Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER II– EXAMINATION – WINTER - 2016

Subject Code: 2720821 **Date: 21/11/ 2016**

Subject Name: Engineering Optimization

Time: 2:30 pm to 5:00 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.)	Explain constraint surface with suitable example.	07
	b.)	Explain Hessian Matrix.	07
Q-2	a.)	Find the extreme point of the following function. $F(x_1, x_2) = x_1^3+x_2^3+2x_1^2+4x_2^2+6$.	07
	b.)	Explain Dual simplex method.	07
		OR	
	b.)	Use simplex method;	07

Maximization $Z = 0.6x_1+0.7x_2$

Subject to $2.4x_1+3x_2 \leq 1200$

$5x_1 \leq 600$

$2.5x_2 \leq 1500$

$x_1, x_2 \geq 0$

Q-3	a.)	Find the maximum of the function $f(x) = 2x_1+x_2+10$ subject to $g(x) = x_1+2x_2^2 = 3$ using the Lagrange multiplier method. Also find the effect of changing the right hand side of the constraint on the optimum value of f.	07
	b.)	Explain the Exterior penalty function method for constrained optimization problem.	07
		OR	
Q-3	a.)	Find the dimensions of a rectangular prism type box that has the largest volume when the sum of its length, width and height is limited to a maximum value of 6o inch and its length is restricted to a maximum value of 36 inch.	07
	b.)	Explain KKT condition.	07
Q-4	a.)	Explain Fibonacci Method.	07
	b.)	Explain Random walk method with direction exploitation.	07
		OR	
Q-4	a.)	Explain Golden Section method. Give meaning of “GOLDEN”.	07
	b.)	Explain any one Pattern search method.	07
Q-5	a.)	Write objective function and constraint for structural topology optimization problem.	07

	b.)	How do you select the length of the binary string to represent a design variable?	07

OR

Q-5	a.)	What is topology optimization? Explain procedure for topology optimization.	07
	b.)	Can you consider SA as a Zeroth – order search method? Explain detail with example.	07