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

Question Paper Code: 45104

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

Fifth Semester

Civil Engineering

14UCE504 – STRUCTURAL ANALYSIS - I

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Number of unknown internal forces in each member of a rigid jointed plane frame is

   (a) 1 (b) 2 (c) 3 (d) 6

2. A truss containing *j* joints and *m* members, will be a simple truss if

   (a) $m = 2j - 3$ (b) $m = 3j - 2$ (c) $j = 2m - 3$ (d) $j = 3m - 2$

3. Slope at a point in a beam is the

   (a) vertical displacement (b) angular displacement
   (c) horizontal displacement (d) none of these

4. The bending moment value at simply supported end is

   (a) Max (b) zero (c) not equal to zero (d) one

5. In general slope at Fixed end support is

   (a) Max (b) zero (c) not equal to zero (d) one

6. If far end is fixed, then the carry over factor in a prismatic member is

   (a) 0.5 (b) 0.25 (c) 0.6 (d) 0.1

7. Flexibility of a member is defined as

(a) Force / displacement (b) displacement / force
(c) L/AE (d) AE/L

8. The method of column analogy in structural analysis falls in the category of

(a) displacement method (b) stiffness method
(c) flexibility method (d) finite element method

9. Size of transformation matrix is

(a) Ns x Ng (b) Ns x Ne (c) Ne x Ns (d) Ng x Ns

10. Static indeterminacy for fixed beam is

(a) 0 (b) 3 (c) 4 (d) 2

PART - B (5 x 2 = 10 Marks)

11. State the principle of virtual work.

12. Write the limitations of slope deflection methods.

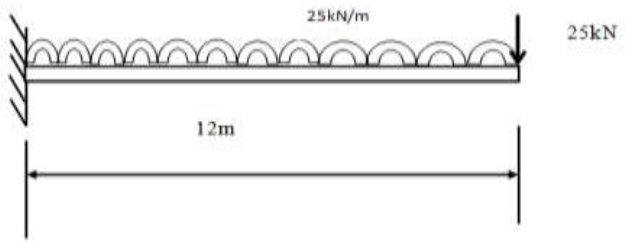
13. Define relative stiffness factor.

14. Define static indeterminacy.

15. Define stiffness coefficient k_{ij}.

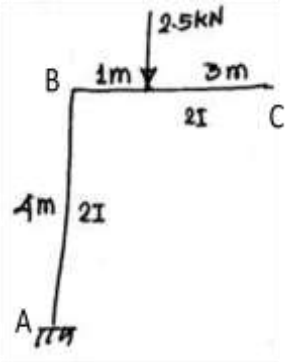
PART - C (5 x 16 = 80 Marks)

16. (a) Determine the vertical displacement at free end of the cantilever beam as shown in figure given blow. Take E = $2x10^5$Mpa, I = 825 x 10^7 mm^4. Use virtual work method. (16)

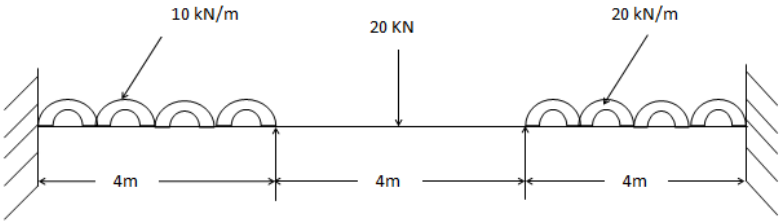


Or

(b) Determine the vertical deflection at the free end of frame shown in figure by unit load method. (16)



17. (a) Analysis the continuous beam as shown in figure given below by slope deflection method. Draw the shear force and bending moment diagrams. (16)



Or

(b) Analyse the portal frame loaded as shown in figure 4 by slope deflection method and sketch the bending moment and shear force diagrams. (16)

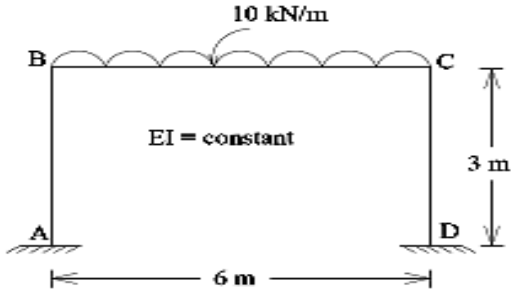
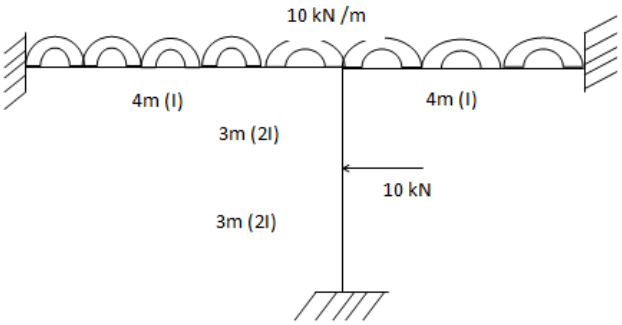


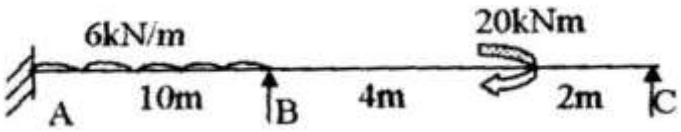
Figure 4

18. (a) Analysis and draw the bending moment diagram as shown in figure using moment distribution method. (16)



Or

(b) Draw the bending moment diagram and shear force diagram for the continuous beam shown in figure by moment distribution method. (EI is constant). (16)



19. (a) Analysis the continuous beam shown in figure 7 using flexibility matrix method. (16)

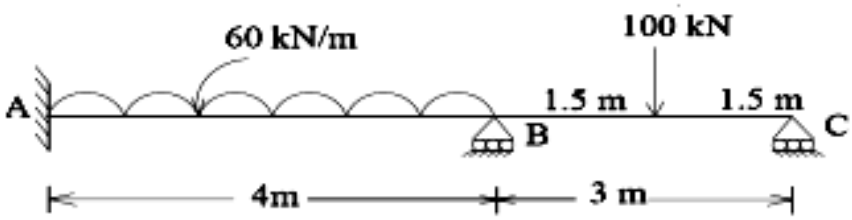


Figure 7

Or

(b) Explain step by step procedure involving the flexibility matrix method. (16)

20. (a) Analysis the continuous beam shown in figure 9 using stiffness matrix method. (16)

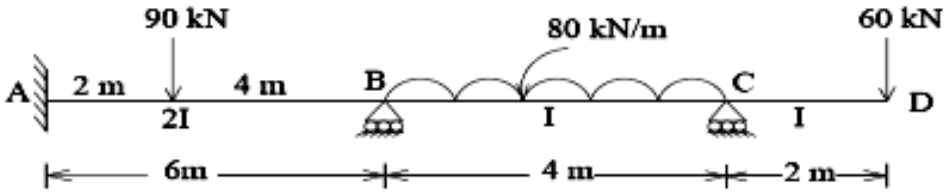


Figure 9

Or

(b) Analysis the beam as shown in below by stiffness method, EI is constant. (16)