(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2133 Roll No.

B. Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION 2012–13

STRUCTURAL ANALYSIS—II

Time : 3 Hours *Total Marks : 100*

Note :– (i) Attempt **all** questions.

(ii) Each question carries equal marks.

(iii) Assume any missing data suitably.

1. Attempt any **two** parts of the following : **(10×2=20)**

(a) Analyze the frame shown in fig. 1 by slope deflection method and draw the bending moment diagram. Assume constant flexural rigidity for all members of the frame.

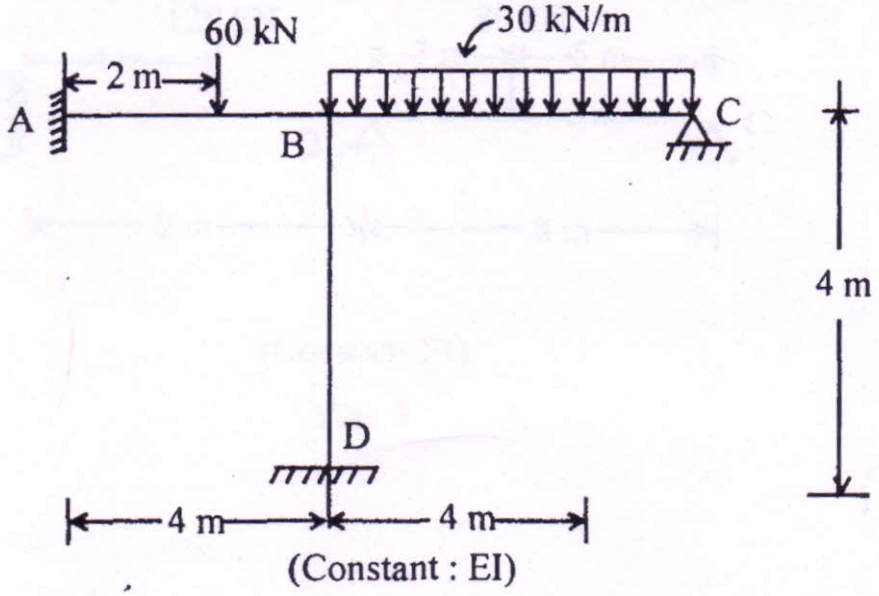


Fig. 1

(b) Using moment distribution method analyze the frame shown in Fig. 2. Draw the bending moment diagram. The comparative moment of inertia is mentioned against each member of the frame.

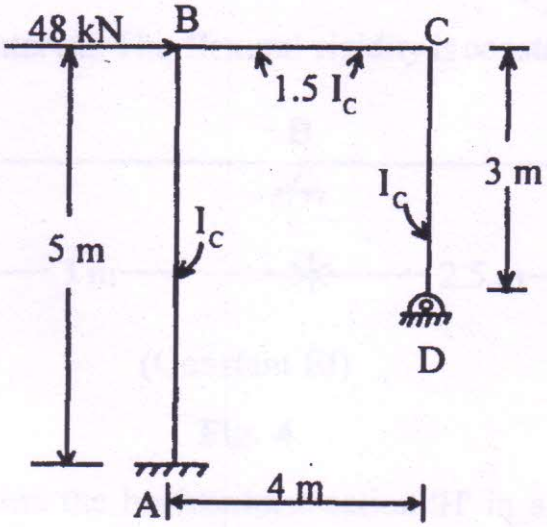
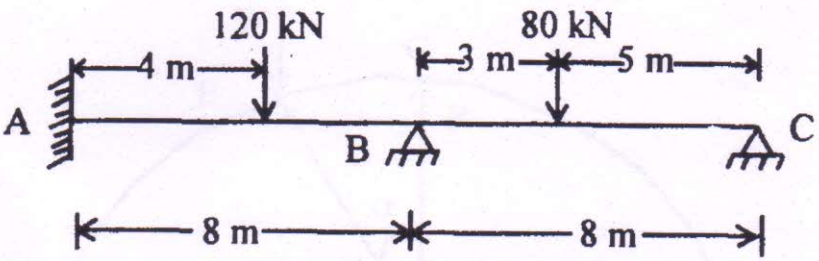


Fig. 2

(c) Analyze the following continuous beam using the strain energy method. Draw the bending moment diagram (Fig.3).

