

Seat No: _____

Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter - 2019- 20 Examinations

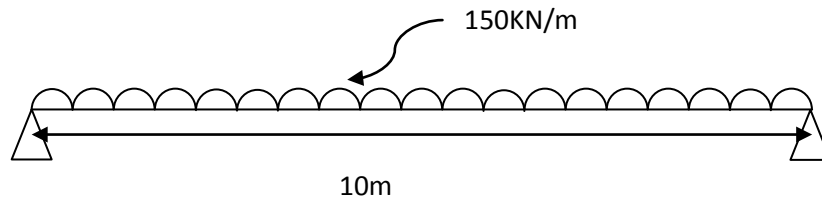
Semester: 2
Subject Code: 203209152
Subject Name: FEM in Structural Engineering

Date: 16/12/2019
Time: 2.00 pm to 4.30 pm
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) Give merits and demerits of Finite Element Method along with its stepwise procedure of solution. (05)
- B) Explain the terms (i) Constant Strain Triangle (CST) (ii) Linear Strain Triangle (LST). (05)
- C) What are Shape Functions? (05)
- Q.2 Answer the following questions.** (Attempt all four) (Each five mark) (15)
- (A) Write a detail on "Process of Discretization" on finite element analysis with examples.
- B) Explain Plane stress and Plane strain with examples?
- C) What are the types of elements?
- D) Name the softwares based on Finite Element Method and what are its applications.
- Q.3 A) Distinguish between a plane stress and plane strain problem with suitable examples. Also give their strain stress linking matrices. (07)
- B) Discuss the use of Pascal's triangle for selection of the displacement function. (08)
- Also give the various examples for the same giving convergence criteria.
- Q.4 (A) Using FEM, determine translation and rotation and reactions for a bar (07)
- subjected to axial force shown in Fig.1. The cross sectional area and E is unity.



- (B) Determine unknown displacements using stiffness matrix method for the following (08)
- beam. Take E and I constant for all members of beam.



OR

- Q-4 (A) Enlist the steps involved in the design of bridge in STAAD PRO. (08)