Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

M.Tech, Winter 2018 - 19 Examination

Semester:1 **Date: 13/12/2018**
Subject Code: 203209135 **Time: 10:30 AM to 1:00 PM**
Subject Name: Structural Optimization **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) Write a short note on Engineering Optimization. **(05)**

B) What are the various methods of Optimization Techniques? **(05)**

C) Enlist various Engineering applications of Optimization. **(05)**

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

A) What do you understand by Statement of an Optimization Problem? Also describe the following: Design Vector, Design Constraints & Objective Function.

B) Give a brief description of Univariate Optimization.

C) Explain the concept of Dynamic Programming.

D) Mention the significance of simplex method. Write steps to be followed in simplex method.

Q.3 A) Use graphical method to solve the following LPP: **(07)**

Maximize $Z=3x_1+9x_2$

Subject to $x_1+4x_2\leq 8$

$x_1+4x_2\leq 4$ and $x_1,x_2\geq 0$

B) Explain Quasi Newton Algorithm. **(08)**

OR

B) Explain Conjugate Gradient with an Algorithm. **(08)**

Q.4 A) Solve the LPP by simplex method: **(07)**

Maximize $Z=4x_1+3x_2$

Subject to $2x_1+x_2\leq 1000$

$x_1+x_2\leq 800$

$x_1\leq 400$

$x_2\leq 700$ and $x_1,x_2\geq 0$.

OR

A) A ship is to be loaded with stock of 3 items. Each unit of item 'n' has a weight of w_n (per unit) and can provide return (in thousand rupees) 'r_n'. The maximum cargo weight the ship can take is 4 tons and the details of the three items are as follows: **(07)**

Item(n)	Weight(w_n)	Return (r_n)
1	2	31
2	3	47
3	4	44

B) What is Linear Programming? Describe Mathematical Model of LPP. **(08)**