SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : SA-II (13A01505) **Course & Branch**: B.Tech – CE

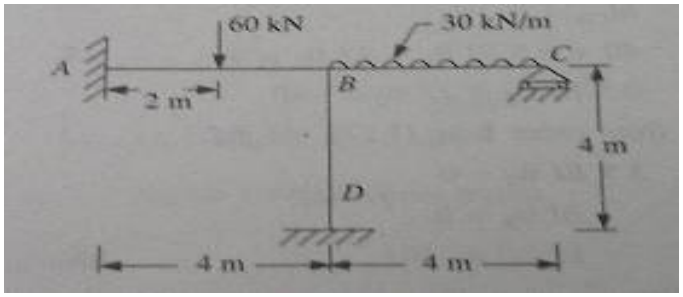
Year & Sem: III-B.Tech & I-Sem **Regulation:** R13

UNIT – II

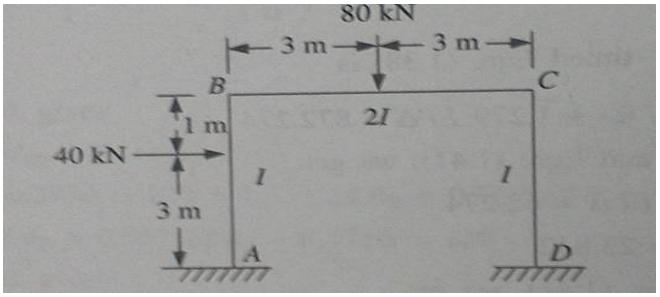
SLOPE DEFLECION AND MOMENT DISTRIBUTION METHOD

1.A single bay single storey portal frame ABCD is fixed at A and D. AB and DC are the columns and columns BC is the beam. The height of the column AB is 6 m and that of DC is 7 m. Span of the beam BC is 10 m. A uniformly distributed load of 60 kN/m is acting on the span BC. All members have the same flexural rigidity. Calculate the support reactions and draw the bending moment diagram for the portal frame. Use slope deflection method. 10M

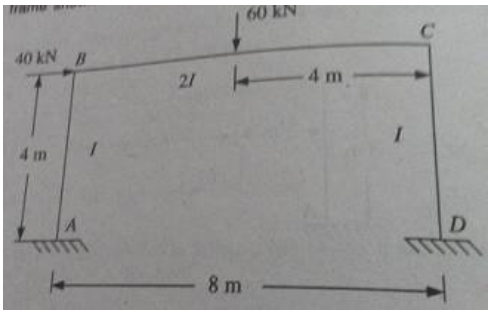
2. Analyse a frame shown in figure below by Slope deflection method & draw bending moment diagram. Flexural Rigidity (EI) is same for all members 10M



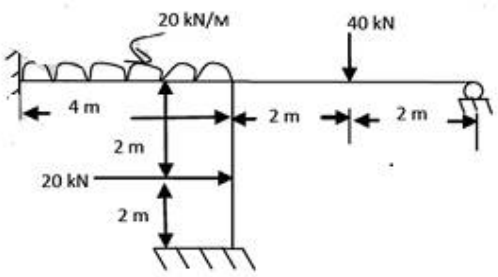
3. Analyse a frame shown in figure below by Slope deflection method. 10M



4. Analyse a frame shown in figure below by Slope deflection method. 10M

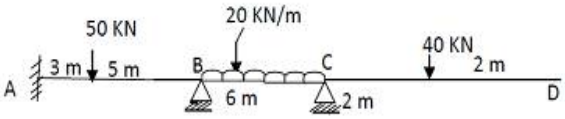


5. Analyse the frame as shown in figure below by moment distribution method. 10M

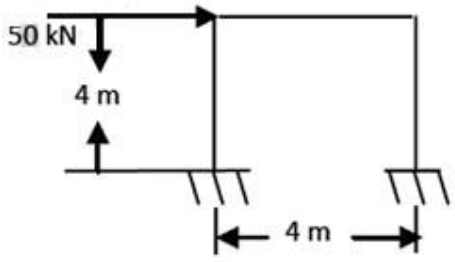


6. A single bay single storey portal frame ABCD is fixed at A and hinged at D. AB and DC are the two columns and BC is the beam. The two columns are of equal height and the height is 5.5m. The span of the beam BC is 6.5m. A uniformly distributed load of 58kN/m is acting on the whole span BC. All members have the same flexural rigidity. Calculate the support reactions and also draw the bending moment diagram for the portal frame. Use moment distribution method. 10M

