CBCS Scheme **15CV664**

Model Question paper

Sixth Semester B.E. Degree Examination, May-June 2018

Finite Element Method Of Analysis

Time 3hrs **Max Marks 80**

Module 1

1.

a) Explain the terms plain stress and plain strain. Also give constitutive laws for these cases**. (8 marks).**

b) Mention the advantages and disadvantages of finite element method.**(8 marks).**

OR

2.

a) Mention the steps involved in Rayleigh Ritz method for determining deflection of a beam.**(8 marks).**

b) Determine the deflection of a cantilever beam of length 'L' and loaded with a vertical load 'P'at the free end by Rayleigh Ritz method. Use a trial function**(8 marks).**

$$\mathbf{y} = a[1 - \frac{cos\pi x}{2L}]$$

Module 2

3.

a) What are convergence and compability requirements of a good displacement model? **(8 marks).**

b) Define shape functions. Mention their properties?**(8 marks).**

OR

4.

a) Explain the following?

I. Local co-ordinates.

II. Global co-ordinates.

III. Natural co-ordinates.**(8 marks).**

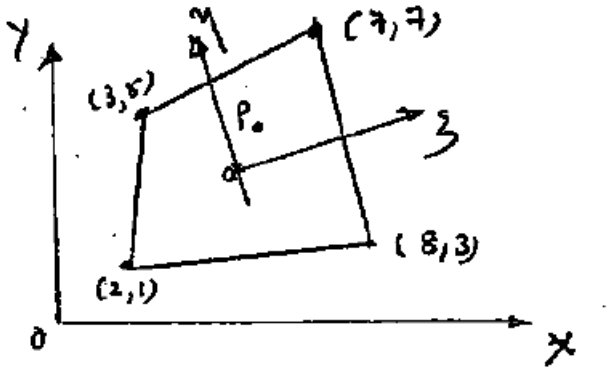
b) Derive the shape function for a 3 noded bar element in terms of natural coordinates. Plot the variation of shape function?**(8 marks).**

Module 3

5.

a) Define Isoparametric, sub parametric and super parametric elements. Explain any one briefly? **(8 marks).**

b) Determine Cartesian coordinate for the point P (€ = ½ , ή= 0.6) shown in Fig



(8 marks).

OR

6.

a) Derive the Jacobian matrix for a linear quadrilateral element.**(16 marks).**

Module 4

7.

a) Determine the nodal displacements for the truss shown in fig?**(16 marks).**

$A_1 = 1200\ mm^2$
$A_2 = 1000\ mm^2$
$E = 2 \times 10^5\ N/mm^2$

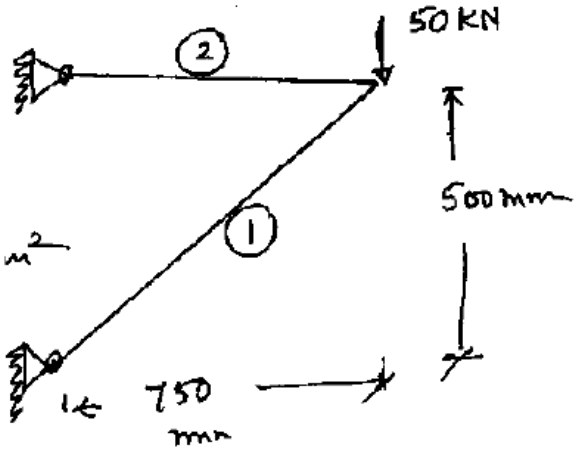
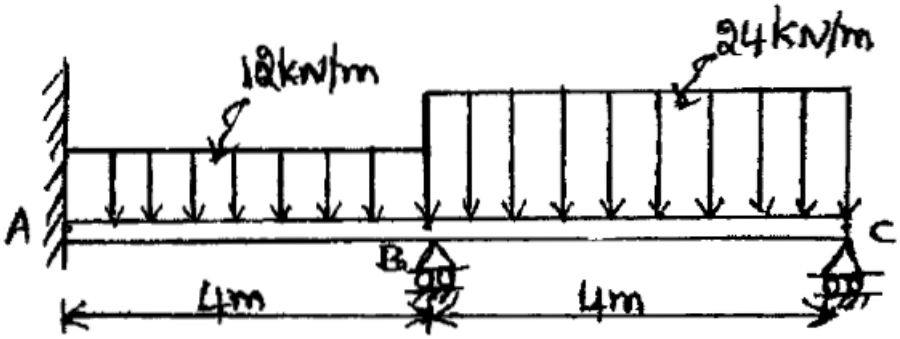


Fig.Q4(b)

OR

8.

a) Determine the nodal displacements at the joints for the beam shown in Fig? Take E= 200GPa, I= $4x10^6$ mm^4.**(16 marks).**



Module 5

9.

a) Write short notes on:
   I. Softwares used in finite element analysis.
   II. Hermition polynomials. **(8 marks).**

b) Explain the terms material non linearity and geometrical non linearity. **(8 marks).**

OR

10.

a) Briefly explain the stiffness matrix formulation of MINDLIN'S plate element. **(16 marks).**