

B.E / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012

CIVIL ENGINEERING BRANCH

SIXTH SEMESTER

CE 9351 – STRUCTURAL ANALYSIS II

(REGULATIONS 2008)

Time : Three hours

Maximum : 100 Marks

Answer ALL Questions

Part – A (10 x 2 = 20 marks)

1. Draw the IL for
 - (a) Bending moment at quarter span of a simply supported beam.
 - (b) Shear force at mid span of a cantilever beam.
2. What is meant by absolute maximum bending moment in a beam?
3. Sketch qualitatively the influence line for shear at D for the beam in Fig. Q.No.3 (Your sketch shall clearly distinguish between straight lines and curved lines)

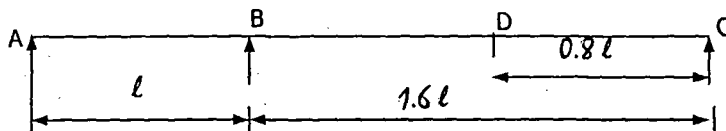


Fig. Q.No.3

4. A beam ABC is supported at A, B and C as shown in Fig.Q.No.4. (D is an internal hinge). Draw the influence lines for reactions at A and B.

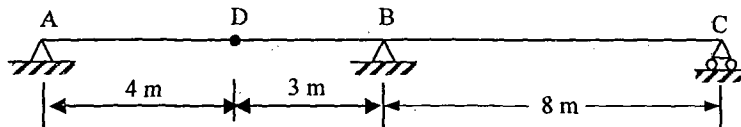


Fig.Q.No.4

5. What is meant by Rib Shortening? How is it influencing the horizontal thrust?
6. Which of the two arches (circular and parabolic) is preferable to carry a uniformly distributed load? Why?
7. Distinguish between unstiffened cable and stiffened cable?
8. What is the minimum number of members required to develop a stable space truss having 4 joints?
9. What is meant by shape factor? What is the shape factor for the following sections (i) rectangle and (ii) circular.
10. Define Kinematic theorem or upper bound theorem.

Part – B (5 x 16 = 80)

11. Four wheel loads of 10, 12, 15 and 8 Tones, spaced at 5m and followed by a udl of 1.5 t/m extending over 10 m starting from a point 5 m behind 8t load, cross a girder of 75 m span from left to right. Calculate the maximum shear force and bending moment at a section 30 m from the right support.

12(a) Determine the influence line for the reaction at the middle support B of the continuous beam shown in Fig.Q.No.12(a). Compute and sketch the ordinates at every quarter of each span.

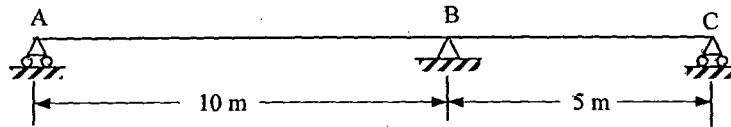


Fig.Q.No.12(a)

OR

12(b) Draw the influence line for reaction at B and for the support moment at A for the propped cantilever shown in Fig.Q.No. 12(b). Compute the IL ordinates at 1.5 m interval.

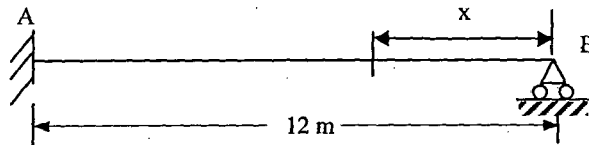


Fig.Q.No.12(b)

13(a) Derive the expression for horizontal thrust in a two hinged arch for the following loading cases,

- (i) Uniformly distributed load – w per meter throughout the span.
- (ii) Central concentrated load W .

OR

13(b) A parabolic 3 hinged arch shown in Fig. Q.No. 13(b) carries loads as indicated. Determine (i) resultant reactions at the end supports and (ii) bending moment, shear (radial) and normal thrust at D, 6 m from A.

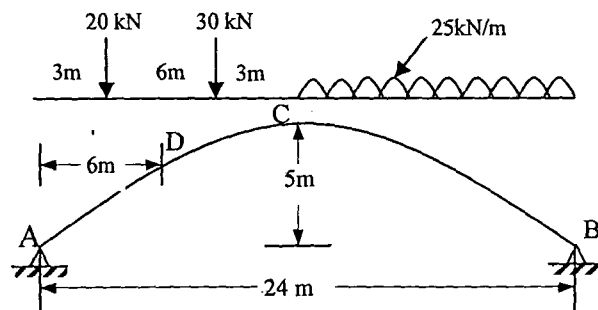


Fig. Q.No.13(b)

14(a) A cable of horizontal span 21 m is to be used to support six equal loads of 40 kN each at 3 m spacing. The central dip of the cable is limited to 2 m. Find the length of the cable required and also its cross sectional area if the safe tensile stress is 750 N/mm^2 .

OR

14(b) Using the method of Tension Coefficient, determine the forces in the members of the crane structure shown in Fig. Q.No.14(b).

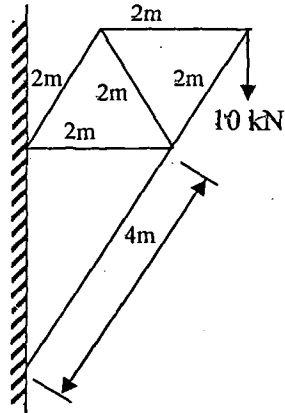


Fig. Q.No.14(b)

15(a) A continuous beam ABC is loaded as shown in Fig.Q.No.15(a). Determine the required M_p if the load factor is 3.2.

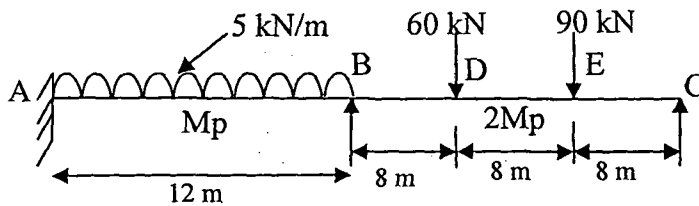


Fig.Q.No.15(a)

OR

15(b) Find the value of plastic moment for the portal frame shown in Fig. Q. No.15(b), loaded upto collapse.

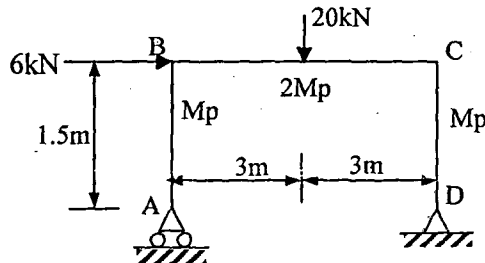


Fig.Q.No.15(b)