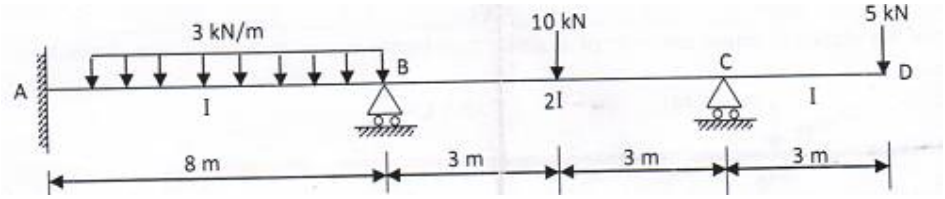
7. Analyse the continuous beam as shown in fig using moment distribution method and draw BMD. Take EI = constant. 10M



8. Determine the end moments of member of frame in figure below by moment distribution method. EI is constant for all members. 10M



9. Analyse the continuous beam as shown in figure below, using moment distribution Method. Draw shear force and bending moment diagram for the continuous beam. 10M



10.

a) what are assumptions made in slope-deflection method 2M

b) Define carry over moment and distribution factor 2M

c) What are the quantities in terms of which the unknown moments are expressed in slope-deflection method? 2M

d) How do you account for sway in slope deflection method for portal frames? 2M

e) What are the situations where in sway will occur in portal frames? 2M

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UNIT – II

SLOPE DEFLECION AND MOMENT DISTRIBUTION METHOD

1. The number of independent equations to be satisfied for static equilibrium of a plane structure is [ ]

   A) 1 B) 2 C) 3 D) 6

2. In moment distribution method, the sum of distribution factors of all the members meeting at any joint is always [ ]

   A) Zero B) less than 1 C) 1 D) greater than 1

3. The carryover factor in a prismatic member whose far end is fixed is [ ]

   A) 0 B) ½ C) ¾ D) 1

4. In the slope deflection equations, the deformations are considered to be caused by [ ]

   i. Bending moment

   ii. Shear force

   iii. Axial force

   The correct answer is

   A) only (i) B) (i) and (ii) C) (ii) and (iii) D) (i), (ii) and (iii)

5. The fixed end moment for continuous beam subjected to UDL [ ]

   A) $\frac{wl^2}{12}$ B) $\frac{wl^3}{12}$ C) $\frac{Wl}{8}$ D) $\frac{wab^2}{l^2}$

6. The fixed end moment for continuous beam subjected to central point load [ ]

A) $\frac{wl^2}{12}$ B) $\frac{wl^2}{12}$ C) $\frac{Wl}{8}$ D) $\frac{wab^2}{l^2}$

7. The fixed end moment for continuous beam subjected to eccentrically point load [ ]

A) $\frac{wl^2}{12}$ B) $\frac{wl^3}{12}$ C) $\frac{Wl}{8}$ D) $\frac{wab^2}{l^2}$

8. Slope deflection equation M_{AB} = [ ]

A) $F_{AB}+\frac{2EI}{l}(2\theta_A+\theta_B)$ B) $F_{AB}-\frac{2EI}{l}(2\theta_A+\theta_B)$

C) $F_{BA}+\frac{2EI}{l}(2\theta_B+\theta_A)$ D) $F_{BA}+\frac{2EI}{l}(2\theta_A+\theta_B)$

9. A continuous beam AB subjected to UDL of 20 kN/m then fixed end moment F_{AB} is [ ]

A) 40 kN-m B) 120 kN-m C) 60 kN-m D) 180 kN-m

10. A continuous beam AB subjected to central point load of 60 kN then fixed end moment F_{AB} is [ ]

A) 40 kN-m B) 45 kN-m C) 60 kN-m D) 80 kN-m

11. Frames may sway due to [ ]

A) Horizontal force & unsymmetry B) horizontal force only

C) unsymmetry of columns D) all the above

12. A beam subjected to UDL then bending moment diagram is in _____ shape [ ]

A) Triangle B) rectangle C) parabola D) cubic

13. A beam subjected to point then bending moment diagram is in _____ shape [ ]

A) Triangle B) rectangle C) parabola D) cubic

14. A beam subjected to UVL then bending moment diagram is in _____ shape [ ]

A) Triangle B) rectangle C) parabola D) cubic

15. The develop method for slope deflection method is [ ]

A) Flexibility method B) kani's method

C) Stiffness matrix method D) moment distribution method

16. Carry over factor = [ ]

A) $\frac{M}{\theta_A}$ B) $\frac{\theta_A}{M}$ C) $\frac{M'}{M}$ D) $\frac{M}{M'}$

17. Stiffness K= [ ]

A) $\frac{M}{\theta_A}$ B) $\frac{\theta_A}{M}$ C) $\frac{M'}{M}$ D) $\frac{M}{M'}$

