

B.E. Eighth Semester (Mechanical Engineering) (CGS)
10887 : Elective-II : Production Planning & Control : 8 ME 01

P. Pages : 4

Time : Three Hours



AU - 2980

Max. Marks : 80

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answer necessary with the help of neat sketches.
 4. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - 'A'

1. a) Elaborate the advantages of PPC from point of view of. 6
- i) Company ii) Workers
- iii) Customers

- b) Differentiate between centralised and decentralised PPC with neat sketch of organization structure. 7

OR

2. a) Explain production consumption cycle mentioning the flow of instruction information and material amongst various departments and stages. 8

- b) What are the objectives of PPC? Explain. 5

3. a) Following data represents the sales of ABC Ltd. for the year 2017. 9

Month	J	F	M	A	M	J	J	A	S	O	N	D
Sales	420	550	470	490	630	500	690	780	810	909	850	940

- i) Calculate three months moving average ignoring decimal values.
- ii) Forecast the demand value for the month of Jan 2018.
- iii) If the actual observation in the month Jan 2018 is 975, what will be the forecast for the month of Feb. 2018?

- b) Explain Delphi technique in detail. 4

OR

4. a) Obtain a linear forecaster with the forecasting function $d' = a + bt$ for the following demand data and also determine the standard error of estimates. 9

Month	J	F	M	A	M	J	J	A	S	O	N	D
Demand	117	124	95	228	274	248	220	130	109	128	125	134

- b) How moving range chart is helpful in verification of forecasting? 4

5. a) Prove the following equation.

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$$\text{Return } \eta = \frac{p' - p}{p + y/2}$$

$$\text{where } p' = \frac{y' - c}{y - c}$$

$$p = \frac{\text{variable cost}}{\text{minimum variable cost}}$$

$y' = \text{sales price per piece}$

$y = \text{Total cost per piece}$

$c = \text{Constant cost per piece}$

$$u = \frac{C}{KQM}$$

- b) A small scale industry manufacturing chemical adhesive tube reveals the following data.

8

Constant cost per piece - Rs. 4.00

Minimum total cost per piece - Rs. 10.00

Setup cost per batch - Rs. 10,000

Due to difficulties in scheduling it was decided that the total cost per piece should be allowed to increase by maximum 5%.

- Find the production range of batch sizes that could be scheduled?
- If the setup cost could be half of the above mentioned, how would production range be affected?
- If the sales price is Rs. 18.00 per piece, find the quantity that yields maximum profit.

OR

6. a) The constant cost per piece are known to be Rs. 4.0, the carrying charges factor

6

$K = \text{Rs. } 0.5 \times 10^{-3}$ per piece per day and setup costs per batch are Rs. 10,000/-

Find the production range, if the allowable increase in total cost per piece is 2% above the minimum cost per piece.

- The minimum cost batch size is known to be 20000 pieces. Find the economic batch size when the sales price yields a factor $p' = 1.50$.
- Explain purpose of production order in detail.

5

3

SECTION - 'B'

7. a) Derive.

8

$$A_n = \frac{1}{p + \left(\frac{1}{nX_n} \right)}$$

$A_n = \text{Ashcroft Number}$

$X_n = \text{Average Number of consecutive servicing task}$

$p = \lambda m$, where m is number of stops per hour per machine.

- b) What are the methods to reduce the cycle time in multimachine supervision by one operator? Explain. 5

OR

8. a) Explain the following terms related to activity charts. 3
 a) Independent activity b) Concurrent activity
 c) Idle time
- b) What do you mean by perfect matching? Explain in detail with neat sketch. 5
- c) What is machine interference? How does it affect the efficiency of production centre? 5
9. a) Define inventory. Also state the objectives of inventory control. 6
- b) During annual gathering of ABC Ltd. Amravati placed an order for buffet with Hotel Grand Rajtilak. The hotel owner, on the basis of past information estimates the probability distribution of no. of plates (demand) as follows. 8

<u>Demand (in multiples of 100)</u>	<u>Probability Distribution</u>
5	0.05
6	0.10
7	0.25
8	0.35
9	0.15
10	0.10

The cost of buffet per head is Rs. 125 and hotel owner charges it for Rs. 300 each. Service charges cost Rs. 5 per head extra. Any buffet not consumed during gathering function will be a total loss to Hotel owner. Buffet comprises standard number of items.

- i) What is total pay off matrix and optimal number of buffet to be kept ready?
 ii) Prepare opportunity cost matrix and verify the solution.

OR

10. a) How static inventory and dynamic inventory cases can be differential from each other? 4
- b) What are the general characteristics of the static inventory problem under risk? Explain. 5
- c) What is ABC analysis? Explain in detail. 5
11. a) Deduce 8

$$TC_{t+d} - TC_t = 12 Cr \left[\frac{d^2}{(t+d)t^2} \right]$$

Where TC = Total cost
 t - months between order (time interval)
 d - fraction of period
 Cr - ordering cost

- b) What is material requirement planning? What are the conditions suitable for implementation of MRP? 5

OR

12. a) A manufacturer of ceiling fan is required to purchase 2400 castings per year. The castings are subject to quantity discount of Rs. 0.75 from the quoted price of Rs. 10 if the quantity purchased is at least 3000 casting at a time. If the ordering cost is Rs. 100/- and inventory carrying cost is 24% per year, find out. 8
- a) What should be the optimal order size?
- b) Whether discount be taken or not?
- c) No. of orders to be placed in a year.
- d) Order interval between two orders, assuming 300 working days in a year.
- b) Compare MRP-I and MRP-II. 5
