

Roll No. 

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Total No. of Pages : 02

Total No. of Questions : 07

MBA (Sem.-3rd)

**APPLIED OPERATIONS RESEARCH**

Subject Code : MB-301 (2009 to 2011 Batch)

Paper ID : [C0197]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students has to attempt any FOUR questions.

**SECTION-A**

1. Write briefly :

- a. What are the steps involved in operations research?
- b. Discuss the similarity and difference in transportation and assignment model.
- c. What are the essential characteristics of dynamic programming?
- d. Discuss various quantitative methods which are useful for decision-making under uncertainty.
- e. State the major limitations of game theory.
- f. Is it necessary that game should always have a saddle point? Illustrate by giving an example.
- g. Explain the characteristics of queuing system.
- h. What are the major weaknesses of EOQ model?
- i. What is the difference between a pure strategy and a mixed strategy?
- j. Why is the transportation method used to find the optimal solution not preferred in the assignment problem?

## SECTION-B

2. Discuss the importance of mathematical models by giving examples in the solution of operations research problems.
3. (a) Describe the matrix form of the transportation problem. Illustrate with 2 origins and 3 destinations. (6)  
(b) Explain how transportation model is a special case of Simplex method. (4)
4. Solve the following Travelling-Salesman problem

|      |   | To       |          |          |          |
|------|---|----------|----------|----------|----------|
|      |   | A        | B        | C        | D        |
| From | A | $\infty$ | 46       | 16       | 40       |
|      | B | 41       | $\infty$ | 50       | 40       |
|      | C | 82       | 32       | $\infty$ | 60       |
|      | D | 40       | 40       | 36       | $\infty$ |

5. Let the value of money be assumed to be 10 per cent per year and suppose that machine A is replaced after every 3 years whereas machine B is replaced after every six years. The yearly costs of both machines are given. Determine which machine should be purchased.

| Year      | 1    | 2   | 3   | 4    | 5   | 6   |
|-----------|------|-----|-----|------|-----|-----|
| Machine A | 1000 | 200 | 400 | 1000 | 200 | 400 |
| Machine B | 1700 | 100 | 200 | 300  | 400 | 500 |

6. Annual demand of an item is 6000 units. Ordering cost is Rs. 600 per order. Inventory carrying cost is 18% of the purchasing price/unit/year. The price break is given. Find the optimal order size.

| Quantity                   | Price (Rs.) |
|----------------------------|-------------|
| 0 to 2000                  | 20          |
| 2000 to 4000               | 15          |
| equal to or more than 4000 | 9           |

7. (a) What are the assumptions made in game theory? Explain the difference between a pure strategy and a mixed strategy.  
(b) Explain two-person zero-sum game by giving suitable example.