

B.Tech. V Semester (Main & Back) Examination, Nov./Dec. - 2017
 Electronic Instrumentation & Control Engineering
 5EI6.1A Optimization Techniques

Time : 3 Hours

Maximum Marks : 80
 Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) What is optimization technique? Write Engineering application of optimization technique. (8)
- b) Explain following with suitable example.
 - i) Objective function (2)
 - ii) Simplex Method (6)

OR

1. a) Solve the following LPP by graphical method. (8)
 Maximize $Z = 5x_1 + 6x_2$
 subject to
 $x_1 + x_2 \leq 10$
 $x_1 - x_2 \geq 3$
 $5x_1 + 4x_2 \leq 35$
 $x_1 \geq 0$ and $x_2 \geq 0$
- b) Solve the following LPP by Dual simplex method. (8)
 Maximize $Z = -4x_1 - 8x_2 - 9x_3$
 subject to
 $2x_1 - x_2 - x_3 \leq 1$
 $3x_1 - 4x_2 + x_3 \leq 3$
 $-5x_1 - 2x_2 \leq -8$
 $x_1, x_2, x_3 \geq 0$

Unit - II

2. What is The Revised Simplex Method? Solve following using Revised Simplex Method. (16)

$$\text{Max } Z = 2x_1 + x_2$$

subject to

$$3x_1 + 4x_2 \leq 6$$

$$5x_1 + x_2 \leq 3$$

$$\text{and } x_1, x_2 \geq 0$$

OR

2. a) What is digeneracy in transportation problem? Explain how to solve the digeneracy in transportation problem. (8)
- b) Solve the following assignment problem for minimization. (8)

	1	2	3	4	5
A	8	8	8	11	12
B	4	5	6	3	4
C	12	11	10	9	8
D	13	21	18	17	15
E	10	11	10	8	12

Unit - III

3. a) What is the objective of the Critical Path Method (CPM)? Explain using suitable example. (8)
- b) Describe the role and application of PERT/CPM for project scheduling. (8)

OR

3. a) Explain Network analysis model for Shortest-Path Problem. (10)
- b) What is the least expensive way to speed up a project to meet a targeted completion time? (6)

Unit - IV

4. a) What is Unconstrained optimization? Explain types of one-Dimensional Unconstrained Optimization Techniquesone. (8)
- b) What is Constrained optimization? Classify methods of Constrained optimization. (8)

OR

4. a) What do you mean by direct search method employed in solving the Non-linear optimization problems. Give a brief of the method. (8)
- b) Find the minimum of the function $f = x^5 - 5x^3 - 20x + 10$ using Fibonacci method, in the interval (0, 5). (8)

Unit - V

5. a) What do you mean by multi-stage decision in dynamic methods of optimization problems. Give a brief of any one method. (8)
- b) Solve the following LP problem by dynamic programming : (8)
- Max $Z = 6x_1 + 5x_2$
- subject to
- $x_1 \leq 2, x_2 \leq 6$
- $6x_1 + 2x_2 \leq 18$
- and $x_1, x_2 \geq 0$

OR

5. a) What do you mean by dynamic programming in optimization problems. Give a brief of the method. (8)
- b) What is the principle of optimality? How to convert an initial value problem and final value problem? (8)
