

(Pages : 3)

**K – 4426**

Reg. No. : .....

Name : .....

**Fourth Semester B.Tech. Degree Examination, September 2020**

**(2008 Scheme)**

**08.403 : STRUCTURAL ANALYSIS – I (C)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions :

1. Derive the differential equation for computation of deflection of beams.
2. Explain Macaulay's method for a beam with external moment.
3. State and prove Castigliano's first theorem.
4. Explain the advantages of arches over beams to carry the same load system.
5. State and explain Clark-Maxwell's reciprocal theorem.
6. Explain the method of tension coefficients for 3 D pinjointed frames.
7. Derive the secant formula for a long column subjected to eccentric loading.
8. What is influence line diagram? What are its uses?

**(8 × 5 = 40 Marks)**

P.T.O.



PART – B

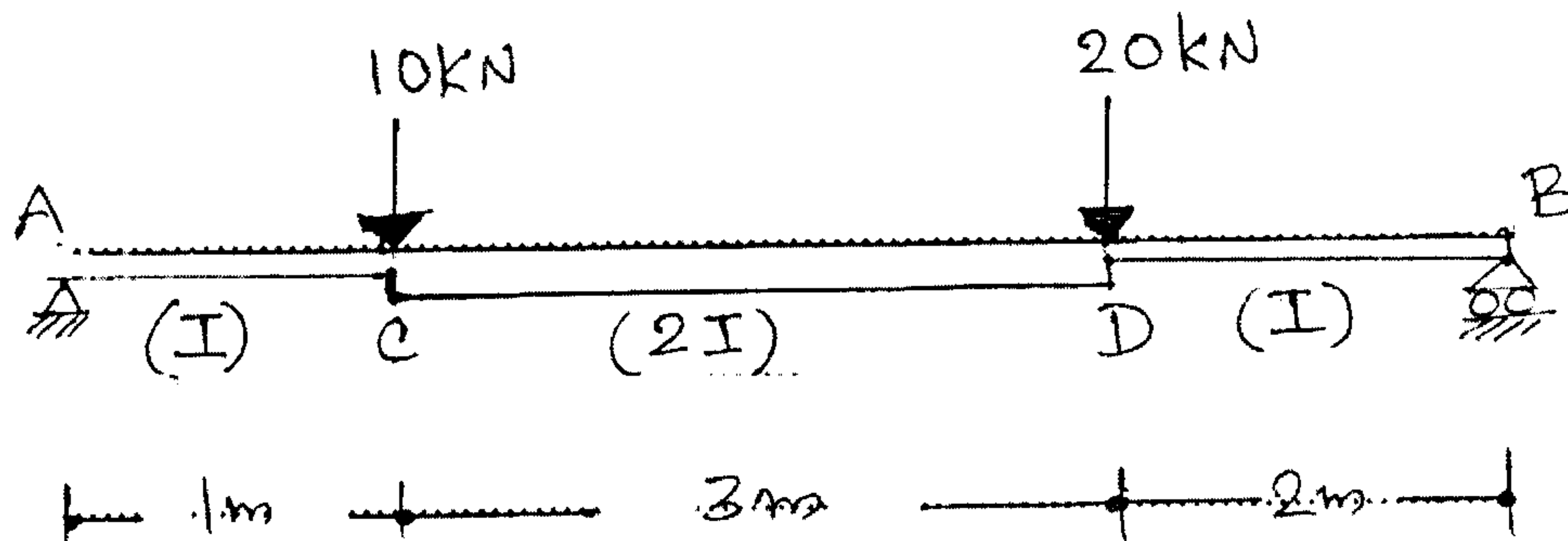
Answer **any one** questions from **each** Module.

**Module – I**

9. A simply supported beam of span 6 m is carrying a point load 60 kN at 4 m from left support. Compute the deflection under the load and maximum deflection using Moment-Area method.

