Total No. of Questions—**8**] [Total No. of Printed Pages—**5**

Seat No.	

[5252]-509

S.E. (Civil) (Second Semester) EXAMINATION, 2017

STRUCTURAL ANALYSIS-I

(2015 Pattern)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. **1** *or* Q. **2**, Q. **3** *or* Q. **4**, Q. **5**, *or* Q. **6**, Q. **7** *or* Q. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

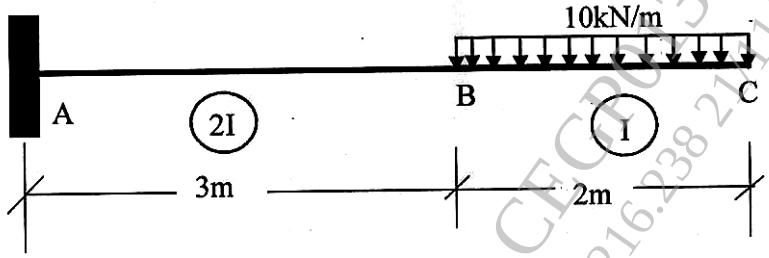
(*iii*) Figures to the right indicate full marks.

(*iv*) Assume suitable data, if necessary.

(*v*) Use of electronic pocket calculator is allowed.

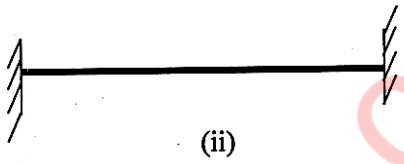
1. (*a*) Write note on Degree of freedom, Determinacy and Indeterminacy. [6]

(*b*) Find slope and deflection at points 'B' and 'C' for cantilever beam by moment area method. [6]

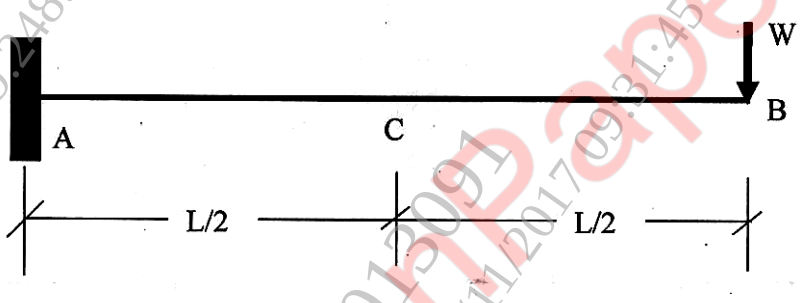


P.T.O.

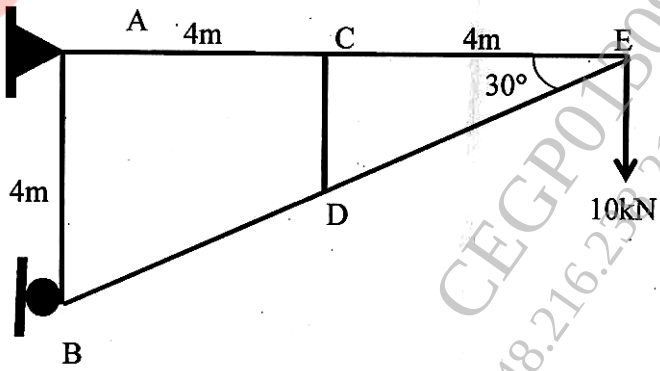
2. (*a*) Determine static and kinematic indeterminacy of the following beams. : [6]



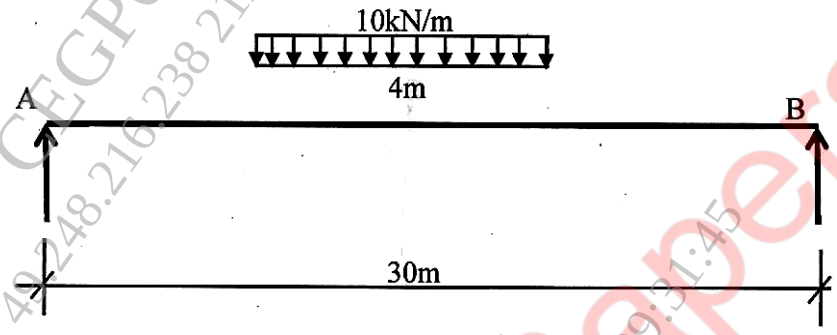
(*b*) Determine deflection at 'C' by Castigliano's first theorem. [6]



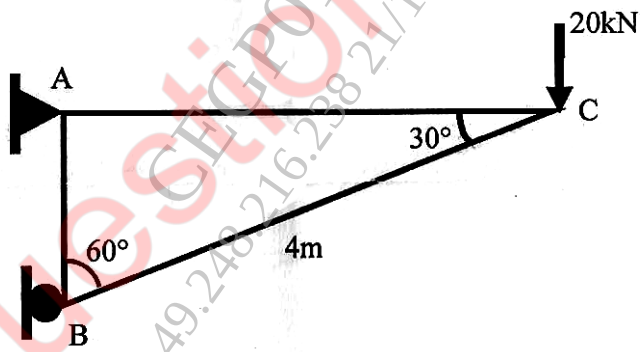
3. (*a*) A cantilever truss shown below is loaded by a vertical force of 10 kN at free end. Find the total deflection at the free end in terms of AE which is constant. [6]



