Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1722905 Date: 20-06-2014

Subject Name: Optimization Techniques

Time: 02:30 pm - 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)**	Discuss scope of optimization? Give detailed classification of optimization problems.	**07**
	(b)	For each of the following functions :(i) f(x) = 3 x^2 (ii) f(x) = -5x^2 (iii) f(x) = 2 x^2 ï x^3 .Determine if f(x) is convex, concave, strictly convex, strictly concave, all or none of these classes in the range -Đ Òx ÓĐ.	**07**
Q.2	**(a)**	Build a simplex table and describe its components.	**07**
	(b)	State necessary and sufficient conditions for stationary points. Sketch y = x^2 - 4x and find stationary points.	**07**
		OR	
	(b)	Bracket the minimum function f(x) = x^2 +54/x in the interval (0,5)	**07**
Q.3	**(a)**	Solve the NLPP Max z = 4 x_1 - x_1^2 +8 x_2 - x_2^2 subject to x_1 + x_2 = 2 x_1, x_2 Ó0 .	**07**
	(b)	Discuss three different types of optimality criteria.	**07**
		OR	
Q.3	**(a)**	Differentiate the simplex solution procedure for a maximization and minimization problem of LPP.	**07**
	(b)	State advantages of duality. Obtain dual of following LPP; Min Z = x_1 -3x_2 -2x_3 Subject to the constraints, 3x_1 -x_2+2x_3Ò7 2x_1 -4x_2 Ó12 -4x_1+3x_2+8x_3 =10	**07**
Q.4	**(a)**	Use Lagrange multipliers to optimize Min Z = 4x_1^2 + 5x_2^2 Subject to the constraints, 2x_1 +3x_2 - 6 = 0.	**07**
	(b)	Discuss Box methodôs algorithm to obtain optimal solution.	**07**
		OR	
Q.4	**(a)**	Why stochastic programming is required? Explain stochastic programming with a suitable example.	**07**
	(b)	ñPenalty method transforms a constrained problem into a sequence of unconstrained problemò. Justify the statement.	**07**
Q.5	**(a)**	Why are engineers interested in optimization? State procedure for solving optimization problems.	**07**
	(b)	Discuss Quadratic Programming for NLP.	**07**
		OR	
Q.5	**(a)**	State steps for GRG algorithms for unconstrained situation.	**07**
	(b)	Discuss a case study in dynamic programming.	**07**

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