B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Sixth Semester

Civil Engineering

CE 336 — STRUCTURAL ANALYSIS — II

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw the influence line diagram for the reactions of a simply supported beam 8 m span.

2. Draw the influence line for bending moment at a section 4 m from the fixed end of a cantilever beam of span 10 m.

3. Draw qualitative influence line diagrams for the reactions in a fixed beam of span 6 m.

4. Find the bending moment at a section 4 m from the left end of a three hinged parabolic arch due to UDL of 10 kN/m over entire span 30 m.

5. Derive the expression for horizontal thrust in a three hinged parabolic arch carrying UDL over entire span.

6. What is shape factor?

7. What is plastic hinge?

8. A uniformly distributed load of 10 kN/m, 5m length crosses a simply supported beam having a span of 4 m. Find the maximum bending moment at mid-span.

9. Find the maximum bending moment at a section 30 m from the left end of the three hinged stiffening girder of span 100 m when a UDL of 10 kN/m, 5 m length crosses the girder.

10. Define tension coefficient.

11. (i) Draw the influence line for reaction at B of the continuous beam ABC simply supported at A and C using Muller Breslau's principle. AB = 3 m, BC = 4 m. EI is constant.

    (ii) Draw the influence line for reaction at A of the beam described above.

12. (a) Analyse the space truss shown in Fig. Q. 12 (a) using tension coefficient method. The coordinates of joints are A (0, 0, 0), B (6, 0, 0), C (6, 3, 0), D (0, 3, 0), E (2, 1.5, 4) and F (4, 1.5, 4). Determine the forces in the members of the truss.
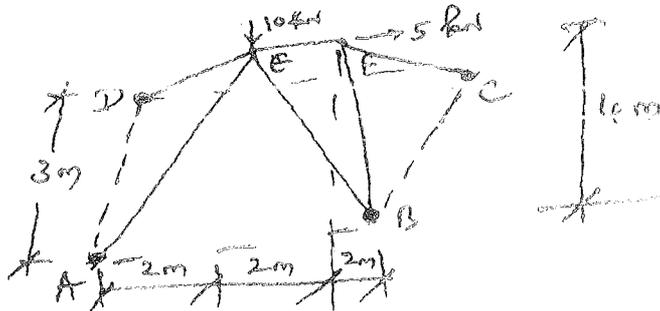

Fig. Q. 12 (a)

Or

    (b) Analyse the curved beam in plan shown in Fig. 12 (b) and draw the SFD and BMD. (Note : P is vertical load).
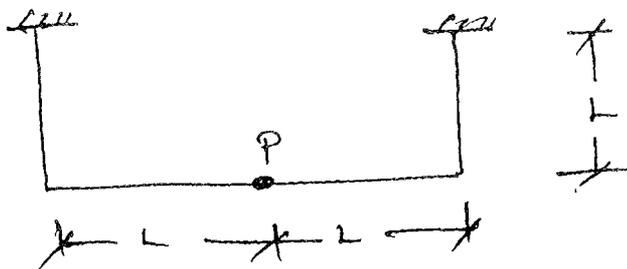

Fig. 12 (b)

13. (a) Derive the expression for horizontal thrust in a two hinged parabolic arch carrying a point load P at distance one fourth span from left support. Assume $l = l_0 \sec\theta$.

Or

    (b) A three hinged parabolic arch having span 20 m, Rise 4 m carries a UDL of 30 kN/m over the left half of the span. Draw the BMD. Also find the normal thrust and radial shear at a section 4 m from the left support.

15. (a)

    (b)

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14. (a) A suspension cable with 70 m span and 7 m dip is stiffened by a three hinged girder. The dead load is 15 kN/m. Find shear force and bending moment in the girder at a section 10 m from the left hand hinge when a point load of 100 kN is placed at 8 m from the left end using influence line diagrams.

Or

(b) Determine the forces in the members of the space frame plan view is shown in Fig. Q. 14 (b) by tension coefficient method. The coordinates are A (0, 0, 0), B (0, 6, 0), C (9, 3, 0), D (6, 3, 5). A, B, C are hinged supports at same level. A vertical load of 100 kN is applied at D.
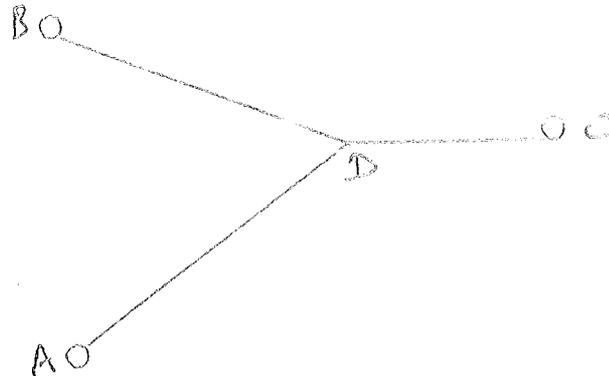

Fig. Q. 14 (b)

15. (a) Derive the shape factor for the triangular cross section.

Or

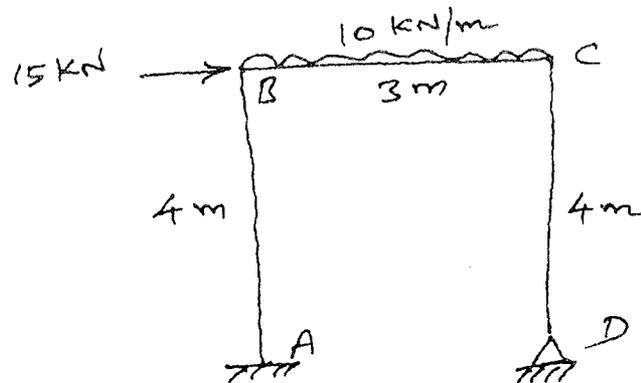(b) Determine the plastic moment capacity required for the frame shown in Fig. Q. 15 (b).

Fig. Q. 15 (b)