Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2712704 **Date:14/05/2015**

Subject Name: First course in Optimization Techniques

Time: 10:30 am to 1:00 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 the necessary and sufficient condition for relative minimum	**07**
	(b)	Find the optimum value of the function $F(x)=(X-2)^4$ and also state that whether function attains maximum or minimum.	**07**
Q.2	**(a)**	What is stationary point? Which are its types? Also define relative maximum.	**07**
	(b)	Explain convexity and concavity of function of one variable.	**07**
		OR	
	(b)	For the function $F(x)=12X^5-45X^4+40X^3+5$ find whether the function is convex or concave or neither at the point of optima.	**07**
Q.3	**(a)**	List the classification of optimization problems and explain any one.	**07**
	(b)	List the engineering applications of optimization and describe any one of them.	**07**
		OR	
Q.3	**(a)**	Discuss the necessary and sufficient condition for optimization of unconstraint function of several variables.	**07**
	(b)	Explain the Kuhn-Tucker conditions.	**07**
Q.4	**(a)**	Explain the classical optimization techniques in brief.	**07**
	(b)	Describe the advanced optimization techniques.	**07**
		OR	
Q.4	**(a)**	Minimize the function $F(x) = -3X_1^2-6X_1X_2-5X_2^2+7X_1+5X_2$ subject to $X_1+X_2=5$ by using Lagrange multiplier method.	**07**
	(b)	Explain the basic components of optimization problem.	**07**
Q.5	**(a)**	Describe the step for model building for optimization.	**07**
	(b)	List the steps to solve mathematical programming problems.	**07**
		OR	
Q.5	**(a)**	Describe the convex function of multi variables.	**07**
	(b)	Describe in brief: Linear Programming problems and also mention how it can be solved?	**07**

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