Code: **MEMD2T1**

PVP 12

I M.Tech - II Semester - Regular Examinations – September 2015

ADVANCED OPTIMIZATION TECHNIQUES
(MACHINE DESIGN)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain the dual simplex method. 7 M

b) Use duality to solve the following L.P.P. 7 M

Maximize $z = 2x_1 + x_2$

Subject to constraints $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$

and $x_1, x_2 \geq 0$

2. a) Explain the travelling sales person problem. 7 M

b) Solve the following assignment problem. 7 M

	A	B	C	D
P	1	4	6	3
Q	9	7	10	9
R	4	5	11	7
S	8	7	8	5

3. a) Show that in a convex programming problem Kuhn-Tucker conditions are both necessary and sufficient conditions for an absolute minimum of the function. 7 M

b) Maximize $f = 8x_1 + 4x_2 + x_1x_2 - x_1^2 - x_2^2$ 7 M

Subject to $2x_1 + 3x_2 \leq 24$

$-5x_1 + 12x_2 \leq 24$

$x_2 \leq 5$

By applying K.T. conditions.

4. a) What is the difference between simplex algorithm and simplex method? 7 M

b) Show that Newton's method finds the minimum of a quadratic function in one iteration. 7 M

5. It is decided to use genetic algorithm to solve the following non-linear programming problem: 14 M

Minimize $(x_1 - 2.5)2 + (x_2 - 5)2$

Subject to $5.5x_1 + 2x_2^2 - 18 \leq 0$

and $0 \leq x_1, x_2 \leq 5$

The accuracy given to variables x_1 and x_2 is three and two decimal places respectively. Then,

i) How many bits are required for coding the variables?

ii) Write down the fitness function which you would be using in reproduction.

6. List out differences between G.A. and G.P. and explain in detail how to solve differential equations using G.P.

14 M

7. Solve the following by dynamic programming technique:

Maximize $z = x_1 + 9x_2$

Subject to $2x_1 + x_2 \leq 25$

$x_2 \leq 11$

$x_1, x_2 \geq 0$ 14 M

8. Explain the formulation of the following problem:

a) Optimization of path synthesis of a four bar mechanism.

b) Optimization of machining operational sequence.

14 M