

MASTER OF PRODUCTION ENGG. EXAMINATION, 2018
 (1st Semester)
SUBJECT – PRODUCTION & INVENTORY CONTROL SYSTEM
Use separate answer script for each part

Time: Three hours

Full Marks: 100

Part-I
(Answer any two)

1. (a) What is the function of “Buffer Stock”? What are all the various uncertainties against which you would like to protect the inventory? 6
- (b) A manufacturing unit uses 8000 components of a cutting tool each year, which it purchases from an outside supplier under the following terms:

Order Size	Price per unit (Rs.)
1-999	22.00
1000-1499	20.00
1500-1999	19.00
2000 and above	18.00

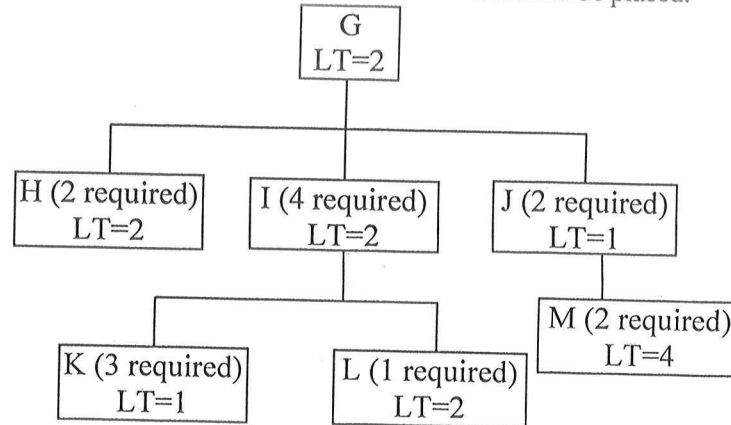
Each time an order is placed, the cost of Rs. 180/- is incurred. The holding cost is 10 per cent of the average inventory value. No safety stock is held. If the components are used at a uniform rate, calculate the best size of order and the total annual stocking cost. 12

2. A machine tool manufacturing company has an annual requirement of 1150 milling cutters for its production unit. Each cutter costs Rs 40; order and inspection cost are Rs. 55 per order. Carrying cost is 25% of the value of average inventory in the storage. The company operates for 230 days per year. Interruptions to the production cause opportunity cost of Rs. 40 per cutter for each day it is unavailable. Lead time follows the pattern as shown below:

Lead Time (days)	5	6	7	8	9	10	11
Probability	0.10	0.15	0.25	0.20	0.15	0.10	0.05

Determine the total inventory cost and optimal order size. 20

3. (a) Within the context of overall planning for production, explain the role of Material Requirements Planning. How does it differ from classical inventory policies? 8
- (b) A manufacturer has received an order for 250 units of product "G" to be completed and supplied at the eighth week from now. The product structure tree diagram is shown below. There is no stock on hand and none on order. Determine the size of the orders for each item and when the orders should be placed. 12



Answer any three questions

- 4(a) Explain with suitable examples the different types of models used in production systems. (5)
- (b) With the help of a flow chart explain briefly the phases of product development. (6)
- (c) With the help of a suitable example of your own explain briefly cause and effect diagram. (5)
- (d) Explain the need of feed back system in Co-ordination for system activities. (4)

- 5(a) Explain briefly the role of forecasting in production systems. (5)
- (b) Explain in connection with time series analysis
(a) Cyclic Variation (b) Seasonal Variation (5)

- (c) Quarterly unit demands for a product are given below :

YEAR	WINTER	SPRING	SUMMER	FALL
1	66	63	79	89
2	93	83	90	74
3	94	61	75	85
4	96	72	88	78
5	118	42	100	75

Using centre point moving average technique determine the seasonal adjusted index for each quarter. (10)

- 6(a) State and explain different types of depreciation. (4)
- (b) The price of a machine tools is Rs 2,25,000 and its salvage value at the end of its economic life of 15 years is Rs30,000 . Find the value of machine tools at the end of 12 years when depreciation charge is calculated annually by double declining method. (8)
- (c) Explain
(a) Capital Recovery Factor (4)
(b) Salvage value

(d) How the break even analysis can be related with System Economy ? (4)

7(a) A manufacturing shop is presently operating at 70% capacity. The shop wants to increase 100% plant capacity by introducing extra accessories due to which variable production cost increases by 4% and the selling price of extra 30% output will be only 87% of the previous price. Again , to exceed 85% capacity , the manufacturer desires to employ an assembly line to increase production rate. This will increase fixed cost by 20% and variable cost 6% more. Presently plant is operating under the following conditions:

Output : 86000 unit per year (70% plant capacity)

Price : Rs 80 per unit

Variable cost : Rs 15 per unit

Fixed cost : 50,000,00

Is it justified to operate the plant with full capacity ? (8)

(b) Explain with neat sketch Gantt chart used for order scheduling and progress reporting. (5)

(c) Sketch a program plan of your own and discuss its importance for determining line of balance. (7)

8(a) Explain with the aid of a two dimensional curve how the cost of production cost depends on the refinement of the product . (5)

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

(c) Discuss briefly sequential sampling plan (5)

(d) How can an operating characteristic (OC) curve be more discriminating ? (4)