18. Distribution factor = [ ]

A) $\frac{\sum K}{M}$ B) $\frac{\sum K}{K}$ C) $\frac{M}{\sum K}$ D) $\frac{K}{\sum K}$

19. If the far end is fixed then stiffness K= [ ]

A) $\frac{4EI}{L}$ B) $\frac{3EI}{L}$ C) $\frac{2EI}{L}$ D) $\frac{EI}{L}$

20. Which of the following methods of structural analysis is a displacement method [ ]

A) moment distribution method B) column analogy method

C) three moment equation D) none of the above

21. In the displacement method of structural analysis, the basic unknowns are [ ]

A) displacements B) force

C) displacements and forces D) none of the above

22. In the slope deflection equations, the deformations are considered to be caused by: [ ]

i) B.M. ii) S.F. iii) axial force

The correct answer is:

A) Only I B)i and ii C) ii and iii D)all three

23. Bending moment at any section in a conjugate beam gives in the actual beam: [ ]

A) Slope B) curvature C) deflection D) B.M.

24. The statically indeterminate structures can be solved by: [ ]

A) Using equations of statics alone B) Equations of compatibility alone

C) Ignoring all deformations and assuming the structure is rigid

C) Using the equations of statics and necessary number of equations of compatibility

25. A beam is completely analysed, [ ]

A) Support reactions are determined B)Shear and moment diagrams are found

C) The moment of inertia is uniform throughout the length

D) All of the above

26. A bending moment may be defined as [ ]

A) Arithmetic sum of the moments of all the forces on either side of section

B) Arithmetic sum of the forces on either side of section

C) Algebraic sum of the moments of all the forces on either side of section

D) None of these

27. At either end of a plane frame, maximum number of possible transverse shear forces, are [ ]

A) One B) two C) three D) four

28. At either end of a plane frame, maximum numbers of possible bending moments are [ ]

A) One B) two C) three D) zero

29.A simply supported beam of span L carries a uniformly distributed load W. The maximum bending moment M is [ ]

A) $\frac{WL}{2}$ B) $\frac{WL}{4}$ C) $\frac{WL}{8}$ D) $\frac{WL}{12}$

30. A simply supported beam of span L carries a concentrated load W at its mid span. The maximum bending moment M is [ ]

A) $\frac{WL}{2}$ B) $\frac{WL}{4}$ C) $\frac{WL}{8}$ D) $\frac{WL}{12}$

31. A simply supported beam carries two equal concentrated loads W at distances L/3 from either support. The maximum bending moment M is [ ]

A) $\frac{WL}{3}$ B) $\frac{WL}{4}$ C) $\frac{5WL}{8}$ D) $\frac{3WL}{12}$

32.For a simply supported beam with a central load, the bending moment is [ ]

A) Least at the centre B) Least at the supports C) maximum at the supports

D) Maximum at the centre

33. The simultaneous equations of slope deflection method can be solved by iteration in: [ ]

A) Moment distribution method B) Consistent deformation method
C) Conjugate beam method D)Williot mohr method

34. The carryover factor in a prismatic member whose far end is hinged is: [ ]

A) 0 B) 1/2 C) 3/4 D) 1

35.The moment required to rotate the near end of a prismatic beam through a unit angle without translation, the far end being simply supported, is given by [ ]

A)3EI/L B) 4EI/L C)2EI/L D)EI/L

Where EI is flexural rigidity and L is the span of the beam.

36.The moment required to rotate the near end of a prismatic beam through a unit angle without translation, the far end being fixed, is given by [ ]

A)EI/L B) 2EI/L C) 3EI/L D)4EI/L

Where EI is flexural rigidity and L is the span of the beam.

37. If M is the external moment which rotates the near end of a prismatic beam without translation (the far end being fixed), then the moment induced at the far end is [ ]

A) M/2 in the same direction as M B) M/2 in the opposite direction as M
C) M in opposite direction D) 0

38.If one end of a prismatic beam AB with fixed ends is given a transverse displacement Δ without any rotation, then the transverse reactions at A or B due to displacement is: [ ]

A) $6EI\Delta/l^2$ B) $6EI\Delta/l^3$ C) $12EI\Delta/l^2$ D) $12EI\Delta/l^3$

39. Moment-distribution method was suggested by [ ]

A) Hardy Cross B) G.A. Maney C) Gasper Kani D) None of these

40.In slope deflection method, the unknown rotations at various joints are determined by considering [ ]

a) The equilibrium of the joint
b) The rigidity of the joint
c) The equilibrium of the structure
d) None

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