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Question Paper Code: 56101

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

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. The resulting parameter in a rigid frame analyzed by matrix stiffness method is _____ CO2- R
(a) force (b) moment (c) displacement (d) rotation
3. The static indeterminacy value for a beam fixed at both ends is _____ CO3- R
(a) 0 (b) 1 (c) 2 (d) 3
4. The length of the suspension cable will be _____ to/than CO4- R
its horizontal span.
(a) more (b) less (c) twice (d) thrice
5. The process of uniting all the elements together is known as _____ CO5- R
(a) discretization (b) assemblage (c) zonation (d) transformation

PART – B (5 x 3= 15Marks)

- | | |
|------------------------------------------------------------|--------|
| 6. State the lower bound theorem. | CO1- R |
| 7. When do you prefer matrix stiffness method of analysis? | CO2- R |
| 8. Define flexibility of a member. | CO3- R |
| 9. What is meant by discretization? | CO4- R |
| 10. Define tension coefficient of a truss member. | CO5- R |

PART – C (5 x 16= 80Marks)

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

Total depth=600 mm

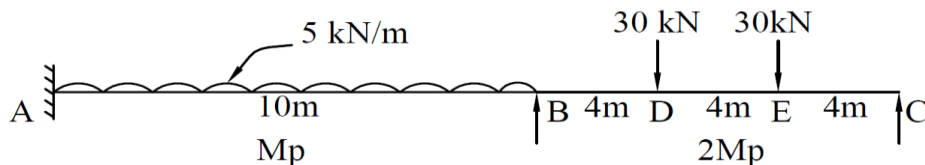
Breadth of each flange= 250 mm

Depth of each flange =30 mm

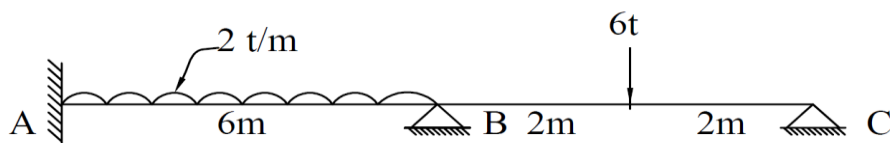
Thickness of web= 12 mm

Or

- (b) A continuous beam ABC is loaded as shown in fig. Determine the required M_p , if the load factor is 3.2. CO1- App (16)

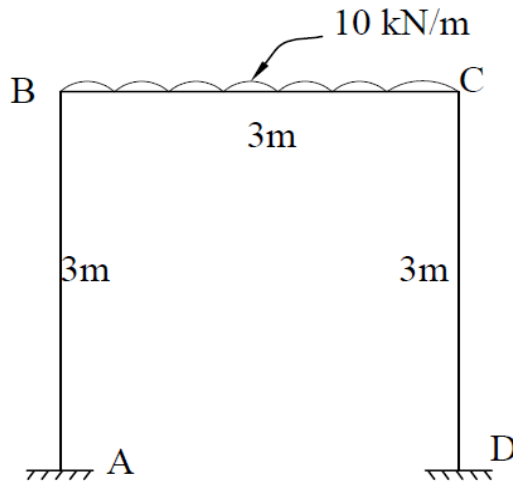


12. (a) Analyze the continuous beam by matrix stiffness method. CO2- Ana (16)



Or

- (b) Compute the final end moments for the portal frame by matrix stiffness method. CO2- Ana (16)

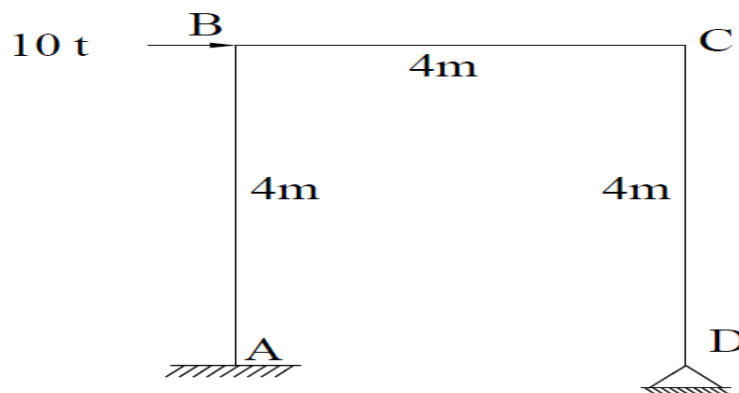


13. (a) Analyze the continuous beam by flexibility matrix method. CO3 Ana (16)



Or

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

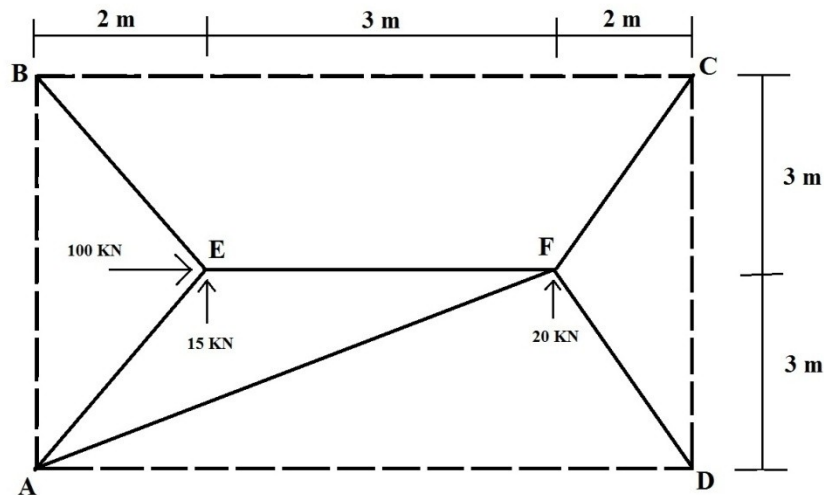


14. (a) Explain the principle of finite element method in detail. CO4- U (16)

Or

- (b) Develop strain displacement matrix and stiffness matrix for the two noded bar element of (30,60) (40,80). Assume $E=70 \text{ GPa}$ & $A=200 \text{ mm}^2$. CO4- Ana (16)

15. (a) A space frame shown in figure is supported at A,B,C and D in a horizontal plane, through ball joints. The member EF is horizontal, and is at a height of 3 m above the base. The loads at the joints E and F shown in figure act in a horizontal plane. Find the forces in all the member of the frame. CO5- App (16)



Or

- (b) A suspension bridge is of 160 m span. The cable of the bridge has a 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. CO5- App (16)