Code No: **R41028** **R10** **Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, March – 2017**

**OPTIMIZATION TECHNIQUES**

**(Open Elective Except for Electrical and Electronics Engineering)**

**Time: 3 hours** **Max. Marks: 75**

**Answer any FIVE Questions**
**All Questions carry equal marks**
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1 a) Explain a single variable optimization technique. [8]

b) Find the maxima and minima of

$$f(x) = \frac{x^4}{(x-1)(x-3)^3}$$ [7]

2 a) State and explain the necessary and sufficient conditions for existence of relative optima in case of multivariable optimization with constraints. [8]

b) Find the dimensions of a rectangular parallelepiped with largest volume whose sides are parallel to the coordinate planes, to be inscribed in the ellipsoid. [7]

3 Max Z = 2x1 + 4x2 + 2x3
S.t. 2x1 + x2 - x3 ≤ 3
- 2x1 + x2 - 5x3 ≥ - 6
4x1 + x2 + x3 ≤ 6
x1, x2, x3 ≥ 0. [15]

4 a) Discuss simplex algorithm wrt LPP [7]

b) Solve the following LPP by simplex method
Max Z = 12x1 + 15x2
subject to 2x1 + 5x2 ≤10
4x1 + 3x2 ≤ 12
x1, x2 ≥ 0. [8]

5 a) Compare transportation problem with simplex method [7]

b) Solve the following transportation problem

| | | | | Availability |
|---|---|---|---|---|
| 9 | 16 | 15 | 9 | 15 |
| 2 | 1 | 3 | 5 | 25 |
| 6 | 4 | 7 | 3 | 20 |
| Requirement 10 | 15 | 25 | 10 | |

[8]

6 a) Draw the flowchart for the Fletcher and Reeves method and explain about each block. [8]

b) What are the advantages of this method over other methods? [7]

7 Classify the constrained optimization techniques and briefly explain each technique. [15]

8 a) What is a multistage decision problem? [7]

b) State two engineering examples of Serial Systems that can be solved by dynamic programming. [8]