**Roll No.** | | | | | | | | | | | | **Total No. of Pages : 03**

**Total No. of Questions : 10**

**MBA (Sem.–3)**

# OPERATION RESEARCH APPLICATIONS

**Subject Code : MBA-952-18**

**M.Code : 77056**

**Date of Examination : 04-01-23**

**Time : 3 Hrs.** **Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A contains EIGHT questions carrying TWO marks each and students has to attempt ALL questions.**
2. **SECTION-B consists of FOUR Subsections : Units-I, II, III & IV. Each Subsection contains TWO questions each carrying EIGHT marks each and student has to attempt any ONE question from each Subsection.**
3. **SECTION-C is COMPULSORY and consist of ONE Case Study carrying TWELVE marks.**

## SECTION-A

**1. Write briefly :**

a) Functions of OR

b) Managerial applications of Optimization

c) Big-M Method

d) Simplex Algorithm

e) Dynamic Programming

f) Queuing Theory

g) PERT & CPM

h) Slack and Float.

## SECTION-B

### UNIT-I

2. State the meaning of Operation Research. Explain the importance of operations, research in the decision-making process.

3. Explain briefly the various Applications of OR. What are the advantages and disadvantages of OR studies?

### UNIT-II

4. Solve the following LPP using simplex method.

   Maximise $Z = 6x_1 + 4x_2$

   Subject to $2x_1 + 3x_2 \leq 30$

   $3x_1 + 2x_2 \leq 24$

   $x_1 + x_2 \geq 3$

   whre $x_1 + x_2 \geq 0$

5. Discuss in detail about Duality Theory and Sensitivity Analysis.

### UNIT-III

6. Explain in detail, any one method for solving a transportation problem. Would you recommend this method to solve an assignment problem?

7. Solve the following transportation problem for minimum cost:

| **Destination** | **Origin** | | | | **Requirements** |
|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | |
| 1 | 7 | 4 | 3 | 4 | 15 |
| 2 | 3 | 2 | 7 | 5 | 25 |
| 3 | 4 | 4 | 3 | 7 | 20 |
| 4 | 9 | 7 | 5 | 3 | 40 |
| Availabilities | 12 | 8 | 35 | 25 | |

## UNIT-IV

8. Discuss the different kinds of non-linear programming problems

9. Construct the network diagram for a project with the following activities:

| Activity Event → Event | Name of Activity | Immediate Predecessor Activity |
|---|---|---|
| 1 → 2 | A | |
| 1 → 3 | B | - |
| 1 → 4 | C | - |
| 2 → 5 | D | A |
| 3 → 6 | E | B |
| 4 → 6 | F | C |
| 5 → 6 | G | D |

## SECTION-C

10. **Case Study :** A small project consisting of eight activities has the following characteristics:

**Time-Estimates (in weeks)**

| Activity | Preceding Activity | Most optimistic Time (a) | Most Likely time (m) | Most Pessimistic Time (b) |
|---|---|---|---|---|
| A | None | 2 | 4 | 12 |
| B | None | 10 | 12 | 26 |
| C | A | 8 | 9 | 10 |
| D | A | 10 | 15 | 20 |
| E | A | 7 | 7.5 | 11 |
| F | B, C | 9 | 9 | 9 |
| G | D | 3 | 3.5 | 7 |
| H | E, F, G | 5 | 5 | 5 |

(a) Draw the PERT network for the project.

(*b*) Prepare the activity schedule for the project.

(c) Determine the critical path.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student**.