Total No. of Questions : 6]

SEAT No. :

P3983

[Total No. of Pages : 2

[4860] - 55

M.E. (Civil) (Structures)

OPTIMIZATION TECHNIQUES

(2008 Pattern) (Elective - IV (d))

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answer any two questions from each section.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Determine the maximum and minimum values of the function;

$F(x)=12x^5-45x^4+40x^3+5$. **[10]**

b) Define Saddle Point and its significance. **[5]**

c) State the various methods of a multivariable optimization problem with equality constraints. **[10]**

Q2) a) Explain Post Optimality Analysis and Decomposition Principle in Linear Programming. **[12]**

b) Solve the following LP problems by the revised simplex method. **13]**

Minimize $f=-5x_1+2x_2+5x_3-3x_4$

Subject to $2x_1+x_2-x_3=6$

$3x_1+8x_3+x_4=7$

$x_i>=0, i=1\text{to}4$

Q3) a) What is the difference between Fibonacci & Golden Section Method. **[7]**

b) What is the different between quadratic & cubic interpolation methods. **[7]**

c) Find the minimum of $f=x(x-1.5)$ in the interval (0, 1) to within 10% of the exact value. **[11]**

P.T.O.

SECTION - II

Q4) a) What is the unconstrained minimization problem? Give broad classification of Direct Search and Descent Methods. **[13]**

b) Differentiate Steepest Descent (Cauchy) and Newton's Method. **[12]**

Q5) a) Explain Direct and Indirect methods of constrained optimization techniques. **[13]**

b) Formulate the problem of determining the cross-sectional dimensions of the cantilever beam for minimum weight. **[12]**

Q6) a) Explain with suitable sketch architecture of artificial neural network. **[10]**

b) Explain with suitable sketch Selection, Crossover and Mutation Operator in Genetic Algorithms. **[10]**

c) Elaborate applications of Artificial Neural Network and Genetic Algorithms to Structural Engineering. **[5]**