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10CV841

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Finite Element Analysis

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. Missing data, if any, may be suitably assumed.

PART – A

1 a. Explain the steps involved in the finite element method of analysis.   **(10 Marks)**
   b. State four differences between FEM and exact method.   **(04 Marks)**
   c. Explain plane stress and plane strain problems with example.   **(06 Marks)**

2 a. Explain briefly Galerkin's method.   **(06 Marks)**
   b. Using Rayleigh-Ritz method, determine the expressions for displacement and stress in a
   c. fixed bar subjected to an axial force P and also plot the same.   **(14 Marks)**

3 a. Explain (i) Local coordinates   (ii) Global coordinates.   **(04 Marks)**
   b. Find the displacements at nodal points and stress in members of the plane truss loaded as
      shown in the Fig.Q3(b). Assume area = 2000 mm^2 and E = 200 GPa.   **(16 Marks)**
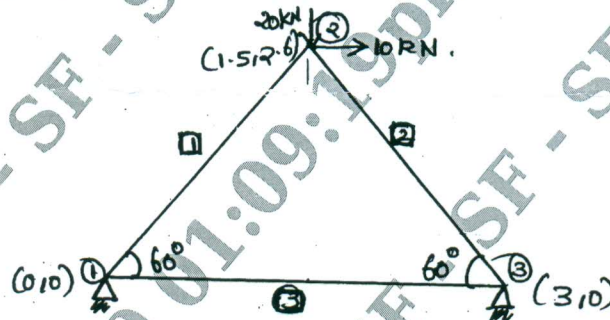

Fig.Q3(b)

4 a. Explain the convergence and compatibility requirements of displacement.   **(10 Marks)**
   b. Mention the advantages and disadvantages of finite element analysis.   **(10 Marks)**

PART – B

5 a. Write a note on different elements used in finite element analysis.   **(10 Marks)**
   b. Determine the shape function of four noded rectangular element.   **(10 Marks)**

6 Find the shape function of beam element using Hermitian polynomial   **(20 Marks)**

7 a. What are isoparametric, subparametric and supermarametric elements?   **(08 Marks)**
   b. Show that the convergence requirements can be satisfied for an isoparametric element if
      $$\sum N_i = 1$$ **(12 Marks)**

8 a. Write a note on preprocessing and post processing infinite element analysis. **(08 Marks)**
   b. Write the structure of computer program to explain finite element analysis.   **(12 Marks)**

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