Code: 13A01404 **R13**

B.Tech II Year II Semester (R13) Supplementary Examinations December 2016

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Differentiate between determinate and indeterminate structures and give appropriate example for each case.

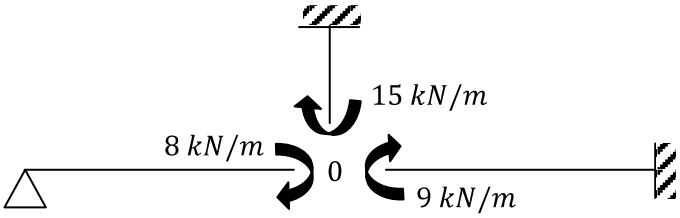
(b) Mention any two reasons for sinking of support occur in beams.

(c) Why is it necessary to compute deflection in structures?

(d) Name any four methods used for computation of deflections in structures.

(e) Explain carry over factor with a sketch.

(f) Three moment meeting at a rigid joint carry moments 15 kN/m (clockwise), 8 kN/m (clockwise) and 9 kN/m (counter clockwise) is shown in figure below. What moment should be applied at the joint 0 for achieving equilibrium?

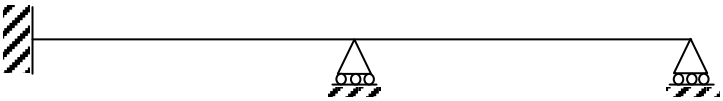


(g) State Muller-Breslau principle.

(h) What are the uses of influence line diagrams to solve the indeterminate structures?

(i) Define degree of indeterminacy.

(j) Find the indeterminacy for the beams given below.

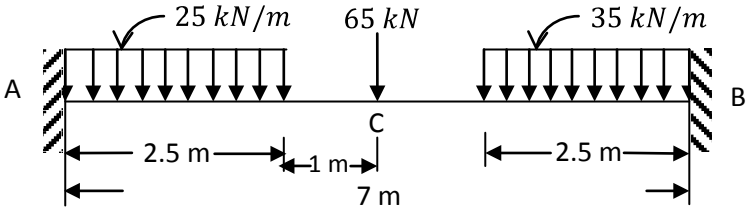


PART - B

(Answer all five units, 5 X 10 = 50 Marks)

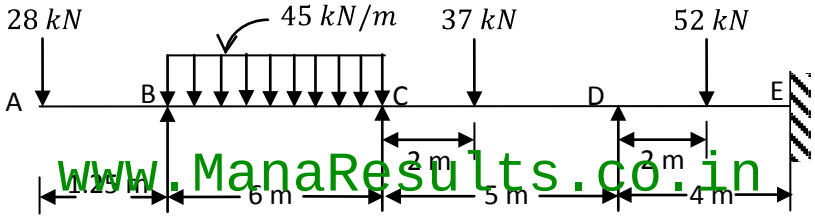
UNIT - I

2 Analyze the fixed beam section is shown in figure below. Calculate the support moments and draw SFD and BMD.



OR

3 Analyze the beam is shown in figure below using Clapeyron's theorem. Draw the BMD and SFD for given beam section.



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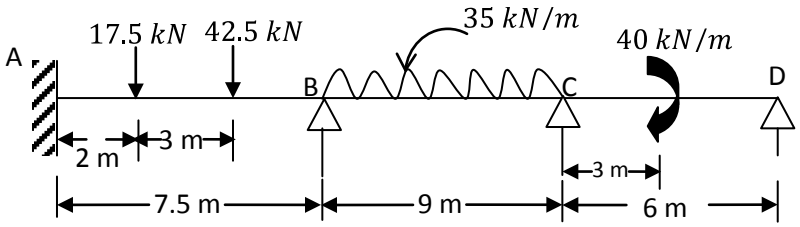
UNIT - II

4 A continuous beam ABCD, 21 m long is carried on simple supports at its ends is propped at the same level at point 6 m and 14 m from left end A. The support A is fixed. All other supports are propped. It carries two concentrated loads 35 kN and 50 kN at 2.5 m and 17.5 m respectively from A and uniformly distributed load of 17.5 kN/m run over the span BC. If the support B sinks downward by 22.5 mm between the support A and C. Find the bending moment and the reactions at their supports by slope and deflection method; also draw the BMD and SFD. Assume E = 2 x 10^5 N/mm^2 and I = 8 x 10^6 mm^4.

