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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY UNIVERSITY EXAMINATION, 2024/2025ACADEMIC YEAR SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (BUSINESS ADMINISTRATION)

Date: 9th December, 2024 Time: 2.30pm –4.30pm

KBA 2202 - PRODUCTION AND OPERATIONS MANAGEMENT

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS_

QUESTION ONE (30 MARKS)

READ THE CASE STUDY BELOW TO ANSWER QUESTION ONE <u>ALPHATECH INNOVATIONS</u>

AlphaTech Innovations is a fast-growing technology firm specializing in consumer electronics, smart home devices, and wearable technology. Over the past few years, the company has seen rapid expansion, driven by increasing global demand for innovative tech products. As the company scales, it faces significant challenges in managing production, supply chain complexities, and optimizing operational efficiency, all while maintaining its competitive edge in a highly dynamic market. At AlphaTech, decision-making processes are heavily reliant on modern verbal models, which serve as the backbone of their operations strategy. These models enable quick yet informed decisions and are pivotal in planning production cycles, managing agile supply chains, and maintaining product quality standards. For instance, the company frequently discusses concepts such as "lean manufacturing," "agile supply chain management," and "demand-driven production."

These discussions help to refine production workflows, ensure product availability, and enhance responsiveness to market shifts. The firm employs a multi-tiered planning approach to manage its production and operations effectively. AlphaTech integrates advanced planning tools such as Enterprise Resource Planning (ERP) systems and Artificial Intelligence (AI)driven demand forecasting software. These technologies enable the company to engage in planning for production needs and to support its global expansion goals. The seamless integration of technology ensures that their planning processes are aligned with real-time data and market trends, allowing the company to remain agile in the face of unpredictable supply chain disruptions and evolving customer preferences. AlphaTech is highly data-driven in its approach to forecasting. To inform its production and operations strategies, the firm relies on a wide range of external data, which is fed into AI-powered forecasting systems. These systems analyze patterns and predict customer demand as well as future market trends. By leveraging these insights, AlphaTech ensures that its production remains aligned with anticipated market shifts, allowing the company to stay competitive and responsive to changing consumer needs. This data-driven approach helps AlphaTech stay ahead of the curve and optimize its operations. AlphaTech has implemented a highly efficient flow shop layout in its production facilities, designed to optimize automation and incorporate robotics. This layout is predominantly used for the company's flagship products, ensuring seamless production of large volumes with consistent quality. The flow shop integrates advanced technologies such as smart sensors and real-time tracking systems, which help streamline operations, reduce waste, and minimize bottlenecks.

While primarily focused on speed and efficiency, the setup also allows for flexibility in accommodating minor customizations later in the production process. Time-series forecasting is a critical component of AlphaTech's operations management. The company uses AI-powered algorithms to analyze historical sales data and identify patterns that guide its production scheduling. These time-series forecasts capture various trends, including linear growth trends tied to increasing market penetration, seasonal trends that reflect holiday sales spikes, and even cyclical trends that are connected to the product innovation lifecycle. The analysis of these trends allows AlphaTech to align production with anticipated demand, ensuring optimized inventory levels and minimizing the risk of stockouts or overproduction.

Required:

- a) Explore the examples of verbal models relevant to AlphaTech's production and operations management. (6 marks)
- b) Discuss the potential sources of secondary data that AlphaTech could utilize for gathering information to inform its forecasting and decision-making processes.

(6 marks)

- c) Investigate the potential triggers that could lead AlphaTech to initiate a redesign of its products or service. (6 marks)
- d) Time-series forecasting involves predicting future demand based on historical data patterns. Using appropriate graphs, identify and describe the types of trends likely to appear in AlphaTech's time-series forecasts. (6 marks)
- e) Discuss the conditions that may have led AlphaTech to adopt a flow shop layout in its production processes. (6 marks)

QUESTION TWO (20 MARKS)

- a) Discuss the day-to-day operations management challenges that organizations face and analyze how these challenges impact the production processes within the organization (8 marks)
- b) You have been consulted by Juhudi Manufacturing Limited to train the managers about forecasting. What key points would you discuss to examine the importance of forecasting in an organization. (6 marks)
- c) Planning is the process of setting objectives and determining the necessary actions to achieve them, ensuring efficient resource use and alignment with organizational goals. Examine the types of planning that the firm employs. (6 marks)

QUESTION THREE (20 MARKS)

a) The Economic Order Quantity (EOQ) is a formula used to identify the optimal order quantity that minimizes total inventory costs. Describe the assumptions underlying this method

(8 marks)

- b) Explain the Relationship between production and operations management and procurement Department. (6 marks)
- c) The Product Life Cycle serves as a conceptual base for examining Product growth and development. Explain the characteristics of the first stage in the products life cycle.

(6 marks)

QUESTION FOUR (20 MARKS)

a) Discuss how schematic models are applied in an organization to facilitate the understanding and analysis of complex systems, while avoiding the need for physical representations.

(8 marks)

- b) Analyse the reasons why many Kenyan organizations are yet to embrace lead strategy while planning for capacity, despite its aggressive approach aimed at attracting customers from competitors. (6 marks)
- c) Discuss the various ways in which technology has shaped production and operations management in today's world.

(6 marks)

QUESTION FIVE(20 MARKS)

a) Mathematical models are utilized to represent real-world systems and processes through mathematical expressions and equations. Provide examples of mathematical models commonly used in production and operations management.

(8 marks)

b) "Manufacturing and service organization differ because manufacturing is goods oriented and service is act- oriented". Discuss this statement.

(6 marks)

c) Examine the strategies organisations should employ in the last stage of its product life cycle. (6 marks)