B.E. Eighth Semester (Computer Science & Engineering) (C.B.S.)

# Elective - III : Optimization Techniques

P. Pages : 2 **KNT/KW/16/7612**

Time : Three Hours * 0 3 4 9 * Max. Marks : 80

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

**1.** a) Explain following: **10**

1) Optimal design of truss structure.

2) Optimal design of a car suspension.

b) Explain Intelligent system design. **3**

**OR**

**2.** a) Write a short note on scheduling & Routing. **5**

b) Explain classification of optimization Algorithm. **8**

**3.** What are disadvantages of local optimization? Explain local optimization in detail? **13**

**OR**

**4.** Explain global optimization point in detail. Explain all methods of global optimization. **13**

**5.** a) Write an algorithm for Exhaustive search method. **6**

b) Find cube-Root of 10 using cube root finding method. **8**

**OR**

**6.** a) Minimize the function $f(x) = x^2 + 54/x$ using Fibonacci search method. **8**

b) Explain point-Estimation method in detail. **6**

**7.** a) Explain Newton's method in detail. **6**

b) Consider the unconstrained function $f(x_1, x_2) = (x_1^2 - x_2^2)^2 + x_2^2$ **8**
Perform five iteration of unidirectional search using the golden section search method along the following search direction.
$S = (2,1)^T$ from the point $(-5,5)^T$ up to the point $(5,0)^T$.

**OR**

**8.** a) Consider the four variable minimization problem. **8**
$f(x_1, x_2, x_3, x_4) = (x_1 + 2x_2 - 1)^2 + 5(x_3 - x_4) + (x_2 - 3x_3)^4 + 10\,(x_1 - x_4)^4$
Perform two iteration of following algorithms from point.
$x^{10)} = (2,-1,0,1)^T$ using Hooke-Jeeves method with $(1,1,1,1,)^T$.

b) Explain Powell's conjugate direction method in detail. **6**

**9.** a) Minimize **8**
$(x_1^2 + x_2 - 11)^2 + (x_1 + x_2^2 - 7)^2$
subject to $(x_1 - 5)^2 + x_2^2 - 26 \geq 0,\ x_1, x \geq 0$
Using penalty function method.

b) Explain transformation method in detail. **5**

**OR**

**10.** Explain following.

a) Variable Elimination method algorithm. **6**

b) Complex search method algorithm. **7**

**11.** a) Explain Artificial variables & Dual phase method. **6**

b) Explain Duality theory in linear programing. **7**

**OR**

**12.** a) Explain Big-M method in detail. **6**

b) Explain sensitivity Analysis of linear programming. **7**

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