Paper Code: CE-504	**Roll No.**										

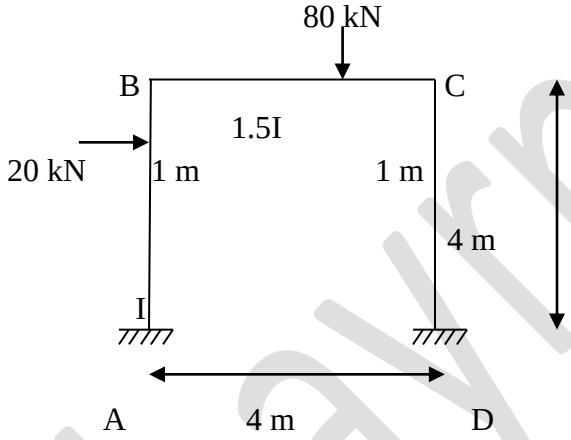
B. TECH
(SEM. V) ODD SEMESTER THEORY EXAMINATION 2016-17
STRUCTURAL ANALYSIS II

[Time: 3 hrs.] **[Max. Marks: 100]**

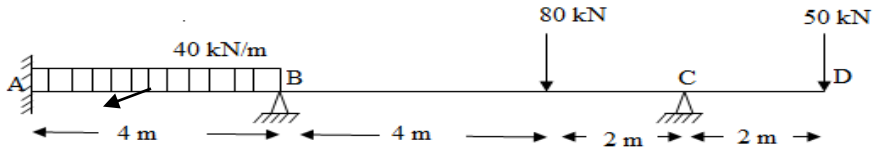
Note: Attempt all questions. Each question carries equal marks.

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

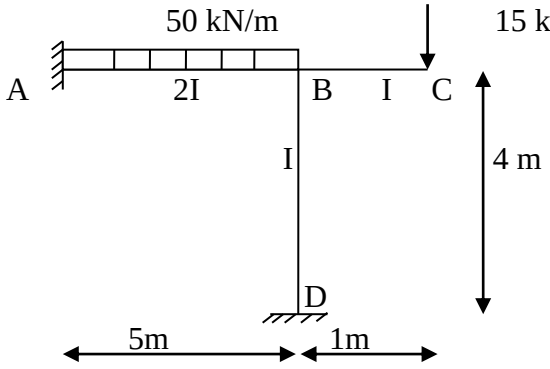
(a) Analyze the frame shown below using slope deflection method and draw the bending moment diagram.



(b) Analyze the continuous beam using slope deflection method. Draw the SFD and BMD. Sketch the deflected shape.



(c) Using moment distribution method to analyze the frame shown in Fig.3. Draw the bending moment diagram

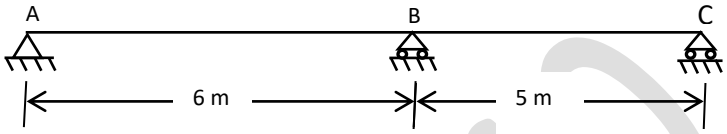


2. Attempt any **TWO** parts of the following:- **(10×2=20)**

(a) Show that the horizontal thrust (H) developed in a two hinged parabolic arch of span 'L' and rise 'h', subjected to a concentrated load W at a distance '*a*' from a springing is given by : $H = \left(\frac{5}{8}\right)\left(\frac{W}{hL^3}\right) a(L-a)(L^2+La-a^2)$

(b) A two hinged parabolic arch of span 30 m and rise 7.5 m carries a uniformly distributed load of 10 kN/m on the left half of the span. Determine (i) the horizontal thrust at each support (ii) position and magnitude of maximum bending moment (iii) normal thrust and radial shear at the section of maximum bending moment.

(c) Define Muller Breslau's principle. Find the influence line diagram for the reaction at B in the continuous beam shown in *fig.* after calculating ordinates at 2m, 4m, 6m, 8m and 10m distances from left support A. Take EI constant throughout.



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

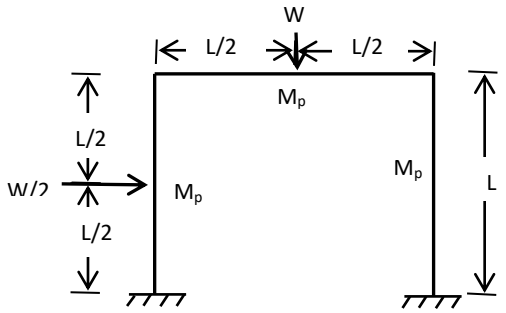
a) A suspension bridge of 120 m span has two hinged stiffening girders supported by two cables, having central dip of 12m. The dead load on the bridge is 6 kN/m^2 and the live load is 12 kN/m^2, which covers the left half of the span. Determine the shear force and bending moment for the girder at 30m and 45 m from the left end. Find also the maximum tension in the cable. The roadway is 6m.

b) The three hinged stiffening girder of a suspension bridge of span 120 metres is subjected to two point loads of 240 kN and 300 kN at distances 25 metres and 80 metres from the left end. Find the shear force and bending moment for the girder at a distance of 40 metres from the left end. The supporting cable has a central dip of 12 metres. Find also the maximum tension in the cable and draw the B.M. diagram for the girder.

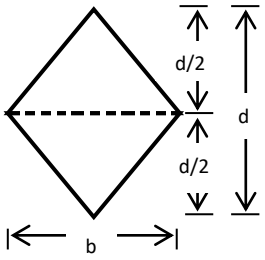
c) A suspension cable of span 20 m and central dip 2 m is carrying a UDL of 20 kN/m^2. Find the horizontal pull in the cable. Also find the maximum and minimum tensions in the cable.

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

a) Find the value of collapse load for the frame shown in *figure*



b) Define the term 'Plastic hinge'. Find the shape factor for the section shown below

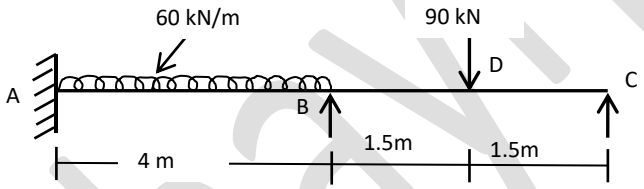


c) Write down the various assumption made in plastic theory.
A beam of rectangular section and span l carries a point load at a distance $l/3$ from one end. Determine at collapse condition what part of the beam is fully elastic.

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

a) What do you understand by matrix analysis of structures? Explain the methods used for analysis.

b) Find the support reactions and moment for the continuous beam shown in fig. using slope deflection method. Also draw the bending moment diagram.



c) Derive a stiffness matrix for the given beam