



PAPER ID-410370

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Subject Code: KME503

Roll No:

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B.TECH
(SEM V) THEORY EXAMINATION 2021-22
INDUSTRIAL ENGINEERING

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

2 x 10 = 20

- Write short note on productivity.
- What is group technology?
- Define forecasting.
- What do you mean by scheduling?
- Draw the cost curve for fixed cost, variable cost & total cost.
- What is safety stock? How it is important?
- What are the objectives of standardization?
- What do you understand by ergonomics?
- What are the limitations of graphical method for solving LPP?
- Describe the unbounded solution and no solution conditions with the help of diagram.

SECTION B

2. Attempt any *three* of the following:

10 x 3 = 30

- Describe process & product layout in detail. Also mention benefits & limitations of both.
- What is material requirements planning (MRP)? Discuss its structure in detail. Also describe JIT manufacturing system.
- What is break-even point in business? Show this point on diagram. Explain ABC analysis & VED analysis in inventory control.
- What is method study & what are its objectives? Explain the principle of motion economy in detail.
- Solve the following linear programming problem by Simplex method:
Maximize $Z = 4X_1 + 10X_2$
Subject to constraints: $2X_1 + X_2 \leq 50$
 $2X_1 + 5X_2 \leq 100$
 $2X_1 + 3X_2 \leq 90$
and $X_1 \geq 0, X_2 \geq 0$

SECTION C

3. Attempt any *one* part of the following:

10 x 1 = 10

- A firm has adopted simple exponential smoothing with $\alpha = 0.1$ to forecast its demand. The forecast for January was 500 units, whereas actual demand was 450 units. Forecast the demand for February. Assume that actual demand during February is 510 units, forecast the demand for the month of March. Continue forecasting up to June, assuming that subsequent demands were actually 520, 490 and 470 respectively.
Also differentiate between PERT & CPM.



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per hour, whereas the repairman Y takes five minutes to repair and the wages are 10 rupees per hour. Which repairman's service should be used and why? Consider the work shift of 8 hours.

- (b) For a production system annual demand is 8000 unit & ordering cost is 17000 rupees per order & inventory holding cost is 10% of unit price. Items can be purchased in a lot as given below determine the best order size.

| Lot Size | Unit Price (In rupees) |
|--------------|------------------------|
| 1 to 999 | 200 |
| 1000 to 1499 | 180 |
| 1500 to 1999 | 170 |
| 2000 & above | 165 |

7. Attempt any one part of the following: 10 x 1 = 10

- (a) Two products A and B are to be machined on three machine tools M1, M2 and M3. Product A takes 10 hrs on machine M1, 6 hrs on machine M2 and 5 hrs on machine M3. The product B takes 7.5 hrs on machine M1, 9 hrs on machine M2 and 13 hrs on machine M3. The machining time available on these machine tools M1, M2, M3 are respectively 75 hrs, 54 hrs and 65 hrs per week. The producer contemplates profit of Rs. 80 per product A, and Rs. 100 per product B. Formulate LP model for maximizing the profit & show the feasible region graphically. Find the optimal solution.

- (b) Use Vogel's approximation method to obtain an initial feasible solution of the transportation problem:

| | D1 | D2 | D3 | D4 | Available |
|--------|-----|-----|-----|-----|-----------|
| S1 | 11 | 13 | 17 | 14 | 250 |
| S2 | 16 | 18 | 14 | 10 | 300 |
| S3 | 21 | 24 | 13 | 10 | 400 |
| Demand | 200 | 225 | 275 | 250 | |

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