Seat No. : _____

13E-110

May-2015

M.Sc., Sem.-II

409 : Statistics

(Mathematical Programming)

Time : 3 Hours] **[Max. Marks : 70**

Instructions : (1) Attempt **all** questions.
(2) **All** questions carry equal marks.

1. (a) Describe the revised simplex method for solving a linear programming problem.

OR

Compare the revised simplex method with simplex method and bring out the salient points of differences.

(b) Describe the dual simplex method for solving a linear programming problem.

OR

Explain with suitable examples the basic philosophy behind sensitivity analysis.

2. (a) Discuss sensitivity analysis with respect to change in the objective function coefficient C_j.

OR

Explain what is meant by a parametric linear programming problem, pointing out its chief characteristics.

(b) Explain the method of solving a zero-sum two person game as a linear programming problem.

OR

Discuss the changes in the components a_{ij} of the vector $a_j \in B$ for the given LP problem :

Max. $Z = c^T x$, subject to $Ax = b$, $x \geq 0$.

3. (a) Discuss dynamic programming with suitable examples.

OR

Explain branch and bound method in integer programming.

(b) Explain fractional programming with suitable examples.

OR

What is all integer linear programming ? Explain Gomory's all integer cutting plane method.

4. (a) Explain modified simplex method of goal programming.

OR

What is goal programming ? Why are all goal programming problems minimization problems ? Why does altering the goal priorities result in a different solution to a problem ? Explain.

(b) Explain graphical solution method for goal programming.

OR

Explain the differences/similarities between linear programming and goal programming.

5. Answer the following :

(1) If either the primal or the dual LP problem has an unbounded objective function value, then the other problem has no feasible solution.

(a) True (b) False

(2) Addition of an additional constraint in the existing constraints will cause a

(a) change in objective function coefficients c_j

(b) change in coefficients a_{ij}

(c) both (a) and (b)

(d) none of the above

(3) A change in the objective function for a non-basic variable can affect

(a) $c_j - z_j$ values of all non-basic variables

(b) $c_j - z_j$ values of all basic variables

(c) only the $c_j - z_j$ value of that variable

(d) none of the above

(4) Game theory models are classified by the

(a) number of players

(b) sum of all payoffs

(c) number of strategies

(d) all of the above

(5) What happens when maximin and minimax values of the game are same ?

(a) no solution exists (b) solution is mixed

(c) saddle point exists (d) none of the above

(6) A game is said to be _____ if lower and upper values of the game are same as well as zero.

(7) Define zero-one integer programming.

(8) The situation of multiple solutions arises with

(a) cutting plane method (b) branch and bound method

(c) both (a) and (b) (d) none of the above

(9) The corners of the reduced feasible region of an integer LP problem contains

(a) only integer solution (b) optimal integer solution

(c) only non-integer solution (d) none of the above

(10) While applying the cutting-plane method, dual simplex is used to maintain

(a) optimality (b) feasibility

(c) both (a) and (b) (d) none of the above

(11) The GP approach attempts to achieve each objective

(a) sequentially (b) simultaneously

(c) both (a) and (b) (d) none of the above

(12) In optimal simplex table of GP problem, two or more $c_j - z_j$ rows indicate

(a) unequal priority goals (b) equal priority goals

(c) priority goals (d) unattainable goals

(13) Deviational variables in GP model must satisfy the following conditions :

(a) $d_i^- \times d_i^+ = 0$ (b) $d_i^+ - d_i^- = 0$

(c) $d_i^+ + d_i^- = 0$ (d) none of the above

(14) Dynamic programming approach optimizes a sequence of interrelated decision over a period of time.

(a) True (b) False