BBA (403) (Old) (Semester. - 4ᵗʰ) OPERATIONS RESEARCH 2007

Time : 03 Hours Maximum Marks : 75
Instruction to Candidates:
1) Section - A is Compulsory.
2) Attempt any Nine questions from Section - B.

Section – A - (15 x 2 = 30)

Q1)
a) Define a general linear programming problem.
b) What are the limitations of linear programming problem?
c) Write steps used in simplex method.
d) Define the dual of linear programming problem.
e) Describe simplex method of solving LPP.
f) Formulate transportation problem as LPP.
g) Show that the transportation and assignment problem can be regarded
as particular case of L.P.P.
h) Give matrix form of transportation problem with 2 origins and 3
destinations.
i) Differentiate decision under certainity and decision under risk.
j) What are the types of decisions?
k) Enumerate any two methods used for decision making with uncertainity.
l) What is a game theory?
m) What are the disadvantages of increased inventory?
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n) Why inventory is maintained?
o) Define "expected value of perfect information.

Section – B - (9 x 5 = 45)

Q2) A nutrition scheme for babies is proposed by a committee of doctors. Babies
can be given two types of food (I and II) which are available in standard sized
packets weighing 50 grams. The cost per packet of these foods are Rs. 2 and
Rs. 3, resp. The vitamin availability in each type of food per packet and the
minimum vitamin requirement for each type of vitamin are shown below.
Vitamin Minimum daily
availability per required
Vitamin packet vitamin
Food type I Food type II
1 1 1 6
2 7 1 14
Cost/packet Rs. 2 3
Develop a linear programming model to determine the optimal combination
of food types with the minimum cost such that the minimum requirement of
vitamin in each type is satisfied.

Q3) Solve graphically the problem

Maximize $Z = 3X_1 + X_2$

$2X_1 + X_2 = 40$

$X_1 + X_2 = 24$

$2X_1 + 3X_2 = 60$

$X_1, X_2 > 0$

Q4) Describe in detail SIMPLEX procedure.

Q5) Form dual of following primal problem

Maximize $Z = 20X_1 + 40X_2$

Subject to

$2X_1 + 20 X_2 = 40$

$20 X_1 + 3 X_2 = 20$

$4 X_1 + 15 X_2 = 30$

$X_1, X_2 > 0$

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Q6) Consider the following transportation problem involving three sources and four destinations. The cell entries represent the cost of transportation per unit

Destination

1 2 3 4 supply

1 3 1 7 4 300

source 2 2 6 5 9 400

3 8 3 3 2 500

Demand 250 350 400 200 1200

Obtain the initial basic feasible solution using Vogels approximation method.

Q7) Give the mathematical formulation of transportation problem. How does it differ from an assignment problem.

Q8) What is a decision tree? Illustrate with an example.

Q9) With an suitable example explain pay off table and opportunity loss table.

Q10)Describe any two methods used for decision making with uncertainity. Explain each method with example.

Q11)Describe a business situation where a decision maker faces a decision under certainity.

Q12)Explain the following terminologies of game theory: value of the game, two person zero sum game, maximin principle, minimax principle.

Q13)What is EOQ? Alpha industry needs 15,000 units per year of a bought out component which will be used in its main product. The ordering cost is Rs. 125/- per order and the carrying cost per unit per year is 20% of the purchase price per unit. The purchase price per unit is Rs. 75. Find EOQ.