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BIMEE-022

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

00046

Term-End Examination

June, 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 allowed.*

1. (a) Discuss how optimization techniques are useful in executive decision making.

(b) With the help a suitable example, explain the role of calculus in solving optimization problems. 7+7

2. Explain Genetic Algorithm (GA) with a neat flow chart and discuss the effect of various parameters involved in GA. *14*

3. (a) What is the role of optimization in Engineering Design ? Explain giving suitable examples.

(b) Briefly explain the economic interpretation of a dual of LPP. 7+7

4. Solve the following Linear Programming Problem (LPP), using Simplex method : *14*

Maximize $z = 3x_1 + 12x_2$

subject to

$$2x_1 + 4x_2 \leq 7$$

$$5x_1 + 3x_2 \leq 15$$

$x_1, x_2 \geq 0$ and are integers.

5. (a) Describe the typical characteristics of a constrained problem. Explain the direct and indirect methods for constrained optimization.

(b) Explain the economical interpretation of a dual of Linear Programming Problem (LPP). *7+7*

6. Solve the following integer linear programming problem : *14*

Maximize $z = 4x_1 + x_2$

subject to

$$4x_1 + 2x_2 \leq 7$$

$$3x_1 + 5x_2 \leq 15$$

x_1, x_2 are non-negative integers.

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Golden Section Method

(b) Goal Programming

(c) Cutting Plane Method