Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**

PEPE103

1st Semester Back Examination – 2016-17

OPTIMIZATION TECHNIQUE

BRANCH(S): PED

Time: 3 Hours

Max Marks: 70

Q.CODE:Y937

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) How do you solve a maximization problem as a minimization problem?
b) State five engineering applications of optimization.
c) Is the decomposition method efficient for all LP problems?
d) What is the difference between a slack and a surplus variable?
e) The steepest descent directions are the best possible directions. True/False, justify.
f) What is the difference between Direct Search Methods and Descent Methods in Unconstrained optimization problem?
g) Why Powell's method is called a pattern search method?
h) What is the difference between Newton and quasi-Newton methods?
i) What is genetic algorithm?
j) Why Karmarkar's method is called an interior method?

Q2 Perform two iterations of Newton's method to minimize the function $f(x_1, x_2) = (x_1 - x_2^2)^2 + (2 - x_1)^2$ from starting point $\begin{bmatrix} -1.1 \\ 1.1 \end{bmatrix}$ (10)

Q3 Minimize f=-$3x_1$-$2x_2$ subjected to: (10)

$$x_1 - x_2 \leq 1$$
$$3x_1 - 2x_2 \leq 6$$
$$x_1 \& x_2 \geq 0$$

Using simplex method

Q4 Write the dual of the following linear programming problem: (10)
Maximize f=$50x_1$+$100x_2$
Subjected to

$$2x_1 + x_2 \leq 1250$$
$$2x_1 + x_2 \leq 1000$$
$$2x_1 + 3x_2 \leq 900$$
$$x_2 \leq 150$$

For n=2 and m=4 where $x_1 \& x_2 \geq 0$

Q5 Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ (10)

From the starting point $X = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ using Powell's method

Q6 Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ (10)

From the starting point $X = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ using Steepest Descent Method

Q7 Minimize $f(x_1, x_2) = x_1 - x_2 + 1.2x_1^2 + 2.5x_1x_2 + x_2^2$ (10)

From the starting point $X = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ using Fletcher-Reeves method

Q8 Write short notes on any (5 x 2)

a) Simulated annealing.
b) Evolutionary Programming
c) Finite Element Based Optimization.
d) Karmakar's algorithm