| Enrolment No. |
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GUJARAT TECHNOLOGICAL UNIVERSITY ME - SEMESTER-I(New course)• EXAMINATION – WINTER- 2015

| | | | /12/2015 | |
|--|------------|--|----------|--|
| Subject Name: Optimization techniques for Engineers Time:2:30 pm to 5:00 pm Total Mar Instructions: | | | 70 | |
| Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. | | | | |
| Q.1 | | Explain Genetic Algorithm and its implementation in detail with suitable example | 14 | |
| Q.2 | (a) (b) | Discuss Hooke & Jeeves method of optimization with necessary derivations. Minimize following function using Golden section search method (Two iterations). $f(x) = x^2 + \frac{54}{x}$ OR | 07 07 | |
| | (b) | Minimize following function using successive quadratic estimation method. (Two iterations). $f(x) = x^2 + \frac{54}{x}$ | 07 | |
| Q.3 | | Minimize following function using Univariate method. (Three iterations). $f(x1,x2) = x1 - x2 + 2x1^2 + 2x1x2 + x2^2$, where initial $X^1 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$ | 14 | |
| Q.3 | | OR Minimize following function using Powelløs method. (Three iterations). $f(x_1, x_2) = (x_1^2 + x_2 - 11)^2 + (x_1^2 + x_2^2 - 7)^2$, where initial $X^0 - \begin{bmatrix} 0\\4 \end{bmatrix}$ | 14 | |
| Q.4 | | Maximize following function with Big-M method. Max(Z)= $x1+2x2+3x3-x4$, Subject to: X1+2x2+3x3=15; 2x1+x2+5x3=20; x1+2x2+x3+x4=10; x1,x2,x3,x4×0. | 14 | |
| Q.4 | | OR Find the maximum of Z=6X+8Y by solving it α s dual problem. Subject to , 5X+2Y \ddot{O} 20; X+2Y×10; X,Y×0. | 14 | |
| Q.5 | | Minimize following function using Generalised Reduced Gradient Algorithm. (two iterations). $f(x1,x2) = (x1^2 + x2 - 11)^2 + (x1 + x2^2 - 7)^2$, Subject to: $g1(X) = 26 - (x1 - 5)^2 - x2^2 \ge 0$; $g2(X) = 20 - 4x1 - x2 \times 0$; $x1,x2 \times 0$ | 14 | |
| Q.5 | (a) | OR Minimize following function using Rosenbrock α s method. (two iterations). | 07 | |
| | (b) | $f(x1,x2) = x1 - x2 + 2x1^{2} + 2x1x2 + x2^{2},$ Minimize following function using Fletcher Reevøs conjugate Gradient method. (two iterations). $f(x1,x2) = x1 - x2 + 2x1^{2} + 2x1x2 + x2^{2}$ | 07 | |
