Code : 302403

BBA 4th Semester Theory Examination, 2017

Operations Research and Logistics

Time : 3 hours *Full Marks : 60*

Instructions :

(i) *There are* seven *questions in this Paper.*

(ii) *Attempt* five *questions in all.*

(iii) *Question No. 1 & 2 is compulsory.*

(iv) *The questions are of equal value.*

1. Answer any 6:

Mark the following statements a T(True) or F (False).

(a) Every linear programming problem has a unique optimal solution.

(b) It is possible for the objective function value of an LPP to be the same at two distinct extreme points.

(c) The feasible region of a LPP must be a convex set.

(d) An LPP can have only two decision variables.

(e) To solve a LPP by simplex method it is essential that all variables in it to be non-negative.

(f) In improving a non optimal solution, the key element may be positive, negative or zero.

(g) A transportation problem is said to be unbalanced when the number of origins does not match with the number of destinations.

(h) A closed loop in a transportation problem would always involve an even number of cells.

(i) The relevant cost element is replaced by a zero in case a certain worker is not to be assigned a particular job.

(j) In a two person game, both the players must have an equal number of strategies.

2. Answer any three:

(i) Graphically solve the following problem of LP Maximize

$3x1 + 2x2$

Subject to: $2x1 - 3x2 \geq 0$

$3x1 + 4x2 \leq -12$

$x1, x2 \geq 0$

(ii) Solve the following linear programming problem using simplex method.

Maximize $x1 + x2$

Subject to : $-2x1 + x2 \leq 1$

$x1 \leq 2$

$x1 + x2 \leq 3\,x1$

$x2, x3 \geq 0$

(iii) Discuss the role of sensitivity analysis in linear programming.

(iv) "Linear Programming is one of the most frequently and successfully used operations research technique to managerial and business decisions". Elucidate

(v) Discuss the difference between decision making under certainty and decision making under uncertainty.

3. "The primary contribution of the game theory has been its concept rather than its formal application to solving real problems "Explain.

4. Write short notes on the following:

(a) Sensitivity Analysis

(b) Steps in the simulation process

5. Solve the following transportation problem by Least Cost method and check the feasibility of the solution. The unit costs of shipment are given in the cells below:

To / From	D	E	F	Supply
A	6	4	1	50
B	3	8	7	40
C	4	4	2	60
Demand	20	95	35	150

6. Two products X and Y both require processing time on machines I and II. Machine-I has 200 hours available, and Machine-II has 400 hours available. Product X requires one

hour on machine-I and four hours on machine-II. Product Y requires one hour on machine-I and one hour on machine-II. Each unit of product X yields Rs.500 profit and each unit of Y yields Rs. 250. Formulate the problem as LPP.

7. (a) Explain the Travelling Salesman Problem

(b) A dispatcher presently has six taxicabs at different locations and five customers who have call for service. The mileage from each taxi's present location to each customer is

Customer / Cab	1	2	3	4	5
A	7	2	4	10	7
B	5	1	5	6	6
C	8	7	6	5	5
D	2	5	2	4	5
E	3	3	5	8	4
F	6	2	4	3	4

Determine the optional assignment that will minimize the total mileage.

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