Ref. No.: Ex/PG/ProdE/T/112B/2024

M.E. PRODUCTION ENGINEERING FIRST YEAR FIRST SEMESTER EXAM– 2024

Subject: PRODUCTION & INVENTORY CONTROL SYSTEM (PM)

Time: Three Hours (Part I & Part II) **Full Marks: 100**

Part I (40 Marks)

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Use Separate Answer scripts for each part. **Answer any Two questions from Part II.**

1. a) Mention the various types of operations scheduling problems. State the major objectives of job shop scheduling.

b) Four trucks, 1, 2, 3, and 4, are waiting on a loading dock at Apex Company that has only a single service bay. The trucks are labelled in the order that they arrived at the dock. Assume the current time is 1:00 PM. The times required to unload each truck and the times that the goods they contain are due in the plant are given in the following table. Determine the schedules that result for the rules First-Come, First-Served (FCFS), and Shortest Processing Time (SPT).

Truck	Unloading time (minutes)	The Material is Due
1	20	1:25 PM
2	14	1:45 PM
3	35	1:50 PM
4	10	1:30 PM

In each case compute the mean flow time, average tardiness, and number of tardy jobs.

(12 + 8)

2. a) What is "Push" and "Pull" Production Control Systems? Explain with examples.

b) What is Break-Even analysis? What is the objective of Break-Even Analysis?

c) One firm, for single product, wants to determine the minimum rupee (Rs.) volume and unit volume needed at its new facility to break-even. The firm determines that it has fixed costs of Rs. 10,00,000/- this period. Direct is Rs. 150/- per unit, and material is Rs. 75/- per unit. The selling price is Rs. 400/- per unit. Calculate the break-even point in units and rupees and explain.

(7+8+5)

3. a) What is the role of MRP in a Production Planning & Control System? How has the modern ERP system been developed?

b) How would you deal a scheduling problem with precedence constraints? Explain.

(10 + 10)

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Form A: *Ref. No.* Ex/PG/ProdE/T/112B/2024

M.E. PRODUCTION ENGINEERING, 1ST YEAR, 1ST SEMESTER EXAM 2024

SUBJECT: PRODUCTION & INVENTORY CONTROL SYSTEM (PM)

Time : Three hours **Full Marks : 100**

Use a Separate Answer Script For Each Part

PART II (60 Marks)

(Answer any Three Question)

4. a) Explain with suitable examples the different types of models used in production systems. 5

b) With the help of a suitable example of your own explain the Cause and Effect diagram. 6

c) Explain briefly: 4+5
   (i) Cycle of production functions;
   (ii) Group Ideation under Products and Services.

5. a) Explain the followings in connection with time series analysis: 6
   (i) Cyclic Variation; (ii) Seasonal Variation.

b) Quarterly unit demands for a product are given below : 14

YEAR	WINTER	SPRING	SUMMER	FALL
1	66	63	50	89
2	93	83	63	79
3	94	76	56	85
4	89	72	54	65
5	90	58	68	75

Using centre point moving average technique, determine the seasonal adjusted index for each quarter.

6. a) Explain the relationship between Acceptable Quality level (AQL) and producer's risk (α) and the relation between Lot Tolerance Percent Defective (LTPD) and consumer's risk (β) in case of single sample percentage defective plan. 8

b) Explain briefly different types of control chart and their significance in the view of quality control. 12

7. a) What are the different categories of inventory involved in a Production System? Describe various major cost factors associated with inventory. State opportunity cost and how material managers protect inventory from this? 8

b) M/s ABC Ltd is trying to decide between two alternate Order Plans for its inventory of a certain item. Irrespective of the plan to be followed, demand for the item is expected to be 1,000 units annually. Under Plan 1st, M/S ABC Ltd. would use a teletype for ordering; order costs would be Rs. 40/- per order. Inventory holding costs (carrying cost) would be Rs.200/- per unit. Under Plan 2nd order costs would be Rs.30/- per order. And holding costs would 20% of unit Cost (unit cost=Rs.480/-). Find out EOQ and Total Inventory Cost than decide which Plan would result in the lowest total inventory cost? 12