B.Sc. (Honours) Examination 2018
Semester-VI
Computer Science
Course : BCSE-63
(Operations Research)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin.

Answer **any five** questions.

1. a) Define general mathematical model of linear programming problem.
   b) Illustrate the simplex methodology. [2+6=8]

2. a) Write down the branch and bound algorithm in Integer Programming.
   b) Describe dynamic programming algorithm. [4+4=8]

3. a) Describe extreme point enumeration approach.
   b) Use the graphical method to solve the following LPP :

   Maximize $Z = 2x_1 + 3x_2$

   subject to the constraints

   $x_1 + x_2 \le 30$

   $x_2 \ge 3$

   $0 \le x_2 \le 12$

   $x_1 \le 20$

   $x_1 - x_2 \ge 0$

   and x_1, x_2 are non-negative integers. [2+6=8]

4. Food A contains 20 units of vitamin X and 40 units of vitamin Y per gram. Food B contains 30 units each of vitamin X and Y. The daily minimum human requirements of vitamin X and Y are 900 units and 1200 units respectively. How many grams of each type of food should be consumed so as to minimize the cost if food A costs Re 0.60 per gram and food B costs Re 0.80 per gram. 8

5. Solve the following LPP by using two-phase simplex method:

   Minimize $Z = x_1 + x_2$

   subject to the constraints

   $2x_1 + x_2 \ge 4$

   $x_1 + 7x_2 \ge 7$ 8

   and $x_1, x_2 \ge 0$

P.T.O.

6. Solve the following all integer programming problem by using branch and bound method:

Maximize $Z = 3x_1 + 5x_2$

subject to the constraints

$2x_1 + 4x_2 \le 25$

$x_1 \le 8$

$x_2 \le 5$

and x_1, x_2 are non-negative integers. 8

7. Determine the values of u_1, u_2 and u_3 so as to

Maximize $Z = u_1.u_2.u_3$

subject to the constraints

$u_1 + u_2 + u_3 = 10$

and $u_1, u_2, u_3 \ge 10.$ 8

8. Use the dual simplex method to solve the following LPP:

Maximize $Z = -2x_1 - x_3$

Subject to the constraints

$x_1 + x_2 - x_3 \ge 5$

$x_1 - 2x_2 + 4x_3 \ge 8$

and $x_1, x_2, x_3 \ge 0.$ 8

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