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BIMEE-022

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

00353

Term-End Examination

June, 2018

BIMEE-022 : OPTIMIZATION FOR ENGINEERING DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***five*** *questions. All questions carry equal marks. Use any suitable data, if missing.*

1. (a) What is meant by optimization ? Explain how optimization helps in engineering design. *7*

(b) Explain the following with the help of example : *7*

(i) Objective function

(ii) Optimum solution

2. State the necessary and sufficient condition for the unconstrained minimization of a function. Discuss the reasons why study of unconstrained minimization is important for engineering design. *14*

3. Minimise

$$z = x_1 - 3x_2 + 2x_3$$

subject to

$$3x_1 - x_2 + 2x_3 \leqslant 7$$

$$-2x_1 + 4x_2 \leqslant 12$$

$$-4x_1 + 3x_2 + 8x_3 \leqslant 10$$

$$x_1, x_2, x_3, \geqslant 0$$ *14*

4. Solve the following integer programming problem :

Max $z = 7x_1 + 9x_2$

subject to

$$-x_1 + 3x_2 \leqslant 6$$

$$7x_1 + x_2 \leqslant 35$$

$x_1, x_2, \geqslant 0$ and integers. *14*

5. (a) Explain the concept involved in the Gomory's cutting plane method. *7*

(b) With the help of an example, describe the graphical method to solve linear programming problem. *7*

6. (a) Explain the concept involved in branch and bound algorithm used for solving integer programming problem. *7*

(b) Discuss the application of non-traditional algorithms in industries. Give any two examples. *7*

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

(a) Goal Programming

(b) Golden Section Method

(c) Genetic Algorithm
