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

M 0697

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2011

FIFTH SEMESTER

CIVIL ENGINEERING

CE1303 STRUCTURAL ANALYSIS — I

(REGULATION 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between perfect and imperfect beam.

2. List different methods of computing the joint deflection of a perfect frame.

3. Draw the influence line diagram for reaction R_A of a simply supported beam.

4. List out the uses of Begg's deformeter.

5. Define the structural aspect of a arch.

6. List out the different types of arches.

7. Differentiate between symmetry and asymmetry structures.

8. Write the expression for moment induced due to settlement of supports.

9. Define Naylor's simplification.

10. Define carry over factor.

PART B — (5 × 16 = 80 marks)

11. Determine the vertical deflection at C and horizondal deflection at D due to a load W applied vertically at C of the truss shown in figure 1. The truss ABCD is made up of two equilateral triangles and is hinged at A and roller support at D. All the members are of same length 1 and all tension members are of area 'a' and all compression members are of area '2a'.

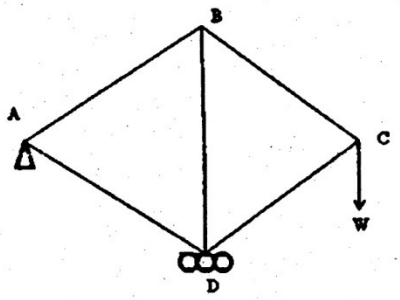

Figure 1

Or

12. Determine the vertical deflection at A and B relative to the support O of the truss shown in figure 2. The truss is loaded with a 3kN load at four points ABCD. The members OA, OB, OC and OD each have the area of 70mm^2 and the members AB, BC, CD each have the area of 140mm^2. E = 2 × 10^5 N/mm^2.

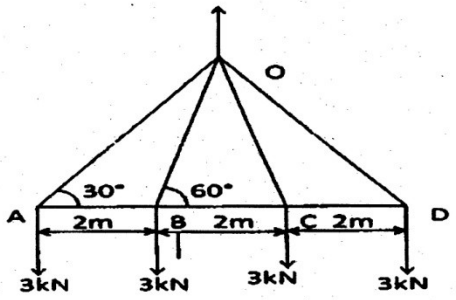

Figure 2

13. Draw the influence line diagram for shear force and bending moment at a section 8m from the left end A of a simply supported beam AB of span 20m long. Using the diagram calculate the maximum bending moment and shear force at this section due to a uniformly distributed load of 2.5kN/m over 8m long.

Or

14. Determine the influence line diagram for the prop reaction at B of a propped cantilever beam AB of span 12.5m. Mark the ordinates at every 1.25m interval.

15. A three hinged parabolic arch of 30m span and 6m central rise carries a point load of 8kN at a distance of 10m horizondally from the left hinge. Calculate the normal thrust, shear force at the section. Also calculate the maximum positive and negative bending moment.

Or

16. A two hinged semi circular arch of radius 10m is subjected to a load of 10kN acting on the section subtending an angle of 45° with the central line of the arch at its centre. Working from first principle, calculate,

(a) The horizondal thrust at the hinge

(b) The vertical reaction at the hinge

(c) The maximum positive and negative bending moment.

17. Using slope deflection method analyse the three span continuous beam ABCD simply supported at ends A and D and continuous over supports Band C. The span AB = 6m carries a non central concentrated load 8kN acting at 2m from end A. The span BC = 5m carries a uniformly distributed load of 4kN/m over span BC. The span CD = 4m carries a central concentrated load of 6kN. EI is constant for the entire length of the beam.

Or

18. Analyse a portal frame shown in figure 3 by slope deflection method. EI is constant for the entire frame.

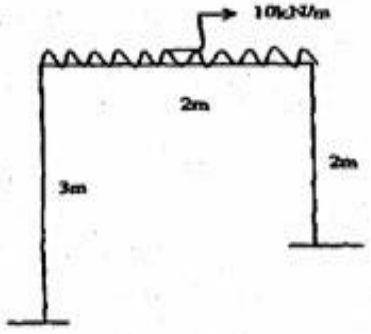

Figure 3

19. A continuous beam ABCD of span AB = 3m, BC = 4m and CD = 3m fixed at the ends A and D and continuous over supports B and C. Using moment distribution method calculate the moment induced at the ends if the support B settles by 25mm. Draw the bending moment diagram, if $E = 2 \times 10^5$ N/mm^2 and $I = 4 \times 10^6$ mm^4 and EI is constant for the whole length of the beam.

Or

20. Analyse the rectangular portal frame ABCD loaded as shown in figure 4 by moment distribution method. The end A is fixed and D is hinged. The joint B and C are rigid. EI is constant for the entire frame.

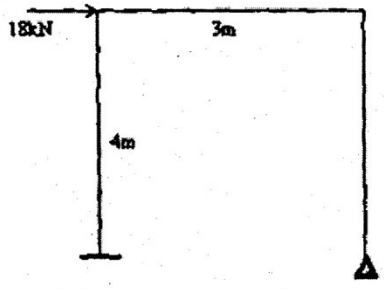

Figure 4