Seat No. /Enrollment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

## MBA-SEMESTER-III-EXAMINATION-WINTER-2024

**Subject Code: 4539273 Date: 17/12/2024**
**Subject Name: Production Planning and Control**
**Time: 10:30 AM TO 01:30 PM Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of simple calculators and non-programmable scientific calculators are permitted.**

| | | | Marks |
|---|---|---|---|
| **Q.1** | | Define the following terms:<br>(a) Mass production<br>(b) Assembly line balancing<br>(c) Layout<br>(d) Demand forecasting<br>(e) Material handling<br>(f) Poka Yoka<br>(g) Preventive maintenance | **14** |
| **Q.2** | **(a)** | Compare and contrast the different types of production systems (projects and job work, batch production, mass/flow production, continuous/process production). Discuss their concepts, applications, and the scenarios in which each type is most suitable. | **07** |
| | **(b)** | Discuss the key functions of production planning and control. How do these functions help in managing the production process effectively? | **07** |
| | | **OR** | |
| | **(b)** | Explain the importance of production planning and control (PPC) in a manufacturing organization. How does PPC contribute to achieving operational | **07** |
| **Q.3** | **(a)** | Explain the meaning and need for demand forecasting in production planning. Compare and contrast quantitative and qualitative methods of forecasting, providing examples of each. | **07** |
| | **(b)** | Describe the process of work order preparation for different manufacturing methods. How do subsidiary orders, shop or production orders, inspection orders, and store issue orders interrelate to ensure smooth production operations? | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Analyze the legal aspects of industrial safety management. Discuss the common causes of accidents in manufacturing plants and the role of work permit procedures, safety equipment, personal protective equipment (PPE), breathing apparatus, and safety belts in preventing accidents. | **07** |
| | **(b)** | Evaluate the significance of aggregate planning, master production scheduling, and material requirement planning in the manufacturing process. How do these | **07** |

levels of planning contribute to efficient production management?

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|---|---|---|---|
| **Q.4** | **(a)** | Discuss the different types of facility layouts. Provide examples of industries or scenarios where each type would be most appropriate. | **07** |
| | **(b)** | Explain the primary objectives of facility layout planning and how these objectives contribute to the overall efficiency and productivity of a manufacturing facility. | **07** |

**OR**

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|---|---|---|---|
| **Q.4** | **(a)** | Define aggregate planning and explain its importance in operations management. Outline the steps involved in developing an aggregate plan and discuss the various strategies used in aggregate planning. | **07** |
| | **(b)** | Discuss the different types of maintenance management (e.g., preventive, corrective, shutdown, and breakdown maintenance). Explain the scope of maintenance management and the importance of a maintenance budget in ensuring operational efficiency. | **07** |

**Q.5** **Case Study: Optimizing Production at "TechGears Inc."**

Background: TechGears Inc. is a medium-sized manufacturing company specializing in high-precision gears for the automotive industry. Established in 2005, the company has built a reputation for quality and reliability. However, with increasing competition and demand fluctuations, TechGears Inc. faced challenges in maintaining efficient production schedules and meeting delivery deadlines.

Challenges:

1. *Demand Variability:* The company experienced significant fluctuations in customer orders, leading to periods of overproduction and underproduction.
2. *Inventory Management:* Inefficient inventory management resulted in either excess stock or stockouts, affecting production continuity and customer satisfaction.
3. *Production Scheduling:* The existing manual scheduling system was unable to cope with the complexity of production processes, leading to delays and increased operational costs.

Strategies Implemented:

1. *Advanced Planning System (APS):* TechGears Inc. implemented an APS to optimize production scheduling. The system used real-time data to adjust production plans based on demand forecasts and inventory levels.
2. *Lean Manufacturing:* The company adopted lean manufacturing principles to minimize waste and improve process efficiency. This included value stream mapping and continuous improvement initiatives.
3. *Supplier Collaboration*: TechGears Inc. enhanced collaboration with suppliers to ensure timely delivery of raw materials and components, reducing lead times and inventory costs.

Results:

1. *Improved Efficiency:* The APS enabled more accurate production scheduling, reducing lead times by 20% and operational costs by 15%.
2. *Better Inventory Control:* Lean manufacturing practices and improved supplier collaboration led to a 25% reduction in inventory levels and a 30% decrease in stockouts.
3. *Customer Satisfaction:* On-time delivery rates improved by 35%, enhancing customer satisfaction and loyalty.

**(a)** Discuss the impact of demand variability on TechGears Inc.'s production planning. How did the implementation of an Advanced Planning System (APS) help address this challenge? **07**

**(b)** Analyze the role of lean manufacturing principles in improving TechGears Inc.'s production efficiency. What lean techniques were employed, and how did they reduce waste? **07**

**OR**

**Q.5** **(a)** Evaluate the importance of supplier collaboration in TechGears Inc.'s production planning and control. How did enhanced supplier relationships contribute to better inventory management and reduced lead times? **14**

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