C

Reg. No. :

Question Paper Code: 56101

B.E./B.Tech. DEGREE EXAMINATION, NOV 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   CO2- R
   method is _____

    (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

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   CO1- App   (16)
symmetrical steel section (I section). Assume yield stress of steel
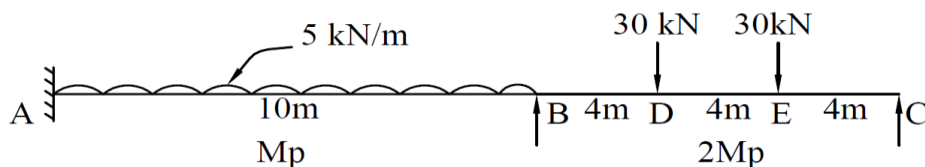is 250 MPa.

Total depth=600 mm

Breadth of each flange= 250 mm

Depth of each flange =30 mm

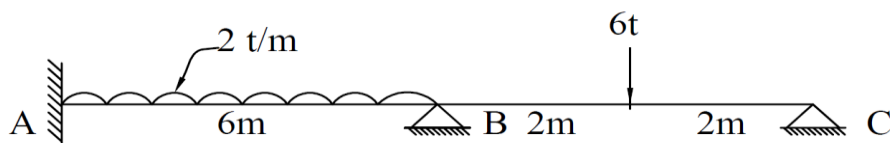Thickness of web= 12 mm

Or

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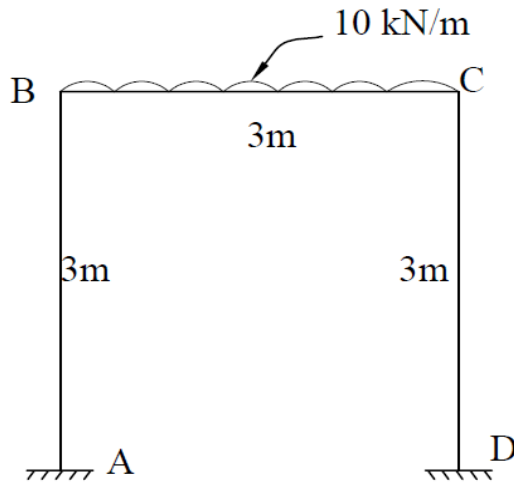required Mp, if the load factor is 3.2.

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

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Or

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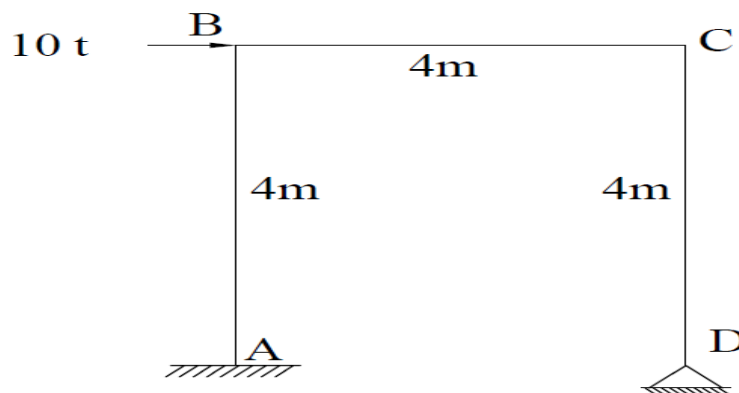stiffness method.

10 kN/m

B ⌒⌒⌒⌒⌒⌒⌒ C

3m

3m   3m

A   D

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

30kN/m   25 kN

A ⌒⌒⌒⌒⌒ B 3m   3m   C
        6m

Or

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

B   C
10 t   4m

4m   4m

A   D

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

<p align="center">Or</p>

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

15. (a) A space frame shown in figure is supported at A,B,C and D in a   CO5- App   (16)
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.
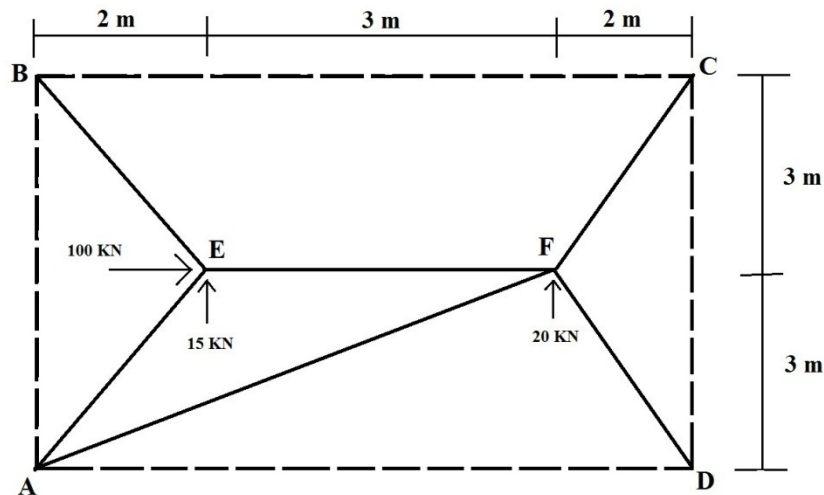
<p align="center">Or</p>

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

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