Exam. Code : 105404
Subject Code : 1502

Bachelor in Business Administration 4th Semester
OPERATIONS RESEARCH
Paper—BBA-406

Time Allowed—Three Hours]   [Maximum Marks—50

SECTION—A

Note :— Attempt any **TEN** questions. Each question carries **1** mark. Answer to each question should not exceed **5** lines.

1. Short answer type questions :—

    (a) What are the features of Operational Research ?

    (b) Explain alternate solution and non negativity constraints in relation to LPP.

    (c) Explain primal dual relationship.

    (d) What is degeneracy ?

    (e) Prohibited/restricted assignment problem.

    (f) Discus the classification of inventory.

    (g) Differentiate between PERT and CPM.

    (h) Explain Minimax and Maximin principle used in the theory of game.

(i) Explain rules of dominance in game theory by practical example.

(j) What are the major difficulties with PERT ?

(k) Derive EOQ formula when no shortages are permissible.

(l) Explain stepping stone method of transportation problem. $10 \times 1 = 10$

SECTION—B

Note :— Attempt any **TWO** questions. Each question carries **10** marks.

2. Discuss the meaning, significance and scope of operational research. Describe some methods of O.R.

3. Solve the following LPP by simplex :

Max Z = $4X_1 + 3X_2$

sub to $\quad X_1 + X_2 \leq 50$

$\qquad X_1 + 2X_2 \geq 80$

$\qquad 3X_1 + 2X_2 \geq 140$

where $X_1, X_2 \geq 0$

4. Solve the following transportation problem :

To From	D1	D2	D3	D4	Available
S1	4	3	1	2	80
S2	5	2	3	4	60
S3	3	5	6	3	40
Requirement	50	60	20	50	180

5. A company purchases raw material from outside supplier for its annual requirement. During the coming year the company plans to manufacture at a constant rate 100000 units of its product. The cost of placing each order is 160. For any item in inventory, the company incurs an annual carrying cost equal to 20% of the item's cost. The product costs Rs. 20 for each unit. Answer the following questions :

   (i) What is optimal order size ?

   (ii) What is the total inventory cost ?

   (iii) How many orders will be placed in the next year ?

   $2 \times 10 = 20$

SECTION—C

Note :— Attempt any **TWO** questions. Each question carries **10** marks.

6. Explain PERT and its importance in network analysis. Also state the circumstances where CPM is better technique of project analysis than PERT.

7. What is game theory ? What are the properties of a game ? Discuss the following terms :

   (i) Pay off matrix

   (ii) Two person zero sum game.

   (iii) Strategies of a game.

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8. The following table gives the data for the activities of a small project :

   (i) The critical path

   (ii) Probability of completing the project within the scheduled time of 48 days.

Job	Optimistic	Most likely	Pessimistic
1−2	4	8	12
2−3	1	4	7
2−4	8	12	16
3−5	3	5	7
4−5	0	0	0
4−6	3	6	9
5−7	3	6	9
5−8	4	6	8
7−9	4	8	12
8−9	2	5	8
9−10	4	10	16
6−10	4	6	8

9. Solve the following game :

Player B

$$\begin{array}{c c c c} & \text{I} & \text{II} & \text{III} \\ \text{I} & -1 & 2 & 1 \\ \text{Player A} \quad \text{II} & 1 & -2 & 2 \\ \text{III} & 3 & 4 & -3 \end{array}$$

$2 \times 10 = 20$