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COIMBATORE-641 035, TAMIL NADU

QUESTION BANK

23BAE741: AI FOR LOGISTICS AND SUPPLY CHAIN

Unit III: AI Strategy in Logistics Planning

Short Answer Questions (2 Marks Each)

1. ***Define AI-driven logistics transformation.***
   AI-driven logistics transformation refers to the integration of artificial intelligence technologies into logistics operations to enhance decision-making, automate processes, and improve efficiency across the supply chain.

2. ***List the barriers to AI adoption in logistics.***
   The key barriers include high costs of implementation, lack of skilled personnel, data privacy concerns, integration issues with legacy systems, and resistance to change within organizations.

3. ***State the role of AI in optimizing inventory management.***
   AI helps optimize inventory by predicting demand accurately, reducing excess stock, improving reorder processes, and minimizing stockouts.

4. ***Identify the factors considered in supplier selection using AI.***
   Factors include supplier reliability, price competitiveness, delivery performance, quality of products, and risk management capabilities.

5. ***Describe how predictive analytics is used in logistics planning.***
   Predictive analytics uses historical data to forecast future demand, optimize routes, and manage risks, enhancing the overall logistics process.

6. ***Explain the importance of AI in network planning for logistics.***
   AI improves network planning by optimizing routes, balancing supply and demand, and ensuring efficient resource utilization across the supply chain.

7. ***Summarize the key risks associated with using AI in logistics operations.***
   Risks include data privacy issues, lack of transparency in decision-making, system malfunctions, and potential job displacement.

8. ***Discuss how AI influences transportation mode selection in logistics.***
   AI analyzes variables such as cost, delivery speed, and environmental impact to recommend the most efficient transportation modes for each shipment.

9. ***Illustrate how AI can lower the barriers to its own adoption in logistics.***
   AI can simplify its adoption through easy-to-use platforms, reducing costs with cloud-based solutions, and automating complex tasks, making it more accessible.

10. ***Classify the types of supply contracts that benefit from AI-enabled risk-sharing strategies.***
    Supply contracts that benefit include cost-sharing contracts, revenue-sharing contracts, and quantity-flexibility contracts, where AI helps manage risks more effectively.

11. ***Compare traditional logistics planning with AI-driven logistics planning.***
    Traditional planning is based on historical data and manual processes, while AI-driven planning leverages real-time data, automation, and predictive insights.

12. ***Apply predictive analytics to improve supplier selection in a logistics scenario.***
    Predictive analytics helps forecast supplier reliability, predict future performance, and assess risks, leading to better supplier selection.

13. ***Analyze the benefits of AI in organizational structure optimization within logistics.***
    AI enhances decision-making, automates administrative tasks, reduces manual labor, and allows for a more agile and flexible organizational structure.

14. ***Examine the role of AI governance in ensuring safe and effective AI usage in logistics.***
    AI governance involves setting policies and controls to ensure AI is used ethically, securely, and in compliance with regulations, reducing risks in logistics.

15. ***Evaluate the impact of AI on risk-sharing strategies in supply contracts.***
    AI enables accurate risk prediction, fair allocation of risks, and data-driven decision-making, improving the efficiency of risk-sharing strategies.

16. ***Assess the importance of AI in enhancing transportation efficiency and decision-making.***
    AI enhances transportation efficiency by optimizing routes, reducing costs, and improving delivery times through automated decision-making.

17. ***Critique the effectiveness of AI in improving inventory optimization.***
    AI is effective in predicting demand, reducing stockouts, and improving reorder points, but may require significant data input and advanced infrastructure.

18. ***Propose AI-driven solutions to minimize risks in logistics operations.***
    AI solutions include real-time monitoring of supply chains, predictive analytics for risk forecasting, and automation to prevent human errors.

19. ***Design a basic framework for implementing AI governance in logistics planning.***
    An AI governance framework should include clear ethical guidelines, data privacy policies, compliance monitoring, and performance evaluation mechanisms.

20. ***Formulate strategies to integrate AI into network planning for supply chain optimization.***
    Strategies include using AI to optimize routing, forecast demand, automate resource allocation, and monitor supply chain performance in real time.

