

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

00333

December, 2016

**BIMEE-022 : OPTIMIZATION FOR ENGINEERING
DESIGN**

Time : 3 hours

Maximum Marks : 70

***Note :** Answer any **five** questions. All questions carry equal marks. Assume missing data suitably. Use of scientific calculator is permitted.*

1. (a) Differentiate between single and multi-variable optimization giving suitable examples. 7
- (b) Discuss the various phases involved in solving the problem of optimization in engineering design. 7
2. Discuss the differences and similarities between GA and conventional optimization methods. 14
3. Describe the algorithm of variable elimination method and random search method for solving multi-variable constrained problem in optimization. 14

4. Use simplex method to solve the following LPP : 14

$$\text{Minimize } z = x_1 + x_2$$

subject to

$$2x_1 + x_2 \geq 4$$

$$x_1 + 7x_2 \geq 7$$

$$x_1, x_2 \geq 0.$$

5. Explain the concept of duality in LPP. Also explain the Dual Simplex Method with the help of a simple example. 14

6. (a) Define Dual of a Linear Programming Problem (LPP). 4

- (b) Find the dual of the following LPP and solve it : 10

$$\text{Minimize } Z = 4X_1 + 6X_2 + 18X_3$$

subject to

$$X_1 + 3X_2 \geq 3$$

$$X_2 + 2X_3 \geq 5$$

$$X_j \geq 0 \text{ for } j = 1, 2, 3.$$

7. (a) Describe branch and bound method with the help of an example. 7
- (b) Explain stochastic processes with suitable examples. 7