| **BIMEE-022**

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

Term-End Examination

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June, 2019

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) Discuss how optimization techniques can be useful in Engineering Design. Give suitable examples.

    (b) What do you understand by deterministic and probabilistic models used in optimization ? Explain them briefly.   7+7

2. (a) With the help of suitable example, differentiate between single and multivariable optimization.

    (b) Explain the graphical method for solving a linear goal programming problem.   7+7

3. Solve the following linear programming problem (LPP), using simplex method : *14*

Maximize $z = 3x_1 + 12x_2$

subject to

$$2x_1 + 4x_2 \leq 7$$
$$5x_1 + 3x_2 \leq 15$$
$$x_1, x_2 \geq 0; \text{ and are integers.}$$

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

(b) Discuss the economical interpretation of a dual of linear programming problem (LPP). 7+7

5. Discuss the similarities and differences between GA and conventional optimization techniques. *14*

6. Write short notes on any *two* of the following : 7+7

(a) Branch and Bound Method

(b) Goal Programming

(c) Golden Section Method