

**Instruction to Candidates:**

- 1) Section - A is compulsory.
- 2) Attempt any Nine questions from Section - B.

Section - A

Q1) (15 x 2 = 30)

- a) Define operation research.
- b) Can we solve a 3-dimensional problem with Graphical method?
- c) Explain unrestricted variable.
- d) What are redundant constraints?
- e) Explain principle of dominance in Game Theory?
- f) What is the importance of Mixed Strategy?
- g) Write limitations of operation research.
- h) What do you mean by Convex set?
- i) What is non-degenerate basic feasible solution?
- j) What is structure of LPP?
- k) What is looping in transportation problem?
- l) What is free float?
- m) What are artificial variables?
- n) What do you mean by objective function?
- o) What is dynamic programming?

Section - B

(9 x 5 = 45)

- Q2) Discuss the various models & methods used in operation research.
- Q3) Write a note on any two of the following:
- (a) Discuss the role of LPP as a decision making tool.
  - (b) Unbalanced transportation problem.
  - (c) Multiple optimal solution & infeasibility.
- Q4) Maximize  $Z = 5x + 8y$ ,  
Subject to  $3x + 5y = 18$   
 $5x + 3y = 14$   
 $x, y$  are greater or equal to zero.
- Q5) Discuss briefly the Hungarian method for solving an assignment problem.
- Q6) What is the difference b/w degeneracy in simplex & degeneracy in transportation?
- Q7) Explain Traveling Salesmen Problem with example.
- Q8) Write five-difference b/w PERT/CPM.
- Q9) Write a short note on Transshipment problem.
- Q10) A company uses 3000 units of a product, its carrying cost is 30 % of average inventory. Ordering cost is Rs. 100 per order. Unit cost is Rs. 20. Calculate EOQ & total cost.
- Q11) Explain the terms, set up cost, holding cost & shortage or penalty cost as applied to an inventory problem.
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- Q12) A truck owner from his past experience estimates that the maintenance cost per year of a truck whose purchase price is Rs. 150000 & resale value of the truck will be given as in table.
- Determine at which time it is profitable to replace the truck.
- | Year         | 1       | 2       | 3       | 4      | 5      | 6      | 7      | 8      |
|--------------|---------|---------|---------|--------|--------|--------|--------|--------|
| Maintenance  | 10,000  | 50,000  | 20,000  | 25,000 | 30,000 | 40,000 | 45,000 | 50,000 |
| Resale value | 13,0000 | 12,0000 | 11,5000 | 10,500 | 90,000 | 75,000 | 60,000 | 50,000 |
- Q13) What is replacement? Describe some important replacement situations & replacement policies.