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Reg. No. : | | | | | | | | | | |

Question Paper Code: 96101

B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Sixth Semester

Civil Engineering

19UCE601- STRUCTURAL ANALYSIS – II

(Regulation 2019)

Duration: Three hours | Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. For a rectangular section of breadth b and depth d, the value of moment of inertia I is — CO2- Ana

   (a) $bd^3/12$ (b) $bd^3/8$ (c) $bd^3/6$ (d) $bd^3/9$

2. In global coordinate system degree of freedom per node in a truss is — CO2- App

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

3. The inverse of flexibility matrix is — CO1- U

   (a) Flexibility matrix (b) Adjacent of flexibility matrix

   C) Transformation matrix (d) Stiffness matrix

4. The tension coefficient (t) for the member is — CO1- U

   (a) Pull in the member/length (b) Push in the member/length

   (c) Pull in the member/length (d) Push in the member/length

5. What is the degree of indeterminacy of a fixed supported portal frames? — CO1- App

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

PART – B (5 x 3= 15Marks)

6. Differentiate lower bound theorem and upper bound theorem. — CO1- U

7. Why stiffness method is also called displacement method? Explain. — CO1- U

8. Why flexibility method is also called force method? Explain. — CO1- U

9. Find the minimum tension in a cable carrying a load of 10 kN/m of horizontal span of 80m.The supports is at the same level and the central dip is 4m. CO4-Ana

10. Explain the approximate analysis method. CO1- U

PART – C (5 x 16= 80Marks)

11. (a) Find the shape factor of the T section having the following dimensions: CO2-App (16)

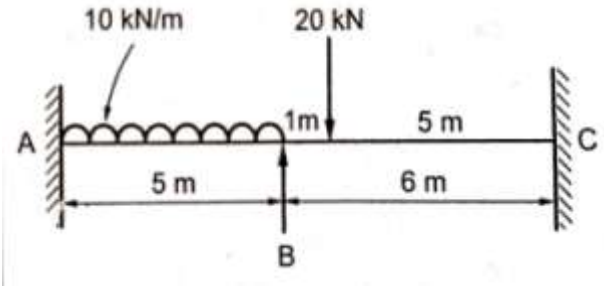
Top flange :120mm x 10mm

Web : 10mm x 120mm

Or

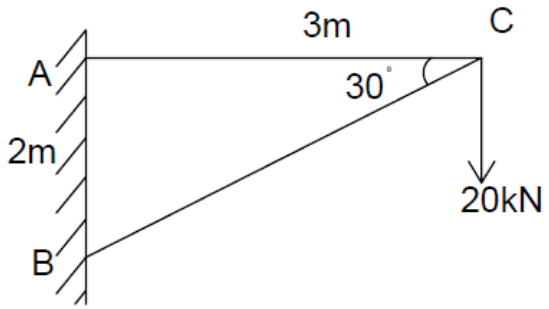
(b) Two spans continuous beam of section is fixed at A hinged at B and C. Span AB is 8m and BC is 6m long. Two point loads of 50kN each are acting on AB at 2m from A&B. Span BC is loaded with uniformly distributed load of intensity 10kN/m. Determine the plastic moment. CO2-App (16)

12. (a) Analyse the continuous beam loaded as shown in fig. by matrix stiffness method. Assume flexural rigidity. CO4- Ana (16)



Or

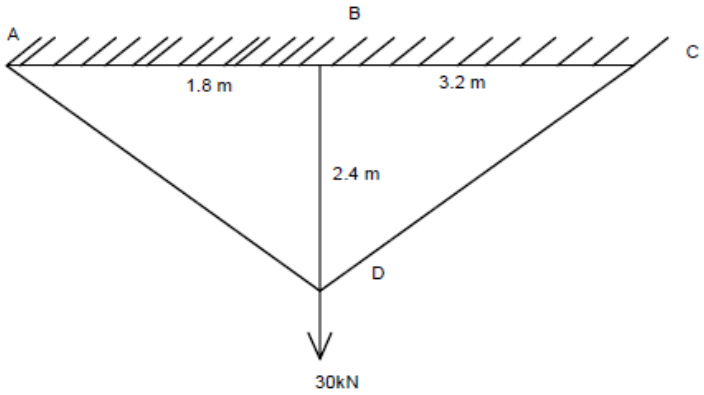
(b) Analyse the pin-jointed truss as shown in fig using displacement method. (AE/l) = 1 is constant throughout the members. CO5- Ana (16)