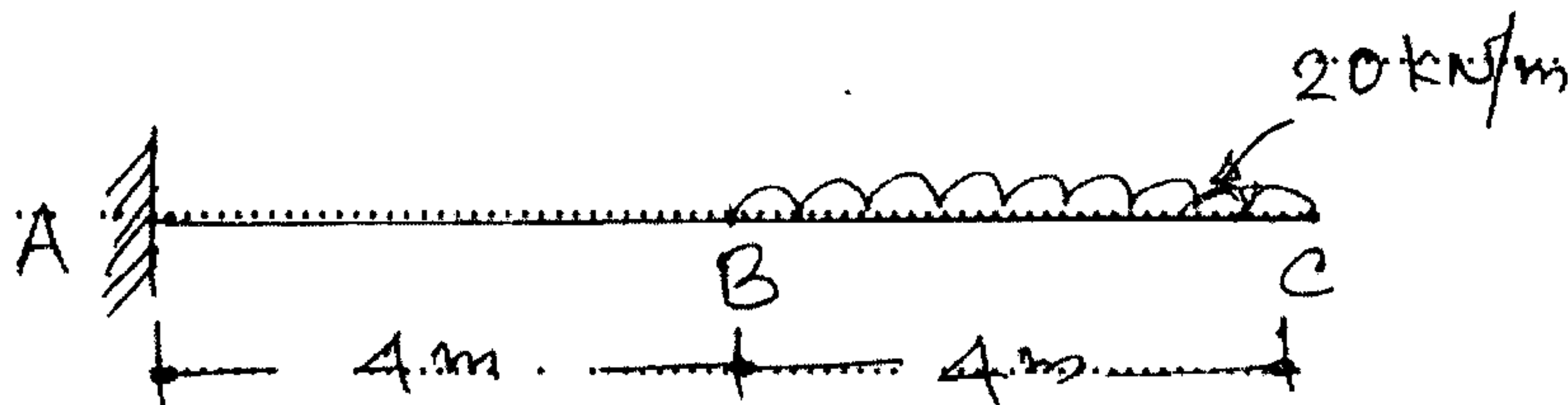
OR

10. Compute the deflection under the load D and slope at B for the beam shown below using conjugate beam method. 20



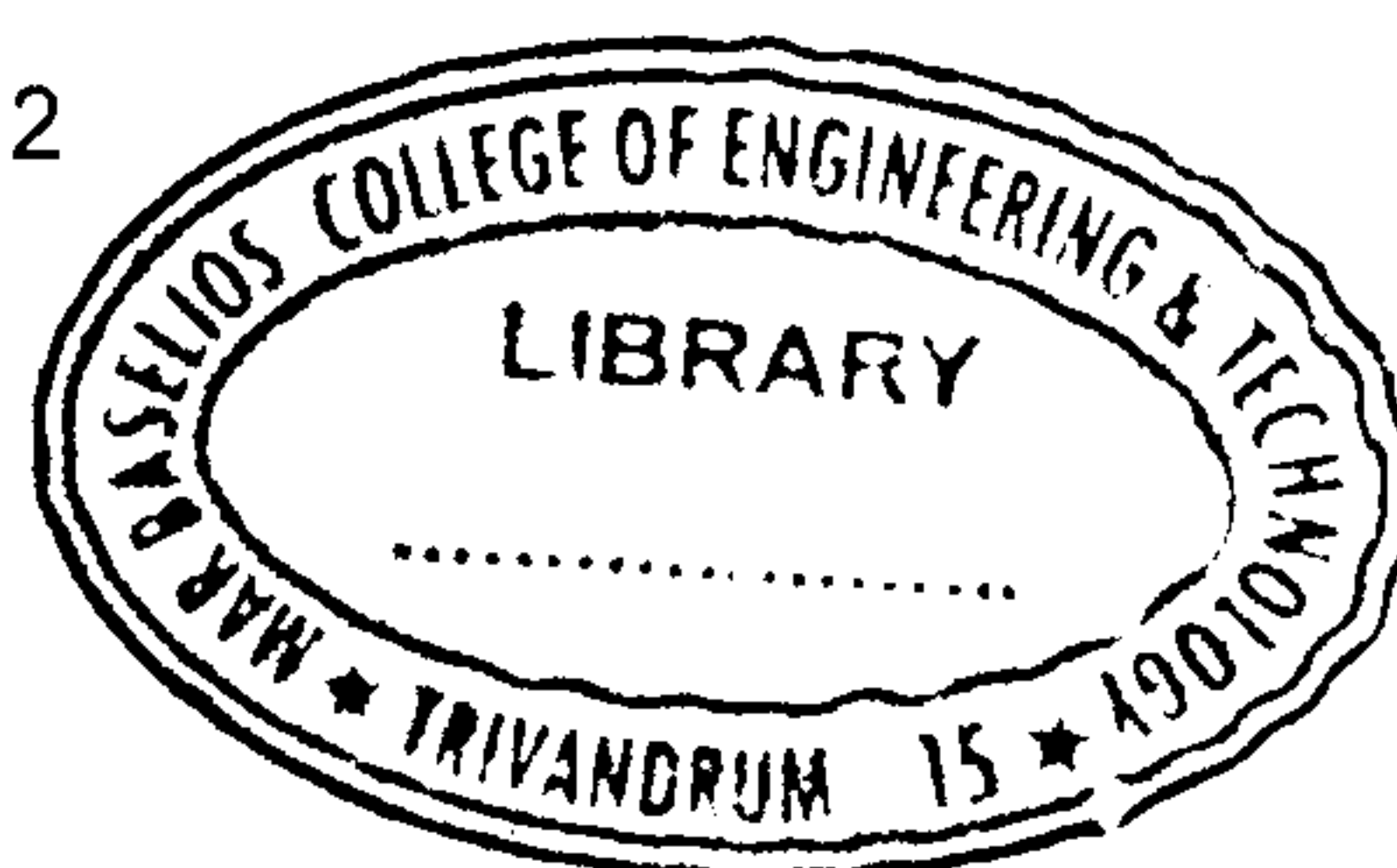
**Module – II**

11. Determine the vertical deflection and slope at the free end of the cantilever shown in figure by principle of virtual work



OR

12. A three hinged parabolic arch of span 30 m and rise 3 m carries a udl of 20 kN/m over the left half portion. Calculate the reactions at the hinges. Find also the Bending moment, Normal thrust and shear force at 7.5 m from left hinge. 20



### Module – III

13. Compare the ratio of the strength of a solid steel column to that of a hollow column of the same cross sectional area. The internal diameter of hollow column is  $\frac{3}{4}$  of the external diameter. The columns have the same length and are
14. pinned at the ends.

OR

15. A simply supported girder of 20 m span having a dead load of 12 kN/m is traversed by a live load of 4 kN/m, 10 m long. Find the maximum BM at 8 m from left support. Also find absolute maximum BM and SF. **20**

