PVP 17

Code: 17**MEMD2T2**

I M.Tech - II Semester - Regular Examinations – AUGUST 2018

ADVANCED OPTIMIZATION TECHNIQUES
(MACHINE DESIGN)

Duration: 3 hours Max Marks: 60

Answer the following questions.

1. Solve the following LP problem using dual simplex method: 15 M

Minimize $f = 20x_1 + 16x_2$

Subject to $2x_1 + x_2 \geq 17$

$x_1 + x_2 \geq 12$

$x_1 \geq 2.5$

$x_2 \geq 6$

(OR)

2. a) Why a dynamic programming problem is called a multi stage decision problem? 6 M

b) Illustrate the significance of sensitivity analysis with example. 9 M

3. Perform two iterations of steepest descent method to minimize the following function from the stated starting point.

$f(x_1, x_2) = 100(x_2 - x_1)^2 + (1 - x_1)^2$ from the starting point (-1.2 1.0). 15 M

(OR)

4. Using Kuhn-Tucker conditions, find the value(s) of β for which the point $x_1^* = 1, x_2^* = 2$ will be optimal to the problem: 15 M

Maximize $f(x_1, x_2) = 2x_1 + \beta x_2$

Subject to

$$g_1(x_1, x_2) = x_1^2 + x_2^2 - 5 \leq 0$$

$$g_2(x_1, x_2) = x_1 - x_2 - 2 \leq 0$$

5. a) Discuss the differences and similarities between conventional and evolutionary algorithms. 8 M

b) How random population is generated in Genetic Programming? 7 M

(OR)

6. a) Describe the terms: (i) Cross over (ii) mutation (iii) reproduction 8 M

b) Construct the objective function to be used in GAs for a minimization problem with mixed equality and inequality constraints. 7 M

7. Solve the following LP problem using the branch-and –bound method: 15 M

$$Maximize\ f = 3x_1 + 4x_2$$

Subject to

$$7x_1 + 11x_2 \leq 88, \qquad 3x_1 - x_2 \leq 12, x_1 \geq 0, x_2 \geq 0$$

$$x_i = integer, i = 1,2$$

(OR)

8. Formulate model for optimization of path synthesis of a four-bar mechanism. 15 M