Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–1(Old) • EXAMINATION – SUMMER 2019

Subject Code: 2710310 Date: 08/05/ 2019

Subject Name: OPTIMIZATION TECHNIQUES FOR ENGINEERS

Time:2.30 TO 5.00 P.M Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 14

$Maximize\ Z = 4x1 + x2$

$subject\ to\ ,3x1 + x2 = 3$

$4x1 + 3x2 \geq 6$

$x1 + 2x2 \leq 4$

$x1, x2 \geq 0$

Use Big-M method to get optimal solutions.

Q.2 A Find the minimum of f = x(x - 1.5) in the interval (0.0,1.00) to within 10% of the exact value using exhaustive search method. 07

B Find the minimum of f = x(x - 1.5) in the interval (0.0,1.00) to within 10% of the exact value using interval halving method. 07

OR

B Discuss about the Kuhn-Tucker Conditions with expressions. 07

Q.3 14

$Minimize\ f(x) = 0.65 - \left[\frac{0.75}{\langle 1 + x^2 \rangle}\right] - 0.65x\tan^{-1}\frac{1}{x}$

in the interval [0,3] by the Fibonacci method using n = 6.

OR

Q.3 14

$Minimize\ f(x) = 0.65 - \left[\frac{0.75}{\langle 1 + x^2 \rangle}\right] - 0.65x\tan^{-1}\frac{1}{x}$

using the golden section method with n = 6.

Q.4 14

$Minimize\ f(x1, x2) = x1 - x2 + 2x1x2 + 2x1^2 + x2^2$

with the starting point (0,0) using Univariate Method.

OR

Q.4 14

$Minimize\ f(x1, x2) = x1 - x2 + 2x1x2 + 2x1^2 + x2^2$

with the starting point $X1 = \begin{Bmatrix}0\\0\end{Bmatrix}, \Delta X1 = \Delta X2 = 0.8\ and\ \in = 0.1.$ using Hooke and Jeeves' method.

Q.5 14

$Minimize\ f(\lambda) = 0.65 - \left[\frac{0.75}{\langle 1 + \lambda^2 \rangle}\right] - 0.65\lambda\tan^{-1}\frac{1}{\lambda}$

With the starting point λ1=0.1. Use $\in$ =0.01 for checking the convergence. Use Newton's method to optimize above function.

OR

Q.5 14

$Minimize\ f(\lambda) = 0.65 - \left[\frac{0.75}{\langle 1 + \lambda^2 \rangle}\right] - 0.65\lambda\tan^{-1}\frac{1}{\lambda}$

With the starting point λ1=0.0 and an initial step size of 0.1. Use $\in$ =0.01 for checking the convergence. Use secant method to optimize above function.

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