C   **Reg. No. :** ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code: 56101

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

Sixth Semester

Civil Engineering

15UCE601- STRUCTURAL ANALYSIS – II

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The shape factor of circular section is ---------   CO1- R

    (a) 1   (b) 1.7   (c) 2   (d) 2.5

2. Static interminacy value of a continuous beam ABC, fixed at A and hinged at   CO2- R
    B and C is

    (a) 1   (b) 2   (c) 3   (d) 4

3. The static indeterminacy value for a beam fixed at both ends is ---   CO3- R

    (a) 0   (b) 1   (c) 2   (d) 3

4. A triangular plane stress element has _____degree's of freedom.   CO4- R

    (a) 3   (b) 4   (c) 5   (d) 6

5. _____ is a three dimensional assemblage of line members,   CO5- R
    each member being joined at its ends.

    (a) Space frame   (b) Penta frame   (c) Cantilever beam   (d) Propped beam

PART – B (5 x 3= 15 Marks)

6. List any two differences between plastic stage and elastic stage. Quote the   CO1- R
    definition for load factor.

7. Differentiate between element displacement and system displacement. State the   CO2- R
    forces in the element in the fixed state.

8. What is meant by indeterminate structures? Sketch a continuous beam.   CO3- R

9. Distinguish primary unknown form secondary unknown. Define nodal points.   CO4- R

10. Recall the applications of space truss. Recall the purposes of anchor cables.   CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Determine the shape factor and plastic moment of the symmetrical   CO1- App   (16)
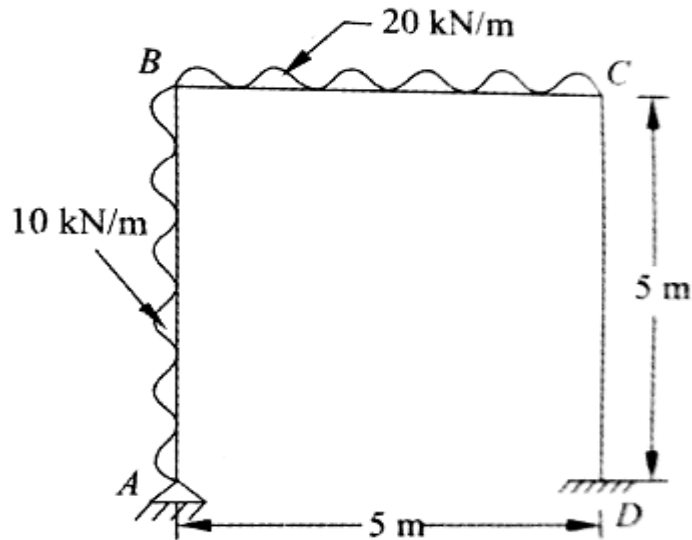steel section (I section). Assume yield stress of steel is 250 MPa.

Total depth=600 mm

Breadth of each flange= 250 mm

Depth of each flange =30 mm

Thickness of web= 12 mm

Or

(b) Collapse loads acting on the frame ABCD is shown in Figure 2.   CO1- App   (16)
Determine the maximum plastic moment capacity of the section.

12. (a) Analyze the beam by matrix stiffness method.   CO2- Ana   (16)

Or

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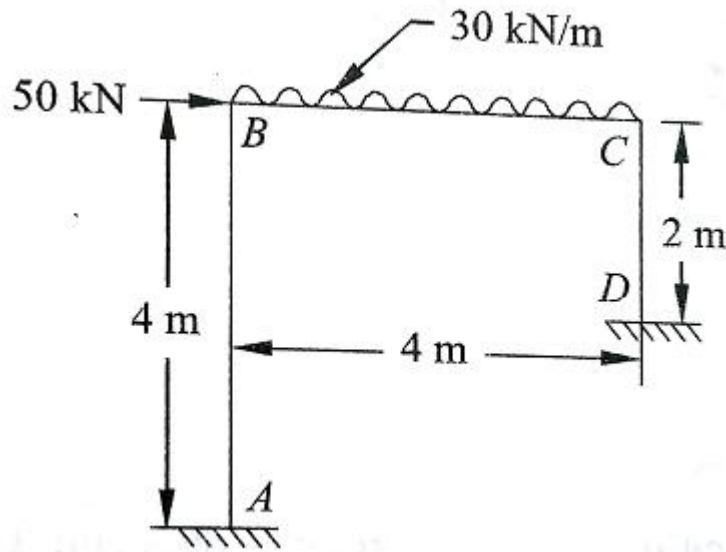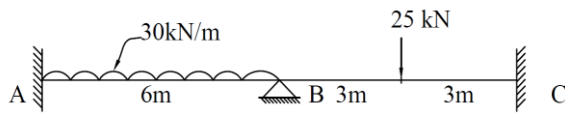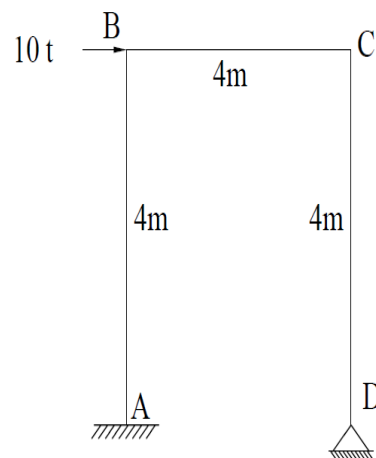(b) Analyse the frame ABCD shown in figure 4 using stiffness matrix method. CO2- Ana (16)

Figure 4

13. (a) Analyze the beam by matrix flexibility method. CO3- Ana (16)

Or

(b) Analyze the frame by force method. CO3- Ana (16)

14. (a) Describe the procedure for discretisation of a structure. CO4- U (16)

Or

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(b) Explain the step by step procedure of analyzing a beam using finite   CO4- U   (16)
     element method.

15. (a) A suspension cable is supported at 2 points 25m apart. The left   CO5- U   (16)
         support is 2.5m above the right support. The cable is loaded with a
         uniformly distributed load of 10KN/m throughout the span. The
         maximum dip in the cable from the left support is 4m. Find the
         maximum and minimum tensions in the cable.

                                      Or

     (b) A suspension bridge is of 160 m span. The cable of the bridge has a   CO5- U   (16)
         dip of 12 m. The cable is stiffened by a three hinged girder with
         hinges at either end and at centre. The dead load of the girder is
         15kN/m. Find the greatest positive and negative bending moments in
         the girder when a single concentrated load of 340 kN passes through
         it. Also find the maximum tension in the cable.

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