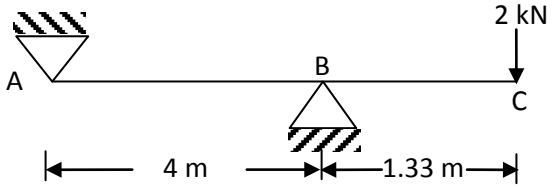
OR

5 Analyze the continuous beam shown in figure below, using the moment distribution method. Draw the BMD and SFD for given beam section.



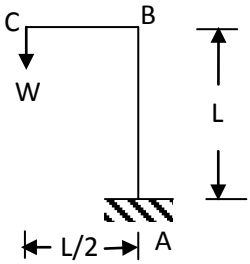
UNIT - III

6 Analyze the simply supported single side overhang loaded beam is shown in figure below. Using the Castigliano theorem, find the vertical deflection at point C.



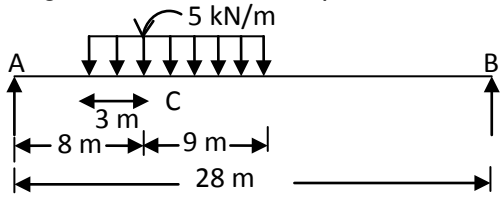
OR

7 A vertical load W is applies to the rigid frame as shown in figure below.



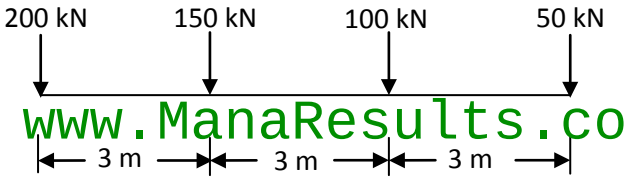
UNIT - IV

8 Draw the influence line for BM and SF for a section 8 m from the left hand support A shown in figure below. Determine the maximum BM and SF values for simply supported span 28 m. The section carries a uniformly rolling load 5 kN/m over a span of 9 m.



OR

9 A girder having a span of 36 m is simply supported at the ends. If the set of vehicle load shown in figure is moving over the girder with 50 kN load leading 0.25 L from the left support is taken as the section and 150 kN load is lying on the section. Find the maximum bending moment influence line diagram which can occur. (a) Under 200 kN load. (b) Under 50 kN load.



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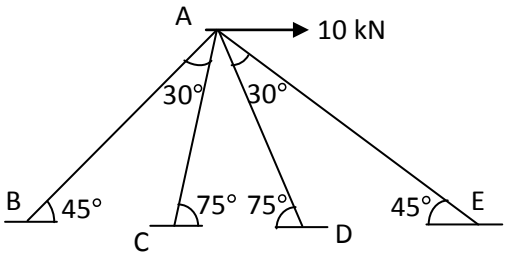
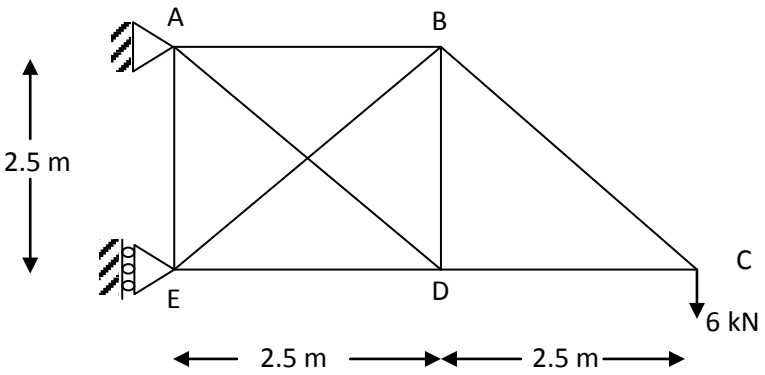
UNIT - V

10 Fine the forces in the middle members of the frame shown in figure below. All members are same cross-sectional area and are same material.



OR

11 In a pin-jointed frame shown in figure below. The cross sectional area of each member is 1300 mm^2 and E = 2.015 N/mm^2. During the construction the member EB was made 2 mm too long and was forced in to plan. Determine the forces developed in each of the diagonal members AD and EB when the vertical load applied 6 kN at joint C.



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