Code No: **R31015** **R10** **Set No. 1**

III B.Tech I Semester Supplementary Examinations, October/November-2018

STRUCTURAL ANALYSIS – II

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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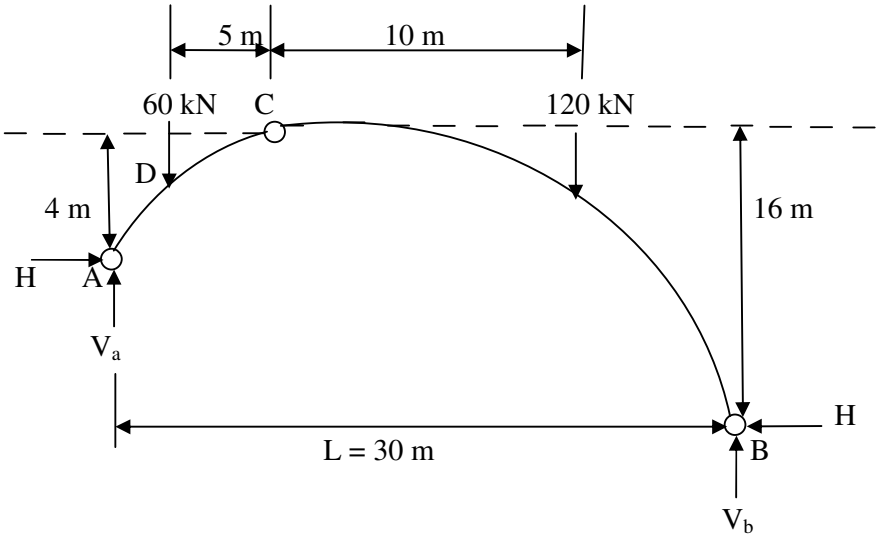
1 a) A three hinged parabolic arch of span l has its abutments A and B at depths h_1 and h_2 below the crown C. The arch carries a concentrated load W at the crown. Determine the horizontal thrust, at each support.

b) A three hinged parabolic arch ACB of span 30 m has its supports at depths 4 m and 16 m below the crown hinge C. The arch carries a point load of 60 kN at a distance of 5 m from C and a point load of 120 kN at a distance of 10 m from C as shown in figure. Find the reactions at the supports and the bending moments under the loads.

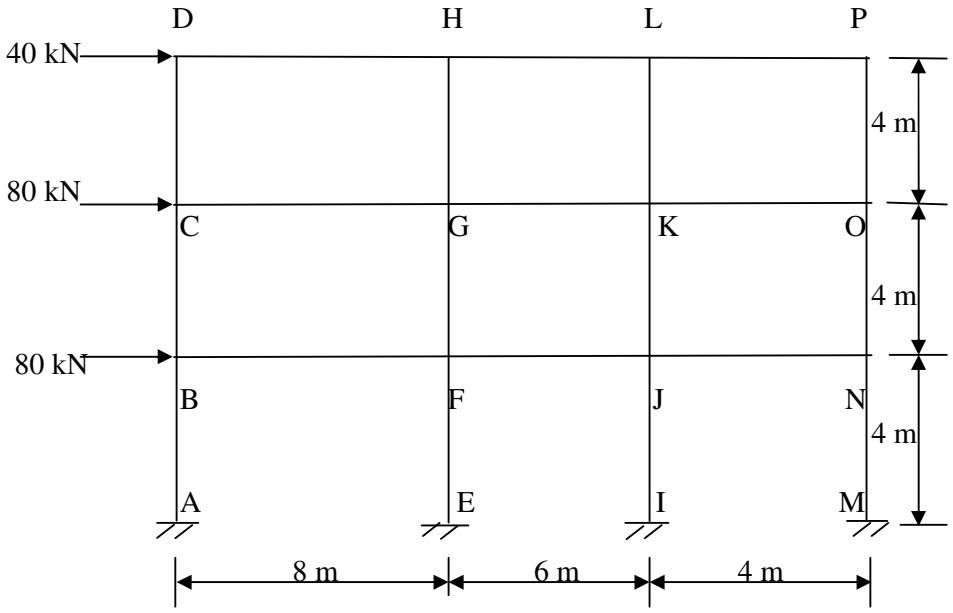


2 a) A two hinged semicircular arch of radius R carries a concentrated load W at the crown. Find the vertical deflection of the crown. Assume uniform flexural rigidity.

b) A two hinged parabolic arch of span 40 m and rise 8 m carries a point load of 80 kN at a distance of 10 m from the left support. Find the horizontal thrust at each support. Find also the maximum bending moment.

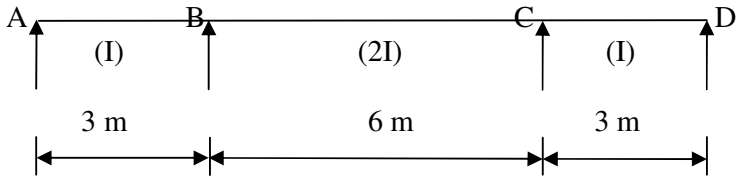
3 a) Differentiate portal method and cantilever method of analysis.

b) Analyze the frame shown in figure by cantilever method. Area of each exterior column is one half of the area of interior column.



4 The cables of a suspension bridge have a span of 60 m and a central dip of 7.5m. Each cable is stiffened by a girder hinged at ends and also at middle so as to retain a parabolic shape for the cables. The girder is subjected to a dead load of 10 kN/m and a live load of 20 kN/m, 15 m long. Find the maximum tension in the cable when the leading edge of live load is just at the centre of girder. Draw also SF and BM diagrams for the girder.

5 a) Analyze the continuous beam shown in figure, if the supports B and C sink by 2 mm and 7 mm respectively. Take E = 200 kN/mm^2 and I = 2.5 x 10^7 mm^4 using moment distribution method.



b) Explain about the procedure of substitute frame method.

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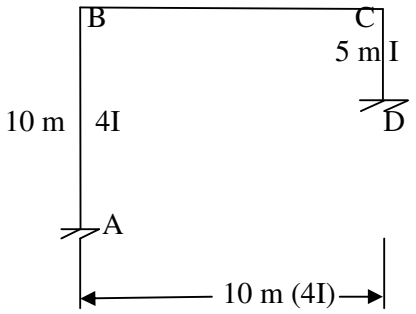
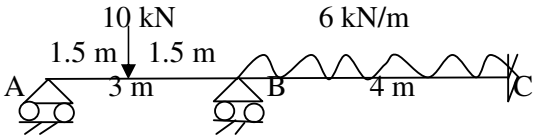
6 a) A continuous beam ABC consists of spans AB and BC of lengths 3 m and 4 m respectively. The end A is simply supported while the end C is fixed. The beam carries a point load 16 kN at the centre of span AB and a point load of 24 kN on the span BC at a distance of 2.5 m from C. Determine the support moments. Assume uniform section for the beam. Use kani's method.

b) Explain about the procedure of kani's method.

7 Develop the flexibility matrix for frame ABCD with reference to the coordinates shown in figure.



8 Analyze the continuous beam shown in figure using stiffness method.



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