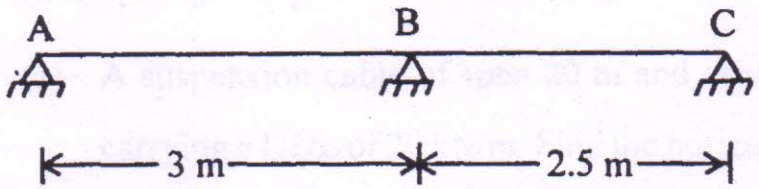


(Constant EI)

Fig. 3

2. Attempt any **two** parts of the following : **(10×2=20)**

(a) Explain Müller Breslau principle. Using the principle draw the influence line diagram for Reaction RA for the beam shown in the following figure, Fig. 4. Compute the ordinate at 1 m interval. The flexural rigidity is constant throughout.



(Constant EI)

Fig. 4

(b) Determine the horizontal reaction 'H' in a semi-circular two-hinged arch when a vertical load W acts at a point P as shown in fig. 5. Assume flexural rigidity constant throughout.

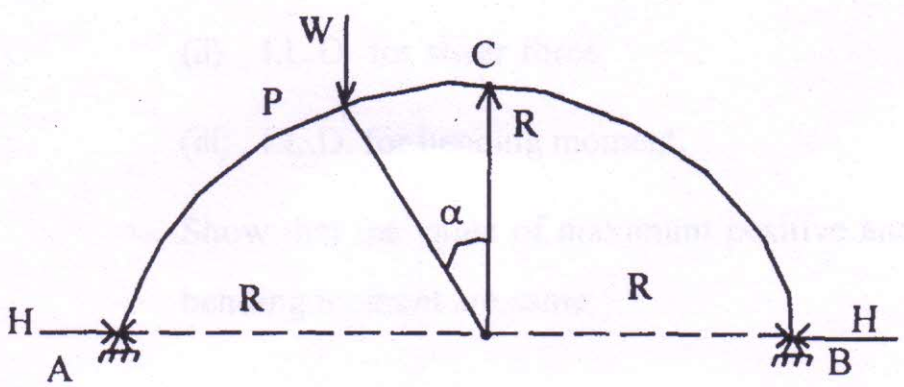


Fig. 5

(c) Draw the schematic diagrams for horizontal thrust, bending moment at any section, radial shear and normal thrust at any given section for a typical two-hinged symmetrical parabolic arch.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) A suspension cable of span 20 m and central dip 2 m is carrying a UDL of 20 kN/m. Find the horizontal pull in the cable. Also find the maximum and minimum tensions in the cable.

(b) Consider a suspension bridge of span '*l*' and central dip 'dc' with two-hinged stiffening girder. Draw the influence line diagram (ILD) for the following when a single concentrated unit load rolling over the suspension bridge :

(i) I.L.D. for horizontal thrust

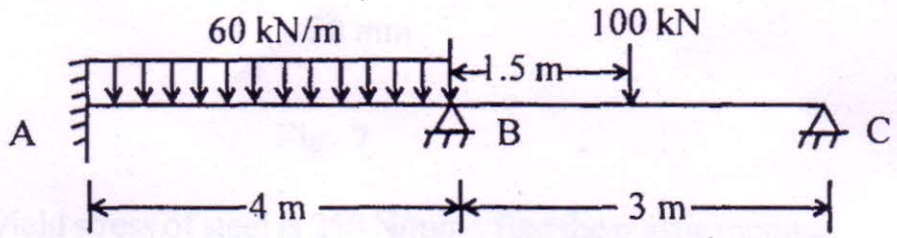
(ii) I.L.D. for shear force

(iii) I.L.D. for bending moment.

Show that the value of maximum positive and negative bending moment are same.

(c) A foot bridge is carried over a river of span 90 m. The supports are 3 m and 12 m higher than the lowest point of the cable. Determine the length of the cable. If the horizontal deck in loaded by a uniformly distributed load of 20 kN/m, find the tension in the cable.

4. Analyze the following continuous beam (fig. 6) using the flexibility of stiffness method of matrix analysis. **(20)**



(Constant : EI)

Fig. 6

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Define shape factor and obtain its value for a T-Section

with the following dimensions shown in fig. 7.

