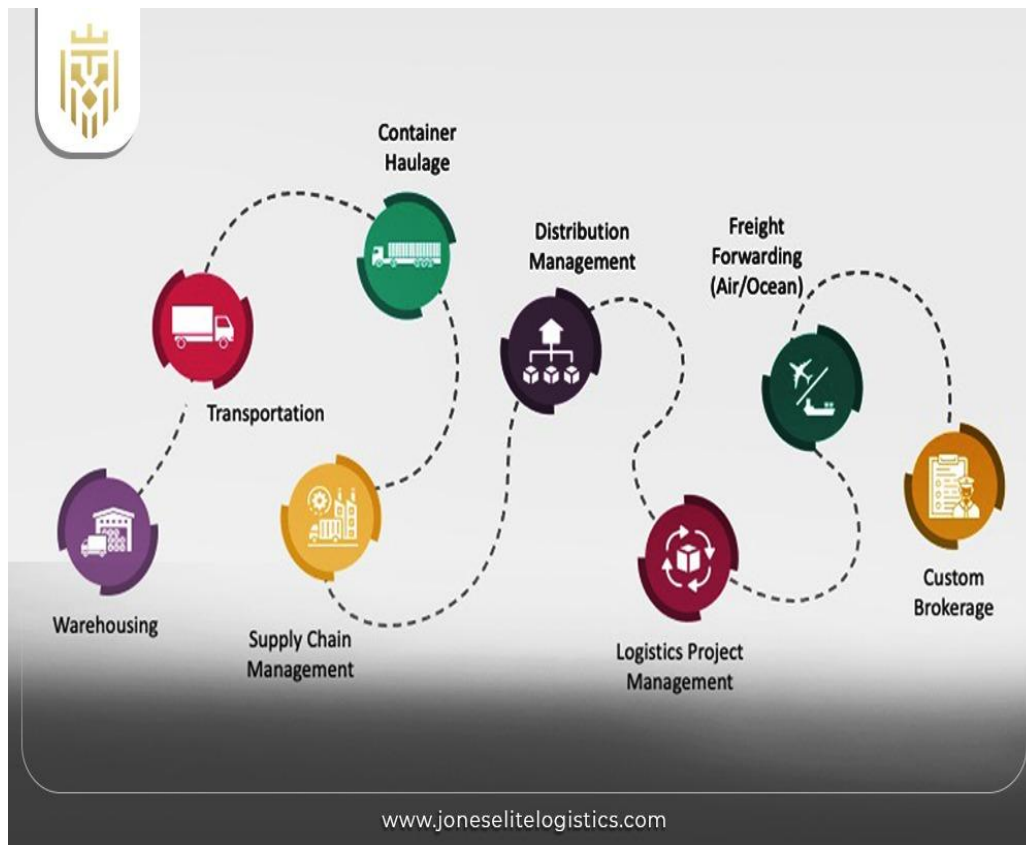
8. Regulatory and Environmental Factors

- Local laws, taxes, customs duties, and environmental regulations influence where facilities can be located and how goods can be moved.

An effective distribution network design considers factors like customer needs, product nature, transportation and facility costs, demand patterns, technology, and legal regulations. A well-planned network helps achieve the right balance between cost-efficiency and customer satisfaction.

7.C Explain the methods and tools facilitating international Logistics.

10MARKS



International logistics involves the planning, control, and movement of goods across international borders. To manage the complexity, various methods and tools are used to ensure efficient, cost-effective, and compliant global operations.

Methods Facilitating International Logistics:

1. Multimodal Transportation

- Uses two or more modes (e.g., sea, air, road, rail) under a single contract.
- Ensures flexibility, cost-efficiency, and timely delivery across long distances.

2. Freight Forwarding

- A freight forwarder acts as an intermediary between the shipper and transportation services.
- Manages customs documentation, cargo insurance, and route planning.

3. Warehousing and Consolidation

- Use of international warehouses to store, sort, and consolidate shipments before distribution.
- Helps in reducing shipping costs and meeting local regulations.

4. Third-Party Logistics (3PL) and Fourth-Party Logistics (4PL)

- Outsourcing logistics functions to specialist providers who handle transportation, warehousing, and customs.

- 4PL includes complete supply chain integration and management.

Tools Facilitating International Logistics:

1. Electronic Data Interchange (EDI)

- Automates the exchange of documents like invoices, shipping notices, and purchase orders between organizations.
- Reduces paperwork and increases speed and accuracy.

2. Global Positioning System (GPS) and Tracking Systems

- Enables real-time tracking of goods in transit across countries.
- Helps in route optimization and timely updates.

3. Customs and Trade Compliance Software

- Ensures compliance with import/export regulations, duties, and documentation.
- Avoids delays, penalties, and legal issues at borders.

4. Transportation Management Systems (TMS)

- Software used to plan, execute, and optimize the movement of goods.
- Helps in carrier selection, load planning, and freight auditing.

