Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech., Winter2017 - 18Examination

Semester: 2 **Date: 10/01/2018**

Subject Code: 03203153 **Time: 2:00 pm to 4:30 pm**

Subject Name: Optimization Techniques in Electrical Engineering **Total Marks: 60**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Explain optimization concept with its standard form of linear programming. **(05)**

B) Explain the principle of optimality. **(05)**

C) Write the dual of the given problem: **(05)**

Min $Z = x_1 + x_2 + x_3$,

Subject to

$$x_1 - 3x_2 + 4x_3 \leq 5$$
$$x_1 - 2x_2 \leq 3$$
$$2x_2 - x_3 \geq 4$$
$$x_1, x_2, x_3 \geq 0$$

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) Write advantages and applications of Duality.

B) Explain technique of revised simplex method.

C) Explain Ant Colony Optimization technique in brief.

D) What is Golden Search Technique? Discuss in brief.

Q.3 A) Explain graphical method. Also list drawbacks of graphical method. **(07)**

B) A manufacturing firm produces two machine parts using induction motor, CNC machine and grinding machine. Different machining times required for each part, machine times available on different machines and the profit on each machine part is given as follows: **(08)**

Determine the equations that express the above table, assuming various variables along with the graph representing these equations.

Type of Machine	Machine Part 1	Machine Part 2	Max time available per week (min)
Induction motor	10	5	2500
CNC machine	4	10	2000
Grinding machine	1	1.5	450
Profit per unit	Rs. 50	Rs. 100	

OR

B) Define the following terms: **(08)**

1. Basic Solution
2. Basis
3. Basic Feasible Solution
4. Optimal Solution

Q.4 A) Explain Bees algorithm in detail with necessary algorithm. **(07)**

OR

A) Explain Cuckoo Search Technique with proposed logic and algorithm. **(07)**

B) Obtain optimized point by graphical method. **(08)**

$$Z = 3x1 + 5x_2$$

$$x_1 \leq 4$$

$$2x_2 \leq 12$$

$$3x_1 + 2x_2 \leq 18$$

$$x_1, x_2 \geq 0$$