Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 710903N **Date: 03-01-2014**

Subject Name: Engineering Optimization

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Name the different statement use in optimization problem. Explain the design vector.	**07**
	(b)	Write the different application in optimizations.	**07**
Q.2	**(a)**	What do mean by a saddle point? Explain it with suitable example	**07**
	(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 a free end. Find the dimensions of the beam that corresponds to the maximum tensile (bending) stress carrying capacity.	**07**
		OR	
	(b)	Find the extreme point of the function $F(x_1, x_2) = X_1^3 + X_2^3 + 2X_1^2 + 4X_2^2 + 6$	**07**
Q.3	**(a)**	Compare the elimination method for efficiency by putting the value n=5and n= 10 in the terms of L_n / L_o	**07**
	(b)	Explain the stepwise procedure for golden section method.	**07**
		OR	
Q.3	**(a)**	Explain the stepwise procedure for random search method.	**07**
	(b)	Find the minimum of f = x (x – 1.5) in the interval to within 10% of the exact value by using internal halving method.	**07**
Q.4	**(a)**	Explain the basic approach of penalty function method.	**07**
	(b)	Explain the algorithm for sequential linear programming method.	**07**
		OR	
Q.4	**(a)**	Minimize $F(x_1, x_2) = \frac{1}{3}(x_1 + 1)^3 + x_2$ Subject to $g_1(x_1, x_2) = -x_1 + 1 \leq 0$ $g_2(x_1, x_2) = -x_2 \leq 0$ Solve this problem using interior penlty function.	**07**
	(b)	Give the difference between sufficient and necessary condition for single point and multi point variable	**07**
Q.5	**(a)**	What do you mean by genetic algorithm? And explain how it is differ from traditional method of optimization.	**07**
	(b)	Draw a flow chart stating the working of simulated annealing.	**07**
		OR	

Q.5	**(a)**	Explain representation of design variables related to genetic algorithm.	**07**
	(b)	Explain multilayer feedback network used in ANN.	**07**

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