120256 62216

Reg. No. | | | | | | | | |

**II Semester M.B.A. (Day and Evening) Degree Examination, January - 2025**

**MANAGEMENT**

**Production and Operation Research**

**(CBCS Scheme-2019 Onwards)**

**Paper : 2.6**

**Time : 3 Hours** **Maximum Marks : 70**

**SECTION - A**

Answer any **Five** questions from the following. Each question carries **5** marks. **(5×5=25)**

1. Explain any two qualitative forecasting methods.
2. What are the steps involved in purchase procedure?
3. Write Note on:
   a) ABC and
   b) FSN analysis
4. Explain elimination of SEVEN wastes (Mudas)
5. Z engineering Co., is offered a material handling equipment "X". Cost of Equipment "X" is Rs.60,000 and maintenance costs are estimated to be Rs. 10,000 for each of the first Five years and increasing every year by Rs.3,000 from the 6th and subsequent years. The company expects a return of 10% in all its investment. What is the optimum replacement period?

   Assume that maintenance cost is incurred at the end of the year.
6. Calculate Vender rating for the following data:

| **Particulars** | **X** | **Y** | **Z** |
|---|---|---|---|
| Quantity supplied | 120 | 150 | 100 |
| Quantity accepted | 108 | 125 | 85 |
| Price of each item | 7 | 6 | 6.5 |
| Delivery Promised (in Months) | 10 | 10 | 10 |
| Actual delivery made (in Months) | 12 | 13 | 14 |

Weightage for Quantity 65%, Price 15% and Delivery 20%.

[P.T.O.

7. Solve LPP graphically:

Max $Z=12x_1+16x_2$

Subject to = $10x_1+20x_2 \leq 120$

$8x_1+8x_2 \leq 80$

$x_1$ and $x_2 \geq 0$

## SECTION - B

Answer any **Three** questions from the following. Each question carries **10** marks. **(3×10=30)**

8. What is plant Layout? Explain in detail types of plant layouts.

9. Solve the following LPP under Simplex method.

Min $Z=2x_1-3x_2+6x_3$

Subject to = $3x_1-x_2+2x_3 \leq 7$

$2x_1+4x_2 \geq -12$

$-4x_1+3x_2+8x_3 \leq 10$

$x_1, x_2, x_3 \geq 0$

10. A production manager wants to assign one of the five new methods to each of the four operations. The following table summarize the weekly output in units.

| **OPERATOR** | **WEEKLY OUTPUT** | | | | |
|---|---|---|---|---|---|
| | M-1 | M-2 | M-3 | M-4 | M-5 |
| A | 4 | 6 | 11 | 16 | 9 |
| B | 5 | 8 | 16 | 19 | 9 |
| C | 9 | 13 | 21 | 21 | 13 |
| D | 6 | 6 | 9 | 11 | 7 |

Cost per unit is Rs.20 . Selling price per unit is Rs.30. Find the maximum profit per month.

11. A product is manufactured by FOUR factories A,B,C, and D. The production cost per unit in them are Rs,2, Rs.3, Rs.1 and Rs.5 respectively. Their production capacities are 50,70,30 and 50 units respectively. These factories supply the product to FOUR stores. Demands of which are 25, 35, 105 and 20 units respectively. Unit transportation cost in rupees from each factory to each stores is given in the table below:

| FACTORIES | STORES | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| A | 2 | 4 | 6 | 11 |
| B | 10 | 8 | 7 | 5 |
| C | 13 | 3 | 9 | 12 |
| D | 4 | 6 | 8 | 3 |

Determine the transportation plan to minimize the total production-cum-transportation cost.

## SECTION - C

**(1×15=15)**

12. **Case Study (Compulsory):**

A Project consists of the following activities and different time estimates:

| Activity | Least Time(in days) | Most Time(in days) | Most Likely Time (in days) |
|---|---|---|---|
| 1-2 | 3 | 15 | 6 |
| 1-3 | 2 | 14 | 5 |
| 1-4 | 6 | 30 | 12 |
| 2-5 | 2 | 8 | 5 |
| 2-6 | 5 | 17 | 11 |
| 3-6 | 3 | 15 | 6 |
| 4-7 | 3 | 27 | 9 |
| 5-7 | 1 | 7 | 4 |
| 6-7 | 2 | 8 | 5 |

**Questions:**

a) Draw a network.

b) Determine the critical path and their variances.

c) Find the earliest and latest expected times to reach each node.