

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

M.Tech. I Year II Semester Regular & Supplementary Examinations July-2025

FEM IN STRUCTURAL ENGINEERING

(Structural Engineering)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 Explain the different steps involved in FEM. CO1 L1 12M

OR

- 2 What is potential energy? State and explain the principle of minimum potential energy. CO1 L1 12M

UNIT-II

- 3 Derive Stiffness matrix for 1D – two noded linear bar element. CO2 L2 12M

OR

- 4 Briefly explain shape function and derive shape function for 1D – three noded line element. CO2 L2 12M

UNIT-III

- 5 Derive shape functions for four noded rectangular elements. Use natural co-ordinate system. CO3 L2 12M

OR

- 6 Write and briefly explain the different types of elements for plain stress and plain strain analysis. CO3 L2 12M

UNIT-IV

- 7 Explain the terms isoparametric, sub parametric and super parametric elements. CO4 L2 12M

OR

- 8 Explain the formulation of 4-noded 2-D isoparametric quadrilateral element. Derive the strain displacement matrix and stiffness matrix. CO4 L2 12M

UNIT-V

- 9 Explain about different types of 3-D solid elements. CO5 L2 12M

OR

- 10 What are the three dimensional stresses and strains explain the relation between them. CO5 L2 12M

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