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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Supplementary Examinations February-2022
FINITE ELEMENT METHODS IN CIVIL ENGINEERING
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 Determine the deflection at center of the simply supported beam of span length 'l' subjected to a concentrated load at its mid-point use Rayleigh-Ritz method. **12M**

OR

- 2 Explain the plane stress condition. Write the constitutive relations for the plane stress condition. **12M**

UNIT-II

- 3 Explain different types of elements in FEM. **12M**

OR

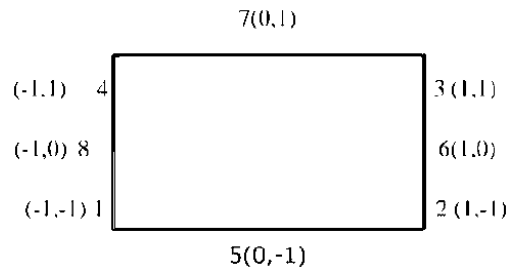
- 4 a Explain the Geometric invariance. **6M**
b Explain the Co-ordinate system. **6M**

UNIT-III

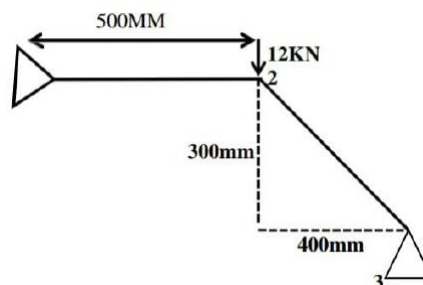
- 5 Derive the shape functions for one dimensional bar element. **12M**

OR

- 6 Derive shape functions for 8-noded rectangular element by using natural co-ordinate system. **12M**

**UNIT-IV**

- 7 For two bar truss as shown in figure. Determine the displacement at node 2 and stresses in both elements. $E=70\text{GPa}$, $A=200\text{mm}^2$ **12M**



OR

- 8 Derive strain -displacement relationship in matrix formulation. **12M**

UNIT-V

- 9 a Explain the Iso - parametric representation. **6M**
b Explain the Formulation of CST element. **6M**

OR

- 10 Explain about formulation of 4-noded Iso-parametric Axi - Symmetric element. **12M**

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