International logistics is supported by a combination of methods like multimodal transport and freight forwarding, and tools such as EDI, GPS, and compliance software. These facilitate seamless cross-border operations, reduce costs, and ensure on-time delivery while complying with international trade regulations.

8. Case Study [Compulsory]:

India is going to be a 5 trillion \$ economy very soon in another 5 years. And it is observed in recent days, that all manufacturing and service industry in India are doing good. There is lot of opportunities for Indian companies to build “Vocal for Local” statement.

Indian supply chain processes are reaching heights in terms of quality and experience. Most of the companies both public and private are engaged in quality SCM services. There are many private agencies like VRL, Sharma roadways, NAVTA travels are working towards successful logistics support.

There are multiple challenges for Indian companies when it comes to speedy delivery, proper packaging, AI handling and technology implementation in SCM activities. However, huge investment is happening in SCM due to Indian govt. positive actions towards infrastructure in recent days.

2029 will be the Era of Indian Logistic System, where the country has pledged to reach higher heights in Global supply chain Network.

a. What are the major challenges that Indian Logistics is facing?

India's logistics and supply chain sector is growing rapidly, with major contributions from both public and private players. However, despite positive trends and government support, the Indian logistics system continues to face several critical challenges:

1. Infrastructure Limitations

- Poor road quality, inadequate cold storage, and limited connectivity in rural areas slow down logistics operations.
- Port congestion and inefficient cargo handling facilities increase turnaround time.

2. High Logistics Cost

- Logistics costs in India are about 13–14% of GDP, much higher than the global average of 8–9%.
- Due to fragmented transport systems, inefficient route planning, and fuel wastage.

3. Technological Adoption and AI Integration

- Limited use of advanced technology like AI, IoT, robotics, and big data in logistics.
- Many small and medium enterprises (SMEs) lack the resources to invest in digitization.

4. Lack of Trained Workforce

- Shortage of skilled manpower in areas such as warehousing, freight management, and last-mile delivery.
- There is a skills gap between traditional logistics operations and modern SCM practices.

5. Regulatory and Policy Challenges

- Complex tax structures, despite GST, and inter-state border checks delay transit time.
- Lack of standardized procedures and coordination among various departments.

6. Packaging and Product Handling Issues

- Poor packaging standards lead to damage and increased return rates.
- Lack of automation in sorting and packaging processes in many areas.

7. Environmental and Sustainability Concerns

- Increasing carbon emissions due to reliance on diesel-based transportation.
- Insufficient emphasis on green logistics and sustainable practices.

8. Fragmented and Unorganized Sector

- A large part of the logistics industry is still unorganized, especially in trucking and small fleet operators.
- This leads to inconsistencies in service quality and accountability.

While India is on the verge of becoming a global logistics hub by 2029, the sector must address infrastructure, cost, technology, and regulatory challenges to achieve sustainable and efficient growth. With focused government initiatives and industry collaboration, these obstacles can be gradually overcome.

b. How developing countries like India can implement new technology in SCM to overcome supply chain cost?

In a fast-growing economy like India, where supply chains are expanding and logistics costs are relatively high, the adoption of **modern technology** is essential. Implementing new technologies in **Supply Chain Management (SCM)** can significantly help reduce costs, improve efficiency, and enhance competitiveness in global markets.

Key Ways India Can Implement Technology to Reduce SCM Costs:

1. Adoption of AI and Machine Learning

- Use of AI for **demand forecasting, route optimization, and inventory management**.
- Helps reduce **excess inventory**, improve **vehicle utilization**, and minimize wastage.

2. Implementation of IoT (Internet of Things)

- IoT devices enable **real-time tracking** of shipments, temperature monitoring for perishables, and predictive maintenance of vehicles.
- Reduces losses due to spoilage, delays, and equipment breakdowns.

3. Automation and Robotics in Warehousing

- Use of **automated sorting, picking, and packing** systems in warehouses.
- Enhances speed, reduces manual errors, and brings down **labor costs** in the long run.

4. Digital Platforms and Cloud-based SCM Systems

- Cloud-based solutions enable **centralized visibility** and data sharing across supply chain partners.
- Improves coordination, reduces lead time, and lowers communication overhead.

5. Use of Blockchain Technology

- Ensures **data transparency, security, and traceability** across the supply chain.
- Helps prevent fraud, improves compliance, and builds trust in global transactions.

6. Integration of Transportation Management Systems (TMS)

- Optimizes **route planning, fuel usage, and load management**.
- TMS helps reduce transportation costs significantly, especially for long-distance logistics.

7. Encouraging Public–Private Partnerships

- Government can collaborate with tech startups and logistics firms to **pilot innovative solutions**.

- Promotes wider adoption at lower initial investment for SMEs.

By strategically investing in **digital infrastructure**, encouraging **training and awareness**, and **incentivizing innovation**, India can successfully implement new technologies in SCM. This will not only lower supply chain costs but also make Indian logistics **globally competitive** by 2029, in line with the "**Vocal for Local**" vision.