Seat No.: _____ *Enrolment No.: _____*

GUJARAT TECHNOLOGICAL UNIVERSITY

ME –SEMESTER-II(NEW) EXAMINATION- WINTER- 2019

Subject Code: 3720821 **Date:22-11-2019**

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	Write the different application of optimizations	[07]
	B	Define: Design space, feasible region, active constraints, constrained surface and behavior constrained	[07]
Q-2	A	Explain Kuhn-Tucker condition	[07]
	B	Write necessary and sufficient condition for Lagrange Multiplier Method. Explain with a Significant example.	[07]
		OR	
	B	Find the minima of function $f(x) = x_1-x_2+2x_1^2+2\,x_1\,x_2+ x_2^2$ with starting point $X_1=(0,0)^T$ using Fletcher-Reeves Method.	[07]
Q-3	A	Explain Golden section method. Give meaning of a "GOLDEN".	[07]
	B	Explain Dual Simplex Method and its Algorithm	[07]
Q-3	A	Solve following optimization problem with using Steepest descent method to minimize $f(x) = x_1-x_2+2x_1^2+2\,x_1\,x_2+ x_2^2$ by assuming starting point as (0,0)	[07]
	B	Explain Univariate method and identify significance of it.	[07]
Q-4	A	Explain Random walk method with direction exploitation.	[07]
	B	Explain Interior penalty function method.	[07]
Q-4	A	Explain the Exterior penalty function method for constrained optimization problem.	[07]
	B	Explain Dichotomous search method.	[07]
Q-5	A	How genetic algorithm is useful for the optimization of a function? Also explain step wise procedure of GA used to optimize a function	[07]
	B	What is the principle for the working of Simulated annealing (SA)? Explain in Detail	[07]
Q-5	A	Minimize $f(x_1, x_2) = x_1-x_2+2x_1^2+2\,x_1\,x_2+ x_2^2$ starting from the point $X_1=\begin{Bmatrix}0\\0\end{Bmatrix}$. Take $\Delta x_1= \Delta x_2 = 0.8$ and $\varepsilon =0.1$ using Hookes and Jeeves' Method.	[07]
	B	Explain the following terms associated with GA: Reproduction, Crossover and mutation.	[07]

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