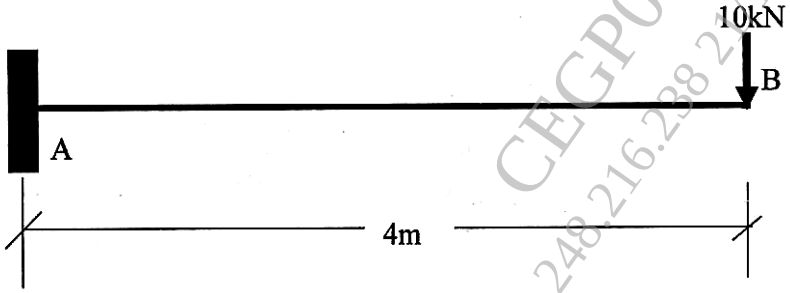
(*b*) A uniformly distributed load of 10 kN/m intensity, 4 m in length crosses a girder of span 30 m from right to left. With the help of influence lines, determine the values of shear force and bending moment at a point of 10m from left end when the head of the load is 12 m from the left support. [6]



4. (*a*) Determine total deflection of joint 'C'. A = 100 mm^2, E = 200 GPa. [6]



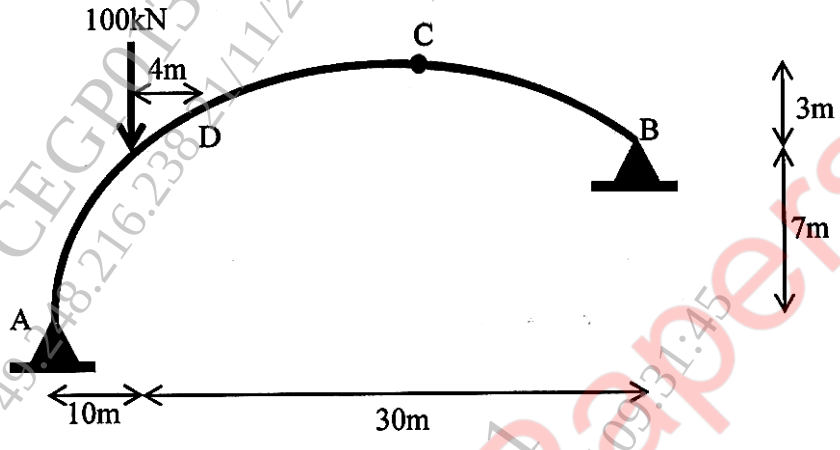
(*b*) For the cantilever beam shown below, calculate reactions at fixed end by influence line diagram method. Also draw influence line diagrams. [6]



5. A three hinged parabolic arch is loaded and supported as shown in figure below. Determine : [13]

(*a*) Support reactions

(*b*) Maximum positive and negative bending moment.



6. Determine horizontal thrust for a two hinged parabolic arch of span 'L' and central rise 'H' carries a point load 'W' at a distance 'a' from left hand support. Assume $I = I_0 \sec \theta$. [13]

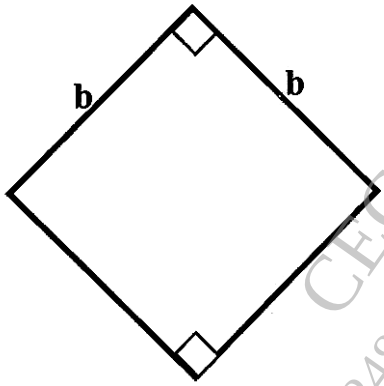
7. (*a*) Explain : [6]

(*i*) Plastic Moment

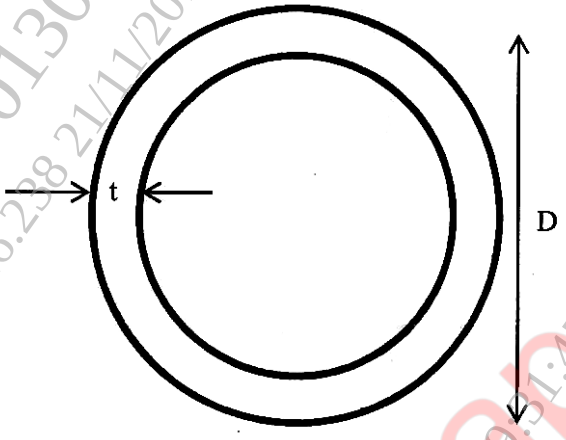
(*ii*) Plastic Collapse

(*iii*) Elastic-Plastic behavior of beam

(*b*) For the cross-section of the beam shown below find the shape factor. [7]



8. (*a*) For the cross-section shown below, find the shape factor. [7]



(*b*) Write note on Shape factor and Plastic section modulus. [6]