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Total No. of Pages : 02

Total No. of Questions : 07

**B.Com(2011 & Onwards) (Sem.-3)**

**OPERATION RESEARCH**

**Subject Code : BCOP-304**

**Paper ID : [B1127]**

**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. Explain applications of Operations Research in brief.
- b. What are the limitations of LPP?
- c. What is Unbalanced Transportation problem?
- d. Define Travelling salesman problems.
- e. Explain the principle of Dominance in game theory.
- f. Define the term Basic feasible solution in LP Problems?
- g. Define Objectives of Inventory Control.
- h. What is Critical Path?
- i. How to calculate floats in network analysis?
- j. What are the advantages of Dual problem?

**SECTION-B**

2. Define Operations Research. Discuss briefly the techniques of Operations Research.
3. What is Travelling Salesman Problem in assignment? Explain the procedure to solve it.

4. Obtain the optimal solution of the following assignment problem :

|   | I  | II | III | IV | V  |
|---|----|----|-----|----|----|
| 1 | 11 | 17 | 8   | 16 | 20 |
| 2 | 9  | 7  | 12  | 6  | 15 |
| 3 | 13 | 16 | 15  | 12 | 16 |
| 4 | 21 | 24 | 17  | 28 | 26 |
| 5 | 14 | 10 | 12  | 11 | 13 |

5. Using stepping stone method solve the following transportation problem to minimize transportation cost :

| Factory  | Depot |     |     |     | Capacity |
|----------|-------|-----|-----|-----|----------|
|          | D     | E   | F   | G   |          |
| A        | 4     | 6   | 8   | 6   | 700      |
| B        | 3     | 5   | 2   | 5   | 400      |
| C        | 3     | 9   | 6   | 5   | 600      |
| Required | 400   | 450 | 350 | 500 | 1700     |

6. Solve the following game :

|     | Player Q |    |     |    |
|-----|----------|----|-----|----|
|     | I        | II | III | IV |
| I   | 6        | 4  | 8   | 0  |
| II  | 6        | 8  | 4   | 8  |
| III | 8        | 4  | 8   | 0  |
| IV  | 0        | 8  | 0   | 16 |

7. From the following draw network, critical path and calculate floats :

| Activity           | A  | B  | C | D  | E    | F    |
|--------------------|----|----|---|----|------|------|
| Preceding activity | –  | –  | A | A  | B, C | D, E |
| Normal time (Days) | 16 | 20 | 8 | 10 | 6    | 12   |