

OPERATIONS RESEARCH

Min. Passing Marks : 24

Maximum Marks : 80

Time : 3 Hours

Instruction to Candidates :

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit-I

1. (a) Discuss the significance and scope of OR in modern management. [8]

(b) Use two-phase Simplex method solve to
 Maximize $Z = 3x_1 + 2x_2 + 2x_3$
 Subjecto to $5x_1 + 7x_2 + 4x_3 \leq 7$
 $-4x_1 + 7x_2 + 5x_3 \geq -2$
 $3x_1 + 4x_2 - 6x_3 \geq 29/7$
 x_1, x_2, x_3 all ≥ 0 [8]

OR

(a) Write short note on the sensitivity analysis. [8]

(b) Discuss the role of OR in decision making. [8]

Unit-II

2. (a) Solve the following problem.

Max $Z = 3x_1 + 2x_2$
 Subject to $x_1 \leq 2$
 $x_2 \leq 2$
 $x_1 + x_2 \leq 3.5$
 $x_1, x_2 \geq 0$ and integer. [8]

(b) State and explain the principle of optimality in reference to the dynamic programming. [8]

OR

2. Using Dynamic Programming solve the following.

Max $Z = y_1^3 + y_2^3 + y_3^3$
 Subject to $y_1 y_2 y_3 \leq 5$
 where $y_i > 0$ and integers. [16]

Unit-III

3. (a) A and B in which each has three coins a 5p, a 10p and a 20p. Each player selects a coin without the knowledge of the other's choice. If the sum of the coins is an odd amount, A wins B's win. If the sum is even B wins A's win. Find the best strategy for each player and the value of the game. [8]

(b) What is game theory? Include in your answer various approaches in solving for strategies and game values. [8]

OR

3. (a) Explain cutting plane method in integer programming. [8]

(b) Solve the following game using principle of dominance: [8]

	I	II	III	IV	V	VI
1	4	2	0	2	1	1
2	4	3	1	3	2	2
3	4	3	7	-5	1	2
4	4	3	4	-1	2	2
5	4	3	3	-2	2	2

Unit-IV

4. (a) Explain the necessity for maintaining an inventory. [8]

(b) An ice-cream retailer buys ice cream at a cost of Rs. 5/cup and sells it for Rs. 8 cup, any remaining unsold at the end of the day can be disposed of at a salvage price of Rs. 2/cup past sales have ranged between 15 and 18 cups/day. Find the expected monetary value if the sale history has following probabilities: [8]

Market size :	15	16	17	18
Probability :	0.10	0.20	0.40	0.30

OR

4. (a) Explain deterministic and stochastic inventory models. [8]

(b) The demand for a commodity is 100 unit per day. Every time an order is placed, a fixed cost of Rs. 400 is incurred. Holding cost is Re. 0.08 per unit per day. If the lead time is 13 days, determine the economic lot size and the recorder point. [8]

Unit-V

5. (a) Explain the application of simulation technique to the inventory problems. [8]

(b) What is simulation? When to use simulation? [8]

OR

5. (a) Find the value of p experimentally by simulation. [8]

(b) Discuss some important applications of queueing theory. [8]