Register Number: ……..

B.E., DEGREE EXAMINATIONS: APRIL/MAY 2013

Sixth Semester

CIVIL ENGINEERING

CEE118**:** Structural Analysis II

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. A pin-jointed frame has 4 joints. How many members will be there, if it is indeterminate to one degree?
   a) 2 b) 5 c) 6 d) 9
2. The kinematic indeterminacy of a single bay portal frame fixed at the base is
   a) one b) two c) Three d) zero
3. A cantilever of span ‘L’ and a load ‘W’ at the free end. The flexibility of the beam is
   a) $L^3/3EI$ b) $3EI/ L^3$ b) $L^2/6EI$ d) $6EI/ L^3$
4. The order of the flexibility matrix for a structure is
   a) Equal to the number of redundant forces
   b) More than the number of redundant forces
   c) Less than the number of redundant forces
   d) Equal the number of redundant forces plus three
5. In a linear elastic structural element
   a) Stiffness is directly proportional to flexibility
   b) Stiffness is inversely proportional to flexibility
   c) Stiffness is equal to flexibility
   d) Stiffness and flexibility are not related
6. A propped cantilever beam has uniform section, span ‘L’ and flexural rigidity ‘EI’. The stiffness co-efficient corresponding to the rotation at the propped end is
   a) L/3EI
   b) L/4EI
   c) 3EI/L
   d) 4EI/L
7. The process of subdividing the given body into a number of elements which results in an equalent body of finite elements is
   a) Convergence
   b) Divergence
   c) Discretisation
   d) assembling
8. Element aspect ratio is
   a) The largest dimension of the element to the smallest dimension
   b) The smallest dimension of the element to the largest dimension
   c) The largest volume of the element to the smallest volume
   d) The smallest volume of the element to the largest volume
9. The shape of the cable suspended between two points
   a) catenary b) parabolic c) circular d) Depends upon loads

10. In a determinate space truss, the relationship between the number of members'm' and number of joints 'n' is

a) m=2j-3 b) m <2j-3

c) m=3j-6 d) m>3j-6

PART B (10 x 2 = 20 Marks)

11. What are the different methods of analysis of indeterminate structures.
12. Define kinematic indeterminacy or Degree of Freedom (DOF)
13. Define a primary structure.
14. Differentiate between determinate and indeterminate structures.
15. Compare flexibility method and stiffness method.
16. List the properties of the stiffness matrix
17. What is meant by discretization?
18. List out the advantages of FEM.
19. Give some examples of beams curved in plan.
20. Define tension coefficient of a truss member.

PART C (5 x 14 = 70 Marks)

21. a) Define internal and external indeterminacies. Write the formulae for degree of indeterminacy for pinjointed truss (2D Truss), rigid frames/plane rigid frames (2D Frames), space truss (3D Truss), space frames (3D Frame).

(OR)

b) Explain the different methods of analysis of indeterminate structures.

22. a) Analyse the continuous beam shown in Fig.1 BY flexibility method. Draw bending moment and shear force diagram. Assume EI to be constant for all members.

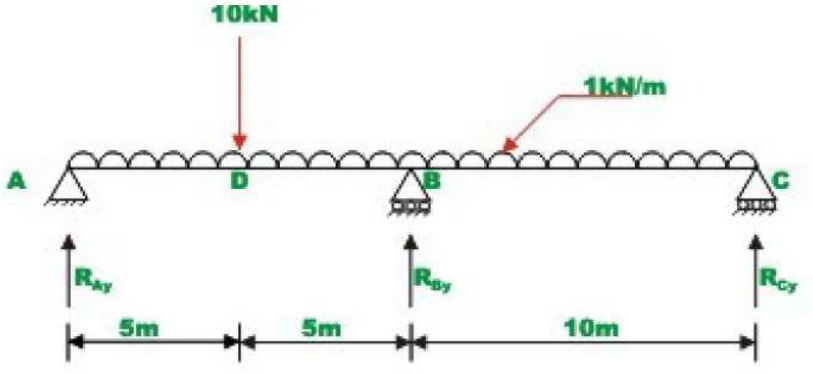

Fig.1

(OR)

b) Analyse the propped cantilever beam shown in Fig.2. Draw BMD and SFD by the flexibility method.

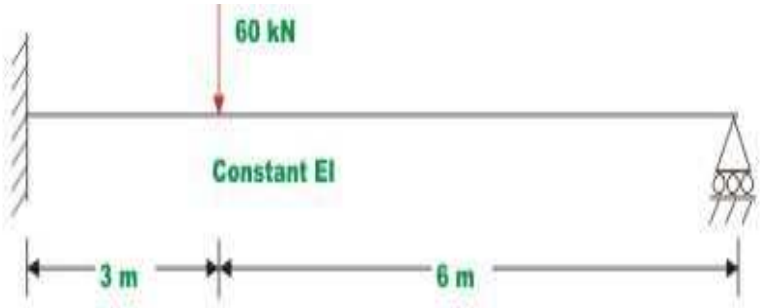

Fig 2

23. a) Analyze the continuous beam shown in Fig.3 by stiffness method. Assume that the flexural rigidity for all members is the same. Draw bending moment diagram.