Long Answer Questions with Key Points (16 Marks Each)

1. **Explain the concept of AI-driven logistics transformation and its impact on modern supply chain operations.**
   AI-driven logistics transformation involves using AI technologies like machine learning, robotics, and predictive analytics to automate logistics tasks, improve decision-making, and optimize supply chain performance. It enhances efficiency, reduces operational costs, and helps meet customer demands more effectively. AI allows for real-time tracking, predictive maintenance, and better demand forecasting, which collectively result in more agile and resilient supply chains.

2. **Analyze the barriers to AI adoption in logistics and suggest methods to lower these barriers for successful implementation.**
   Barriers include high costs, lack of skilled labor, and integration challenges with existing systems. Solutions to overcome these include investing in AI training programs, adopting scalable cloud-based AI platforms, and fostering collaboration with AI technology providers for smoother integration. Reducing fear of job loss through effective change management and demonstrating short-term wins with AI implementations can also help lower resistance to adoption.

3. **Evaluate the role of AI in supplier selection and transportation mode selection, and how it enhances decision-making in logistics.**
   AI streamlines supplier selection by analyzing large datasets to predict supplier reliability and risks. It uses algorithms to assess criteria such as cost, performance, and delivery times. In transportation mode selection, AI assesses factors like speed, cost, and environmental impact to recommend the best options. This data-driven approach allows for more precise, efficient, and sustainable decision-making in logistics.

4. **Examine the significance of AI in network planning and inventory optimization, and assess how predictive analytics can further improve these processes.**
   AI optimizes network planning by improving route optimization and resource allocation, leading to lower costs and faster delivery times. It helps with inventory optimization by predicting demand fluctuations and automating stock levels. Predictive analytics further refines these processes by forecasting demand based on historical and real-time data, enabling proactive decision-making that minimizes stockouts and overstocking.

5. **Discuss the risks associated with using AI in logistics and propose risk mitigation strategies through AI governance.**
   Risks include biased algorithms, data privacy issues, lack of transparency, and system failures. Mitigation strategies include establishing AI governance policies that outline ethical use of AI, regular audits of AI systems, data protection protocols, and transparency in AI-driven decisions. Implementing robust data security measures and ensuring compliance with relevant laws are also critical for risk mitigation.

6. **Critically assess the role of AI in transforming organizational structure within the logistics sector.**
   AI reduces the need for manual tasks, freeing up human resources for more strategic roles. It automates routine tasks, leading to leaner organizational structures. AI-driven insights also enable more agile decision-making and a shift toward data-centric cultures. However, organizations must ensure that they invest in reskilling employees and fostering a culture of continuous learning to adapt to this transformation.

7. **Propose an AI governance framework that ensures ethical and safe AI deployment in logistics planning.**
   An AI governance framework should include policies that focus on data security, compliance with legal standards, and ethical AI use. It should establish clear accountability for AI

decisions, provide for regular audits, and include measures for bias detection in algorithms. Training and awareness programs on ethical AI use should be mandatory for all stakeholders involved.

8. **Design an AI-driven strategy for network planning and inventory optimization that incorporates risk-sharing strategies and predictive analytics.**
   The strategy should leverage AI for route optimization, demand forecasting, and risk assessment. AI-enabled predictive analytics can enhance inventory management by forecasting demand trends and automating stock adjustments. Risk-sharing strategies should involve dynamic supply contracts based on real-time data from AI systems, allowing for more flexible and resilient supply chain operations.

9. **Evaluate the effectiveness of AI in supply contracts and risk-sharing strategies, with examples of how it reduces operational risk.**
   AI improves risk-sharing strategies by providing accurate risk assessments, forecasting potential supply chain disruptions, and enabling real-time adjustments to contract terms. For instance, AI can predict supplier failures and trigger risk-mitigation measures such as alternative sourcing, thereby reducing operational risks.

10. **Analyze the influence of AI on transportation efficiency and explain how predictive analytics can optimize the selection of transportation modes in logistics.**
    AI enhances transportation efficiency by automating route planning, load optimization, and fuel consumption tracking. Predictive analytics optimizes transportation mode selection by forecasting variables like delivery time, cost, and potential disruptions, helping logistics managers choose the most efficient and cost-effective transportation options.