Reg. No. :

Question Paper Code : 40797

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Fifth Semester
Civil Engineering
CE 6501 – STRUCTURAL ANALYSIS – I
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

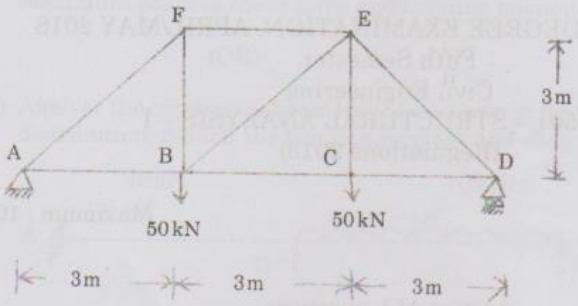
Answer ALL questions

PART – A (10×2=20 Marks)

1. What is meant by thermal stresses ?
2. Define static indeterminacy of a structure.
3. What is the absolute maximum bending moment due to a moving udl longer than the span of a simply supported beam ?
4. Define similitude.
5. Under what conditions will the bending moment in an arch be zero throughout.
6. Define "Rib Shortening" in arches.
7. Define degrees of freedom.
8. The continuous beam is to be analysed by slope-deflection method. What are the unknowns and, to determine them, what are the conditions used ?
9. What are the advantages of continuous beam over simply supported beam ?
10. Define : Stiffness factor.

PART – B (5×13=65 Marks)

11. a) Determine the vertical displacement of joint C of the steel truss shown in fig. The cross sectional area of each member is A = 400 mm² and E = 2 × 10⁵ N/mm².



(OR)

b) A simply supported beam of span 6 m is subjected to a concentrated load of 45 kN at 2 m from the left support. Calculate the deflection under the load point. Take E = 200 × 10^6 kN /m² and I = 14 × 10^{-6} m⁴.

12. a) In a simply supported girder AB of span 20 m, determine the maximum bending moment and maximum shear force at a section 5 m from A, due to the passage of a uniformly distributed load of intensity 20 kN/m, longer than a span.

(OR)

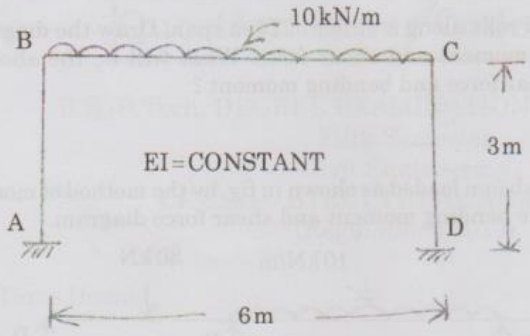
b) A single rolling load of 100 kN moves on a girder of span 20 m. (a) Construct the influence lines for (i) shear force and (ii) bending moment for a section 5 m from the left support. (b) Construct the influence lines for points at which the maximum shears and maximum bending moment develop. Determine these values. (7+6)

13. a) A parabolic arch hinged at the ends has a span of 60 m and rise of 12 m. A concentrated load of 80 kN acts at 15 m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section.

(OR)

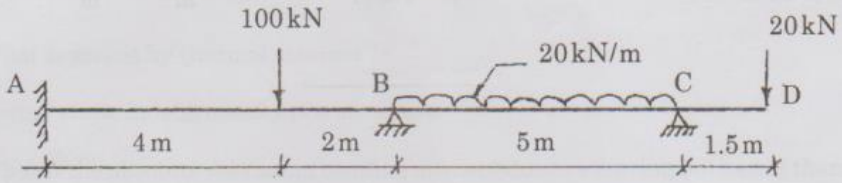
b) A parabolic 3-hinged arch of span 'l' is subjected to an u.d.l. of w/m run over the entire span. Find the horizontal thrust and bending moment at any section XX.

14. a) Analyse the frame by slope deflection method.

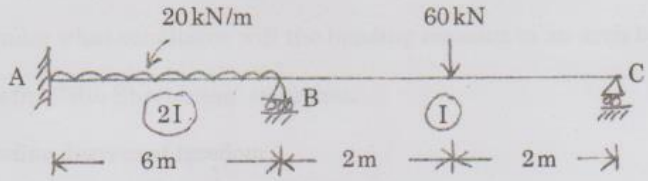


(OR)

b) Analyse continuous beam ABCD by slope deflection method and then draw bending moment diagram, Take EI constant.

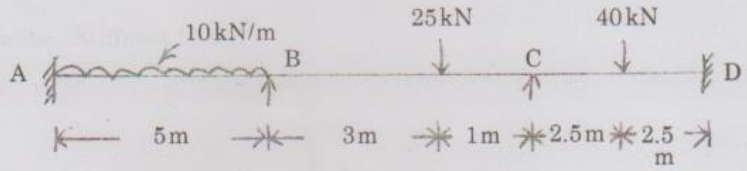


15. a) Analyse the continuous beam as shown in fig. by moment distribution method.



(OR)

b) Analyse the continuous beam loaded as shown in fig. by moment distribution method. Sketch the bending and shear force diagram.



PART – C (1×15=15 Marks)

16. a) A single load of 100 kN rolls along a girder of 20 m span. Draw the diagrams of maximum bending moment and shear force. What will be the absolute maximum positive shear force and bending moment ?

(OR)

b) Analyse the continuous beam loaded as shown in fig. by the method of moment distribution. Sketch the bending moment and shear force diagram.