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B.E/ B.Tech (FULL TIME) END SEMESTER EXAMINATIONS, APRIL/MAY 2019

CIVIL ENGINEERING

SIXTH SEMESTER

CE8603 STRUCTURAL ANALYSIS - II (Regulation 2012)

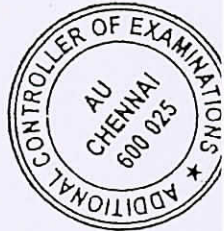
Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What are the uses of influence lines?
2. What do you mean by focal length of a trussed girder?
3. What is the limiting distance from propped end for having only positive portion in the influence line diagram for bending moment at any point in a propped cantilever?
4. Draw a typical sketch showing the shape of the influence line for shear force at any point in the left span of a two span continuous beam when the end supports are hinged.
5. state Eddy's theorem.
6. Distinguish between two hinged and three hinged arches.
7. List out the main functions of stiffening girders in suspension bridges.
8. What are the forces developed at a section in a beam which is curved in plan?
9. Define: Plastic hinge
10. Brief the principle of virtual work as applied to plastic analysis.



Part – B ( 5 x 16 = 80 marks)

(Question No.11 is Compulsory)

11. A simply supported girder has a span of 40 m. A moving load consisting of a uniformly distributed load of 1kN/m over a length of 8 m preceded by a concentrated load of 6 kN moving at a fixed distance of 2 m in front of the distributed load crosses the girder. Using influence line diagram, determine (i) the point on the beam at which the greatest bending moment occurs (ii) the position of the load where it occurs and (iii) the value of the greatest bending moment in the beam.
12. a) A continuous beam ABC is simply resting on supports A and C, and continuous over the support B. The span AB is 8 m and the span BC is 6m. Draw the influence line diagram for moment at the support B using Muller Breslau's principle. Assume flexural rigidity is constant throughout the length and calculate the influence line ordinates at 2 m interval.  
(OR)  
b) Draw influence line using Muller Breslau's principle for vertical reaction at the propped end of a propped cantilever of span 7 m. Calculate the influence line ordinates at every 1 m interval.
13. a) A segmental circular symmetrical three hinged arch has a span of 20 m and central rise of 5 m, hinged at both the ends and also at the crown. Draw the bending moment diagram showing the maximum positive and negative bending moments when it is subjected to a vertical downward point load of 20 kN at a horizontal distance 4 m from the left hinge. Also determine the radial shear and normal thrust at 6 m from the left support.

(OR)

- b) A two hinged parabolic arch has a span of 20 m and central rise of 4 m. It is subjected to a uniformly distributed load of 10 kN/m over a length of 15 m from the left support. Determine the horizontal thrust and draw the bending moment diagram.

14. a) A suspension bridge of span "l" has two three- hinged stiffening girders supported by two cables one on each side with a central dip of "h". Draw influence line from first principle with detailed explanation for (i) horizontal reaction for the cable and (ii) the load intensity transmitted to the cable.

(OR)

- b) Three bars of equal length 4 m each are joined together at A and supported by hinges at B, C and D as shown in Fig. Q 14 (b). Using tension coefficient method, determine the axial forces induced in all bars due to a vertical load of 30 kN at A, if  $OB = OC = OD = 4$  m.

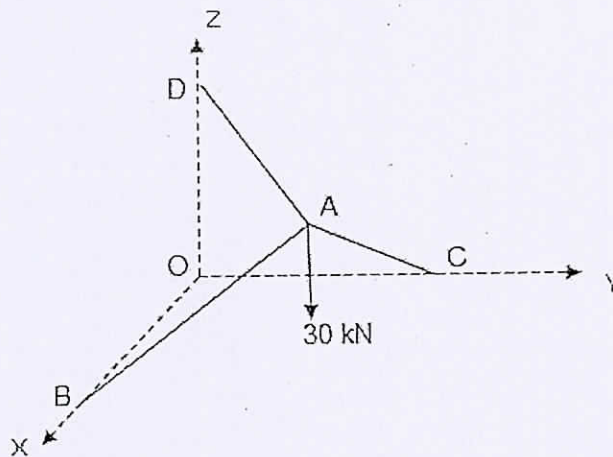


Fig. Q 14 (b).

15. a) Determine the shape factor for a symmetrical T- section which is formed by two rectangular plates of cross section 150 mm x 20 mm. Also find the plastic moment capacity of the section if the yield stress of the material is 250 MPa.

(OR)

- b) Determine the plastic moment capacity " $M_p$ " for the frame shown in fig.Q.15(b). The loads shown in the figure are the collapse loads.

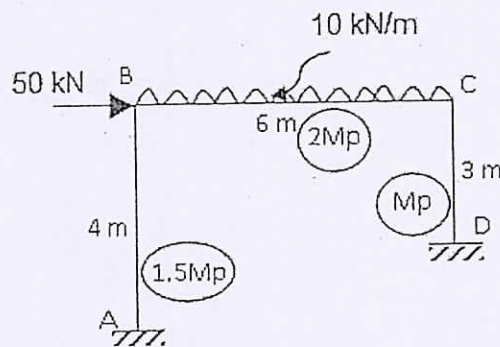


Fig.Q.15 (b)

