

## M.Sc Sem.-2 Examination

P - 409

Statistics

June 2022

Time : 2-00 Hours]

[Max. Marks : 50

Instruction: All questions in **Section-I** carry equal marks.  
 Attempt any **Three** questions in **Section-I**.  
 Question 9 in **Section-II** is **COMPULSORY**.

## Section-I

- Q.1 Describe the revised simplex method for solving a linear programming problem. Compare the revised simplex method with simplex method and bring out the salient points of differences. [14]
- Q.2 (A) Describe the dual simplex method for solving a linear programming problem. [07]  
 (B) State and prove complementary slackness theorem. [07]
- Q.3(A) Explain the method of solving a zero-sum two person game as a linear programming problem. [07]  
 (B) Explain payoff matrix, pure and mixed strategies in game theory. [07]
- Q. 4(A) Discuss sensitivity analysis with respect to change in  $(b_i)$ . [07]  
 (B) Discuss sensitivity analysis with respect to change in the objective function coefficient  $c_j$ . [07]
- Q.5 (A) Explain mathematical formulation of linear fractional programming problem. Also discuss importance of fractional programming in practical situations. [07]  
 (B) Explain Gomory's all integer cutting plane method. [07]
- Q.6 (A) State the principle of optimality in dynamic programming. Describe the basic features which characterize a dynamic programming problem. [07]  
 (B) Explain Gomory's mixed-integer cutting plane method. [07]
- Q.7 (A) State the general goal programming model. Give a procedure to formulate a GP model. [07]  
 (B) Explain modified simplex method of goal programming. [07]
- Q.8 (A) State some problem areas in management where goal programming might be applicable. [07]  
 (B) Explain alternative simplex method for goal programming. [07]

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**Section-II**

Q.9 Answer any eight.

[08]

- (i) Revised simplex method automatically generates the inverse of the current basis matrix and the new basic feasible solution as well.  
(a) True (b) False
- (ii) Duality is used to solve a LP problem by -----method in which the initial solution is infeasible.
- (iii) If dual has an unbounded solution, primal has  
(a) no feasible solution (b) unbounded solution  
(c) feasible solution (d) none of the above
- (iv) if  $i$ th constraint in the primal is an equality, then the  $i$ th dual variable is unrestricted in sign.  
(a) True (b) False
- (v) 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
- (vi) What do you understand by saddle point?
- (vii) When an additional variable is added in the LP model, the existing optimal solution can further be improved if  
(a)  $c_j - z_j \geq 0$  (b)  $c_j - z_j \leq 0$  (c) both (a) and (b) (d) none of the above
- (viii) 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
- (ix) 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
- (x) A non-integer variable is chosen in the optimal simplex table of the integer LP problem to  
(a) leave the basis (b) enter the basis (c) to construct a Gomory cut (d) none of the above
- (xi) The part of the feasible solution space eliminated by plotting a cut contains  
(a) only non-integer solutions (b) only integer solutions  
(c) both (a) and (b) (d) none of the above
- (xii) Dynamic programming approach  
(a) optimizes a sequence of interrelated decisions over a period of time  
(b) provides optimal solution to single period decision-problem  
(c) provides optimal solution to long-term corporate planning problems  
(d) all of the above

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- (xiii) 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.
- (xiv) In simplex method of goal programming, the variable to enter the solution mix is selected with
- (a) lowest priority row and most negative  $c_j - z_j$  value in it
  - (b) lowest priority row and most positive  $c_j - z_j$  value in it
  - (c) highest priority row and most negative  $c_j - z_j$  value in it
  - (d) highest priority row and most positive  $c_j - z_j$  value in it
- (xv) For applying a GP approach, the decision –maker must
- (a) set targets for each of the goals
  - (b) assign pre-emptive priority to each goal
  - (c) assume that linearity exists in the use of resources to achieve goals
  - (d) all of the above
- (xvi) What do you understand by Deviation variables?

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