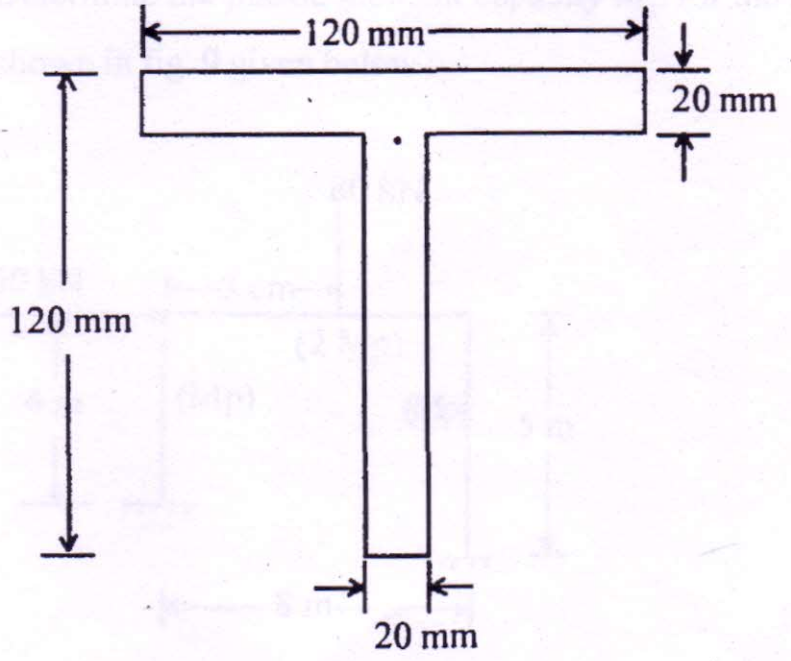
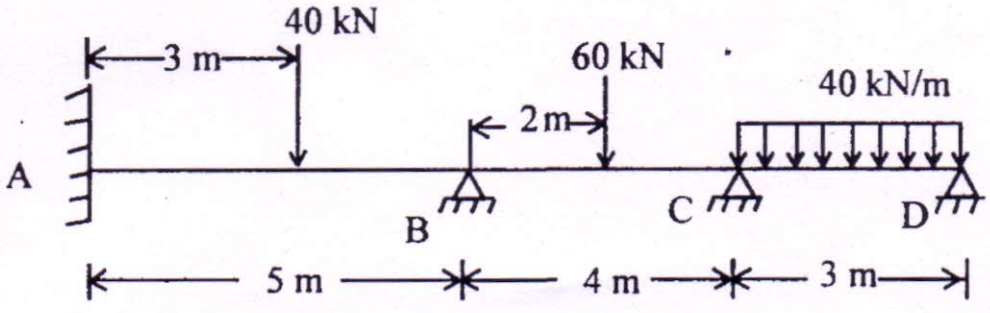


Fig. 7

If yield stress of steel is 250 N/mm^2, find the plastic moment capacity of the section.

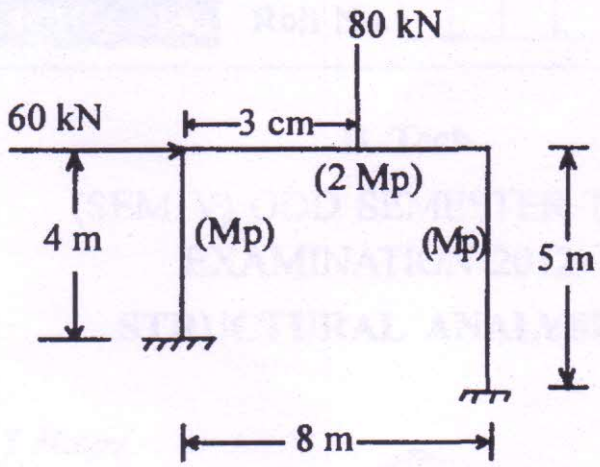
(b) Determine the plastic moment capacity Mp, required for the continuous beam shown in Fig. 8. Assume the same flexural rigidity throughout the beam.



(Constant : EI)

Fig. 8

(c) Determine the plastic moment capacity Mp for the frame shown in fig. 9 given below :



(Constant : EI)

Fig. 9