CE8502 Structural Analysis-I

Important 13 Mark Questions

Part-B

1. Determine the force in the members of the truss shown in figure. The cross-sectional area of vertical and horizontal members is 4000mm2 and that of the diagonal is 6000 mm2.
2. Find the forces developed in all the members of truss shown in fig, if the temperature of member AC goes up by 20°c. Take the co efficient of thermal expansion α=12X10-6 /°c. Cross sectional area of all the members is 2500mm2 and young's modulus is 200KN/mm2.
3. A beam has a span of 24m, draw the influence line diagram for the bending moment and shear force at a section 8m from the left and also determine maximum bending moment and shear force at this section due to two-point loads of 10kN and 6kN at a fixed distance of 2m apart rolling from left to right with 6kN load leading.
4. Two-point loads of 100kN and 200kN spaced 3m apart cross a girder of span 12 meters from left to right with the 100kN leading. Draw the ILD for shear force and bending moment and find the values of maximum bending moment and find the values of maximum shear force and bending moment at a section 4m from the left-hand support. Also evaluate the absolute maximum bending moment due to the given loading system.
5. A simply supported beam has a span of 16m, is subjected to a UDL (dead load) of 5kN/m and a UDL (live load) of 8kN/m (longer than the span) travelling from left to right. Draw the ILD for shear force and bending moment at a section 4m from left end. Use these diagrams to determine the maximum shear force and bending moment at this section.
6. Determine the influence line diagram for bending moment at a point D, the middle point of span AB of a continuous beam ABC of span AB=6m and BC=4m simply supported at supports A, B and C. Compute the ordinates at every 1m interval.
7. Find the stresses in all the members of the given frame, in which the cross-sectional areas of vertical members are 3000mm2 each and those of all other members are 2200mm2. E=2x10^5 N/mm2.

8. Analyses the frame shown in fig, using the consistent deformation method. Flexural rigidity is constant throughout.
9. A beam ABC 5.8 meters long is fixed at A and simply supported at B,4 meters from A so as to provide an overhang BC 1.8 meters long. It carries a point load of 5kN at C. Analyze the beam.
10. A Continuous beam ABCD fixed at A and D and continuous over supports B and C. The span AB=5m carries a central concentrated load of 10kN. The span BC=4m carries a uniformly distributed load of 4 kN/m over the entire span of BC. The span CD=6m carries a non-central concentrated load of 8 kN acting at a distance of 2m from the end D. Analyse the beam and draw bending moment diagram using slope deflection method and tabulate the results.
11. A continuous beam ABCD is simply supported at A, B, C and D, AB = BC = CD = 5 m. Span AB carries a load of 30 kN at 2.5 m from A. Span BC carries an UDL of 20 kN/m. Span CD carries a load of 40 kN at 2 m from C.By using moment distribution method and Examine SFD and BMD.
12. A beam ABCD fixed at A and D and continuous over supports B and C. The span AB=10m carries a central concentrated load of 10kN. The span BC=8m carries a uniformly distributed load of 4 kN/m over the entire span of BC. The span CD=6m carries a non-central concentrated load of 10kN acting at a distance of 2m from the end D. Analyse the beam and draw bending moment diagram using slope deflection method and tabulate the results
13. A three hinged circular arch of span 16m and rise 4m is subjected to two-point loads of 100 kN and 80 kN at the left and right quarter span points respectively. Find the reaction at the supports. Find also the bending moment, radial shear and normal thrust at 6m from left support.
14. A symmetrical three hinged arch has a span of 50 & rise 5m. Find the maximum bending moment at a quarter point of the arch caused by a uniformly distributed load of 10kN/m which occupies any portion of the span. Indicate the position of the load for this condition.
15. Derive moment distribution for a continuous beam.
16. Derive moment distribution for a fixed beam.
17. A beam ABC 5.8 meters long is fixed at A and simply supported at B,4 meters from A so as to provide an overhang BC 1.8 meters long. It carries a point load of 5kN at C. Analyse the beam.

18. A Continuous beam ABCD fixed at A and D and continuous over supports B and C. The span AB=5m carries a central concentrated load of 10kN. The span BC=4m carries a uniformly distributed load of 4 kN/m over the entire span of BC. The span CD=6m carries a non-central concentrated load of 8 kN acting at a distance of 2m from the end D. Analyse the beam and draw bending moment diagram using moment distribution method and tabulate the results.
19. A continuous beam ABCD is simply supported at A, B, C and D, AB = BC = CD = 5 m. Span AB carries a load of 30 kN at 2.5 m from A. Span BC carries an UDL of 20 kN/m. Span CD carries a load of 40 kN at 2 m from C. By using Moment stiffness method and Examine SFD and BMD.
20. A continuous beam ABCD simply supported at all its end. Span AB of length 6 m carries a central point load of 40 kN. Span BC of 7 m length carries 50 kN to the right of 3 m from support B. Span CD of length 6 m carries a UDL of 10 kN/m throughout its length. If the support B sinks by 10 mm, Identify the following.
    (i) Moment at the supports
    (ii) Reactions at the supports
    (iii) Draw SFD and BMD., using Stiffness method
21. Draw the SFD and BMD of a continuous beam for the following cases.
    (i) Central point load at AB
    (ii) UDL throughout its length at BC.
22. Explain SFD and BMD for standard cases.
23. A Continuous beam ABCD fixed at A and D and continuous over supports B and C. The span AB=10m carries a central concentrated load of 10kN. The span BC=10m carries a uniformly distributed load of 4 kN/m over the entire span of BC. The span CD=10m carries a non-central concentrated load of 10 kN acting at a distance of 2m from the end D. Analyse the beam and draw bending moment diagram using Stiffness method and tabulate the results.
24. A Continuous beam ABCD fixed at A and D and continuous over supports B and C. The span AB=7m carries a central concentrated load of 10kN. The span BC=6m carries a uniformly distributed load of 4 kN/m over the entire span of BC. The span CD=6m carries a non-central concentrated load of 10 kN acting at a distance of 2m from the end D. Analyse the beam and draw bending moment diagram using Stiffness method and tabulate the results.