PVP 17

Code: **17MEMD2T2**

I M.Tech - II Semester – Regular/Supplementary Examinations
OCTOBER - 2020

ADVANCED OPTIMIZATION TECHNIQUES
(MACHINE DESIGN)

Duration: 3 hours Max Marks: 60

Answer the following questions.

1. Use Revised Simplex method to solve the following. 15 M

Maximize $F = X_1 + 2X_2 + X_3$

Subject to $2X_1 + X_2 - X_3 \leq 2$

$-2X_1 + X_2 - 5X_3 \geq -6$

$X_1, X_2, X_3 \geq 0$

(OR)

2. a) Explain the computational procedure used in dynamic programming. 6 M

b) Solve the following LP problem using Dynamic programming. 9 M

Max $Z = 8X_1 + 7X_2$

Subject to: $2X_1 + X_2 \leq 10$

$5X_1 + 2X_2 \leq 20$

$X_1, X_2 \geq 0$

3. a) State the necessary and sufficient conditions for the minimum of a function f(x). 6 M

b) A beam of uniform rectangular cross section is to be cut from a log having a circular cross section of diameter 2a. The beam has to be used as a cantilever beam (the length is fixed) to carry a concentrated load at the free end. Find the dimensions of the beam that correspond to the maximum tensile (bending) stress carrying capacity. 9 M

(OR)

4. a) Show that the Newton's method finds the minimum of a quadratic function in one iteration. 6 M

b) Use Newton's method, Minimize

$f(X_1, X_2) = X_1 - X_2 + 2X_1^2 + 2X_1X_2 + X_2^2$

By taking the starting point as $X1 = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$ 9 M

5. a) Write about working principle of genetic algorithms. 6 M

b) Discuss the Differences and similarities between genetic algorithms and Genetic Programming. 9 M

(OR)

6. a) How Random Population is generated in Genetic Programming. 8 M

b) How is the fuzzy feasible domain defined for a problem with inequality constraints? 7 M

7. Solve the following integer programming problem using Branch and Bound algorithm. 15 M

Maximize, $Z=2x_1+3x_2$

Subject to: $5x_1+7x_2 \leq 35$

$4x_1+9x_2 \leq 36$

x_1, x_2 non negative integers.

(OR)

8. Explain optimization of path synthesis of a four-bar mechanism. 15 M