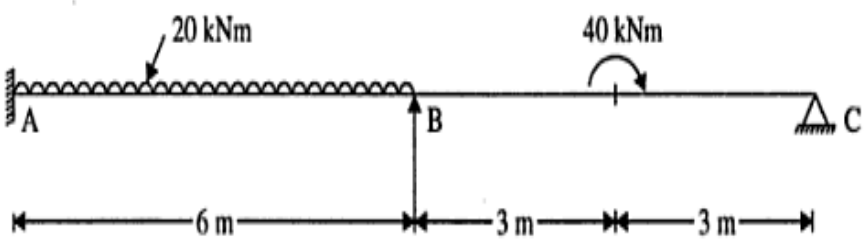

Fig.3

(OR)

b) Analyze the plane frame shown in Fig.4 by stiffness method.

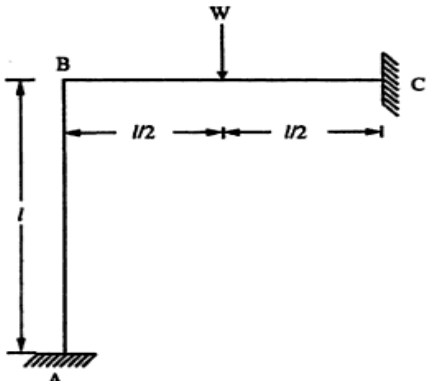

Fig.4

24. a) (i) Briefly explain a few terminology used in FEM. (7)

(ii) Explain the basic steps in FEM? (7)

(OR)

b) Explain different types of elements used in FEM with examples.

25. a) Analyse the space truss shown in fig.5 by the method of tension co-efficients and determine the forces in the members of the truss.

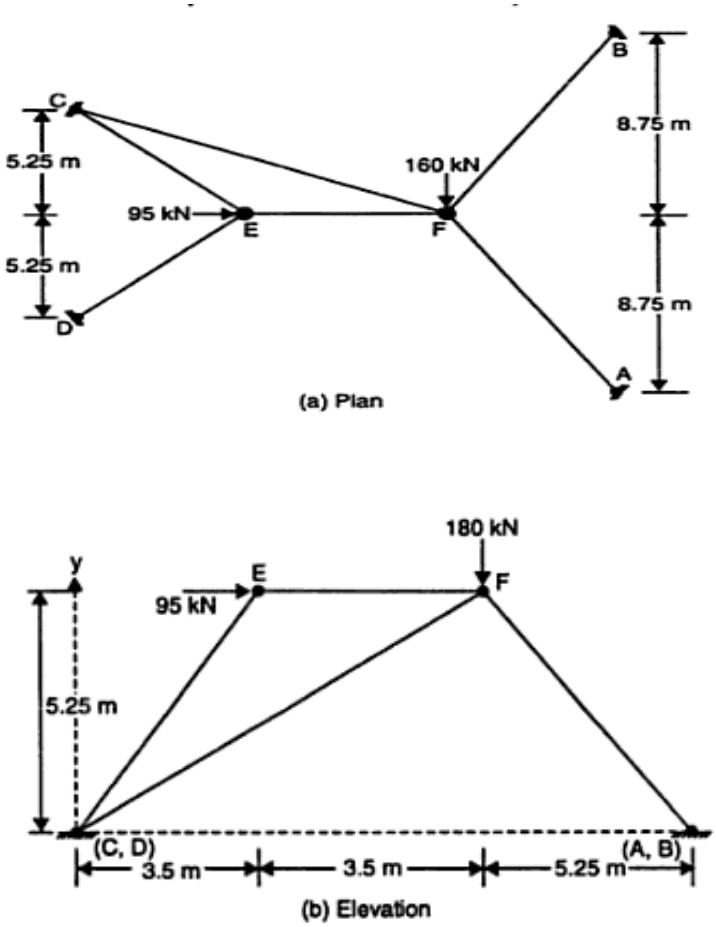

Fig.5

(OR)

b) A curved beam in the form of a quadrant of a circle of radius R and having uniform cross section is in a horizontal plane. Compute the Shear Force, BM, TM values and sketch the variations of the above quantities. Also determine the vertical deflection of the free end B.

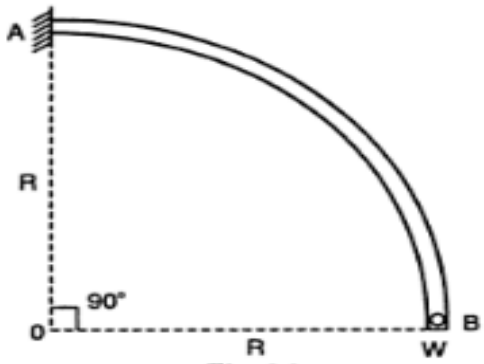

Fig.6

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