Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER – II(New)• EXAMINATION – SUMMER - 2020

Subject Code:3720821 Date: 29/10/2020

Subject Name: Optimization Techniques

Time:02:30 PM To 05:00 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.)	Define saddle point and indicate its significance.	07
	b.)	State the necessary and sufficient condition for the maximum of multivariable function F(X).	07
Q-2	a.)	Define Characteristics of Hessian matrix.	07
	b.)	Find the extreme points of given function. $F(x_1, x_2) = x_1^3+x_2^2+2x_1^2+4x_2^2+6$.	07
		OR	
	b.)	Differentiate Random jumping, Random walk and Random walk with direction Exploitations for unconstrained optimization.	07
Q-3	a.)	Explain Lagrange multiplier method for two variable and one constraint.	07
	b.)	Explain the exterior penalty function method for constrained optimization problem.	07
		OR	
	a.)	Explain the interior penalty function method for constrained optimization problem.	07
	b.)	What is a direct root method? Differentiate Newton method and Quasi-Newton method.	07
Q-4	a.)	Find the dimension of 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 60 m and its length is restricted to maximum value of 36 m. (use transformation technique for constrained optimization problems)	07
	b.)	Explain cutting plane method. Why it's known as cutting plane method discuss with suitable examples.	07
		OR	
	a.)	Differentiate Fibonacci method and Golden Section method.	07
	b.)	Explain Dichotomous search method.	07
Q-5	a.)	What is topology optimization? Explain procedure for topology optimization.	07
	b.)	Explain procedure for GA. Define fitness function of GA.	07
		OR	
	a.)	Can you consider SA as a zeroth – order search method? Explain detail with example.	07
	b.)	Write objective function and constraints for structural topology optimization problems.	07