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BIMEE-022

00494

B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

June, 2014

BIMEE-022 : OPTIMIZATION FOR ENGINEERING DESIGN

Time : 3 hours *Maximum Marks : 70*

Note : *(i)* *Answer any five questions.*
(ii) *Use any suitable data if missing.*
(iii) *Each question carries equal marks.*

1. (a) What is Optimization ? Give its applications in engineering. 7
   (b) Explain the following : 7
   (i) Objective function
   (ii) Constraints
   (iii) Merit function

2. Explain the concept of duality in LPP. Also explain the Dual Simplex Method. 14

3. State the necessary and sufficient condition for the unconstrained minimum of a function. Give three reasons why the study of unconstrained minimization is important ? 14

4. Solve the following problem by using cutting plane algorithm : 14
   Maximise $z = 3x_1 + 12x_2$
   Subjected to
   $2x_1 + 4x_2 \leq 7$
   $5x_1 + 3x_2 \leq 15$
   $x_1, x_2 \geq 0$ and are integers.

5. Use simplex method to solve the following LPP. **14**

Minimise $Z = x_1 + x_2$

Subjected to

$2x_1 + x_2 \geq 4$

$x_1 + 7x_2 \geq 7$

$x_1, x_2 \geq 0$

6. (a) Discuss typical characteristics of constrained problem. Explain in brief direct and indirect methods. **7**

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

7. Write short notes on **any two** of the following : **7x2=14**

(a) Golden Section Method

(b) Genetic Algorithm

(c) Goal Programming