

## MSc Sem.-2 Examination

409

Statistics

May-2025

Time : 2-30 Hours]

[Max. Marks : 70

Note: Attempt all questions.

Q.1

- (i) Describe the revised simplex method for solving a linear programming problem. [7]  
 (ii) Define primal and dual problem. Explain dual simplex method. [7]

OR

- (i) State and prove complementary slackness theorem. [7]  
 (ii) Show that if either the primal or the dual problem has a finite optimal solution, then the other one also possess the same, and the optimal values of the objective functions of the two problems are equal,  $\text{Max. } Z_x = \text{Min. } Z_y$ . [7]

Q.2

- (i) Explain how will you solve a two- person zero-sum game using linear programming. [7]  
 (ii) Discuss sensitivity analysis with respect to change in the objective function coefficient  $c_j$ . [7]

OR

- (i) Discuss sensitivity analysis with respect to change in  $(b_i)$ . [7]  
 (ii) Discuss sensitivity analysis with respect to change in the component  $a_{ij}$  when  $a_{ij} \notin B$  of matrix  $A$ . [7]

Q.3

- (i) Describe Gomory's all integer cutting plane method. [7]  
 (ii) What is fractional programming? Give some situations where you can apply fractional programming. [7]

OR

- (i) Explain Branch and Bound method. [7]  
 (ii) What is dynamic programming? Give some situations where you can apply dynamic programming. [7]

Q.4

- (i) What is goal programming? Give a procedure to formulate a goal programming model. [7]  
 (ii) Explain graphical method for goal programming. [7]

OR

- (i) Explain the differences/similarities between linear programming and goal programming. [7]  
 (ii) Explain modified simplex method of goal programming. [7]

(P.T.O)

Q.5 Answer any seven:

[14]

- (i) Give one advantage of revised simplex method.
- (ii) If dual has an unbounded solution, primal has  
 (a) no feasible solution (b) unbounded solution  
 (c) feasible solution (d) none of the above
- (iii) Duality is used to solve a LP problem by -----method in which the initial solution is infeasible.
- (iv) Define Two-person zero-sum game.
- (v) Define fair game.
- (vi) The size of the payoff matrix of a game can be reduced by using the principle of  
 (a) game inversion (b) rotation reduction (c) dominance (d) game transpose
- (vii) Define all integer programming.
- (viii) 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
- (ix) Dynamic programming approach optimizes a sequence of interrelated decision over a period of time.  
 (a) True (b) False
- (x) The deviational variable in the basis of the initial simplex table of GP problem is  
 (a) positive deviational variable (b) negative deviational variable  
 (c) both (a) and (b) (d) artificial variable
- (xi) In GP problem, a constraint having unachieved variable is expressed as:  
 (a) an equality constraint (b) a less than or equal to type constraint  
 (c) a greater than or equal to type constraint (d) all of the above.
- (xii) The GP approach attempts to achieve each objective  
 (a) sequentially (b) simultaneously (c) both (a) and (b) (d) none of the above

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