13. (a) The two span continuous beam of span AB is 4m and BC is 3m respectively. The udl will act at span AB is 60kN/m and the mid span point load of capacity 100kN will act at span BC. Using Force method, analyse the beam. Assume the EI value is not uniform. CO4-Ana (16)

Or

(b) Analyse the pin jointed truss as shown in fig. by force method. Assume AE Value. CO5- Ana (16)

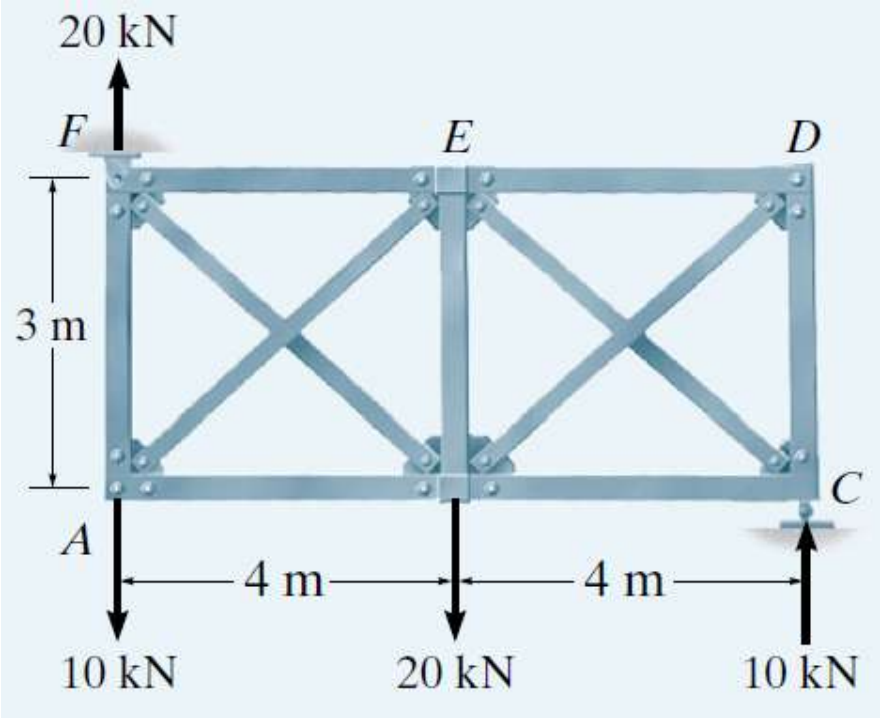


14. (a) A suspension cable is supported at 2 points 25 m apart. The left support is 2.5 m above the right support. The cable is loaded with a uniformly distributed load of 10 kN/m throughout the span. The maximum dip in the cable from the left support is 4 m. Find the maximum and minimum tensions in the cable. CO4- Ana (16)

Or

(b) A three hinged stiffening girder of a suspension bridge of 350 m span and sag of 35 m is subjected to three point loads 25 kN, 45 kN and 35 kN placed at 60 m, 150 m and 280 m respectively from the left hand hinge. Draw the Bending Moment Diagram. CO4- Ana (16)

15. (a) Analyse (approximately) the forces in the members of the truss shown in Fig. The diagonals are to be designed to support both tensile and compressive forces, and therefore each is assumed to carry half the panel shear. The support reactions have been computed. CO5-Ana (16)



Or

(b) Cross bracing is used to provide lateral support for this bridge deck due to the wind and unbalanced traffic loads. Analyse (approximately) the forces in the members of this truss. Assume the diagonals are slender and therefore will not support a compressive force. The loads and support reactions are shown in Fig. CO5-Ana (16)