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

I M.Tech II Semester Supplementary Examinations March-2022

FEM IN STRUCTURAL ENGINEERING

(Structural Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 What is potential energy? State and explain the principle of minimum potential Energy. L2 12M

OR

- 2 Using Rayleigh-Ritz method determine the expression for deflection and B.M in a SSB Subjected to UDL over entire span. Find the deflection and moment at mid span and Compare with exact solution. L3 12M

UNIT-II

- 3 A 2 Noded truss element having the nodal displacement are $u_1=5\text{mm}$ and $u_2=8\text{mm}$ at the ends. Calculate the displacement at $x=L/4, L/3$ and $L/2$. L3 12M

OR

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

UNIT-III

- 5 Write and briefly explain the different types of elements for plain stress and plain strain analysis. L1 12M

OR

- 6 Derive the shape function for the Constant strain triangle element (CST) element. L3 12M

UNIT-IV

- 7 Derive the Jaccobian matrix for 4-noded rectangular element. L2 12M

OR

- 8 Explain the formulation of 4-noded 2-D isoparametric quadrilateral element. Derive the strain displacement matrix and stiffness matrix. L3 12M

UNIT-V

- 9 Explain about different types of 3-D solid elements. L1 12M

OR

- 10 Explain about Hexahedral Isoparametric elements. L2 12M

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