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Register Number:

DATE:12-03-2022

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

M.Sc. STATISTICS - III SEMESTER

SEMESTER EXAMINATION: OCTOBER 2021

(Examination conducted in March 2022)

**ST DE 9420: Optimization Techniques**

**Time: 2 ½ hrs Max: 70 Marks**

This question paper has **TWO** printed pages and **TWO** parts

**SECTION – A**

**I Answer any SIX of the following: 6 x 3 = 18**

1. Define lines and hyper planes with an illustrative example.
2. Define the following terms
3. Unbounded solution (ii) Basic feasible solution (iii) Degeneracy
4. Discuss the procedure for solving unbalanced transformation problem.
5. Explain mathematical formulation of assignment problem.
6. Prove that quadratic function is convex stating necessary assumptions.
7. State Karush-Kuhn-Tucker conditions for a general non-linear programming problem.
8. Outline the procedure for solving a maximum flow problem.
9. Explain the method of determining time estimate in a PERT network defining relevant terms.

**SECTION – B**

**II Answer any FOUR of the following: 4 x 13 = 52**

1. A) Explain Gomory’s cutting plane algorithm. (6)

B) Explain simplex algorithm. How do you identify the existence of alternate solution

in simplex method? (7)

1. A) Explain dynamic programming and its characteristics. (6)

B) Discuss the effect of addition of new constraints on the optimal solution of a linear

programming problem. (7)

1. A) What is the importance of sensitivity analysis? (3)

B) Explain the stepping stone algorithm. (5)

C) Explain the Vogel’s approximation method. (5)

1. A) Explain network simplex method to solve a minimal cost flow problem. (6)

B) Discuss a procedure to solve the travelling salesman problem. (7)

1. A) Explain Wolfe's method to solve quadratic programming problem. (7)

B) Illustrate the graphical method for solving a non-linear programming problem. (6)

1. A) Explain resource allocation in network scheduling. (6)

B) Discuss the network scheduling by CPM. (7)