

**TILAK MAHARASHTRA VIDYAPEETH, PUNE**  
**MASTER OF BUSINESS ADMINISTRATION (M.B.A.)**  
**EXAMINATION: MAY - 2025**  
**SEMESTER - IV**  
**Sub.: Operations Research (MBA403)**

**Date : 19/05/2025****Total Marks : 60****Time: 10.00am to 12.30pm**

- Instructions:** 1) All questions are compulsory.  
 2) Figures to the right indicate full marks.

**Q. 1. Write Short notes on (Any Three) (15)**

1. Operations Research
2. North West Corner Rule
3. Travelling Salesman Problem (TSP)
4. Simulation
5. Techniques and Tools in Operations Research

**Q. 2. Answer in detail (Any One) (10)**

1. Use North West Corner Rule of Transportation Problem calculate the total minimum cost-

| From   |     |     |     |     | Supply |
|--------|-----|-----|-----|-----|--------|
|        | D1  | D2  | D3  | D4  |        |
| O1     | 11  | 13  | 17  | 14  | 250    |
| O2     | 16  | 18  | 14  | 10  | 300    |
| O3     | 21  | 24  | 13  | 10  | 400    |
| Demand | 200 | 225 | 275 | 250 |        |

2. What is the Monte Carlo method to solve the transportation problem?

**Q. 3. Answer in detail (Any One) (10)**

1. Find the solution of given Assignment problem using Hungarian method (MIN case )

| Job →     | I  | II | III | IV | V  |
|-----------|----|----|-----|----|----|
| Workers ↓ |    |    |     |    |    |
| A         | 10 | 5  | 13  | 15 | 16 |
| B         | 3  | 9  | 18  | 13 | 6  |
| C         | 10 | 7  | 2   | 2  | 2  |
| D         | 7  | 11 | 9   | 7  | 12 |
| E         | 7  | 9  | 10  | 4  | 12 |

2. Definition of Simulation and write it's Advantages and disadvantages

**Q. 4. Answer in detail (Any One)****(10)**

1. Solve the following transportation problem by using North-west corner method –

| From   | To |   |    | Supply |
|--------|----|---|----|--------|
|        | P  | Q | R  |        |
| A      | 2  | 7 | 4  | 5      |
| B      | 3  | 3 | 1  | 8      |
| C      | 5  | 4 | 7  | 7      |
| D      | 1  | 6 | 2  | 14     |
| Demand | 7  | 9 | 18 |        |

2. What is Vogel's Approximation Method(VAM) to solve the transportation problems?

**Q. 5. Case study****(15)**

A truck owner finds from his past records that the maintenance cost of a truck (whose purchase price is Rs. 3,00,000/- during the first eight years of its life and the resale price at the end of each year is as follows –

| Year | Maintenance Cost (Rs.) | Resale Price (Rs.) |
|------|------------------------|--------------------|
| 1    | 36,000                 | 2,00,000           |
| 2    | 48,000                 | 1,50,000           |
| 3    | 60,000                 | 1,00,000           |
| 4    | 72,000                 | 80,000             |
| 5    | 84,000                 | 70,000             |
| 6    | 96,000                 | 60,000             |
| 7    | 1,08,000               | 50,000             |
| 8    | 1,20,000               | 40,000             |

**Questions:**

1. Estimate the year to replacement .
2. When should the truck be replaced?
3. Give support to your answer.

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