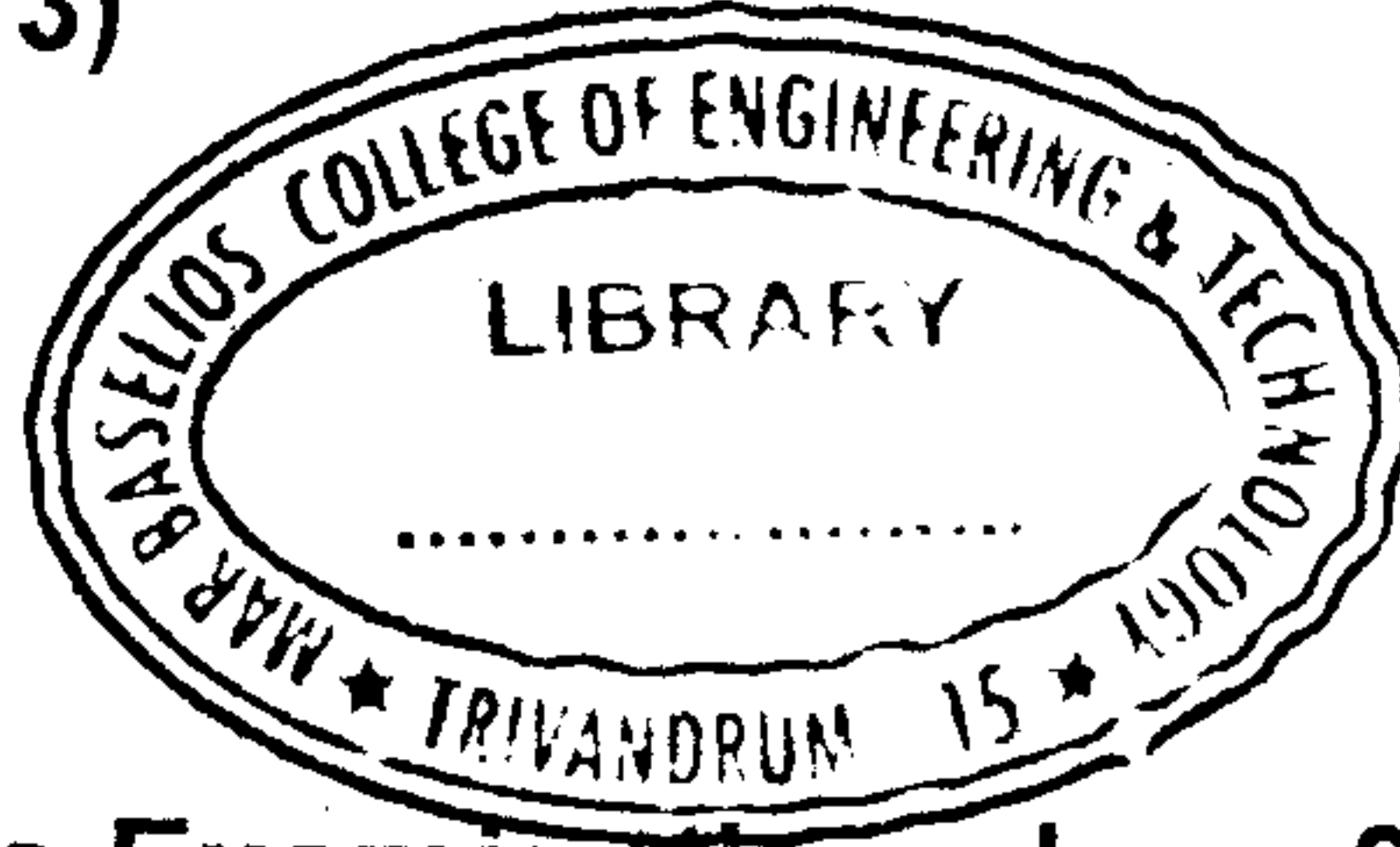


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G – 3326

Reg. No. :

Name :



Fourth Semester B.Tech. Degree Examination, June 2019

(2008 Scheme)

08.403 : STRUCTURAL ANALYSIS – I (C)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. Each question carries 5 marks.

1. State the theories of the conjugate beam method.
2. How do you differentiate the static indeterminacy from the determinacy of the structures?
3. Derive Maxwell's reciprocal theorem.
4. Write the principle and procedure for tension coefficient method.
5. Find the bending moment at a section 4 m from the left end of a three hinged parabolic arch due to udl of 10 kN/m over entire span 30 m.
6. Show the failure of short and long column with neat sketches.
7. What are the various stresses set up in the column?
8. Draw the ILD for shear force and bending moment of a cantilever carrying a point load at a distance 'a' from the free end.

(8 × 5 = 40 Marks)

P.T.O.

PART – B

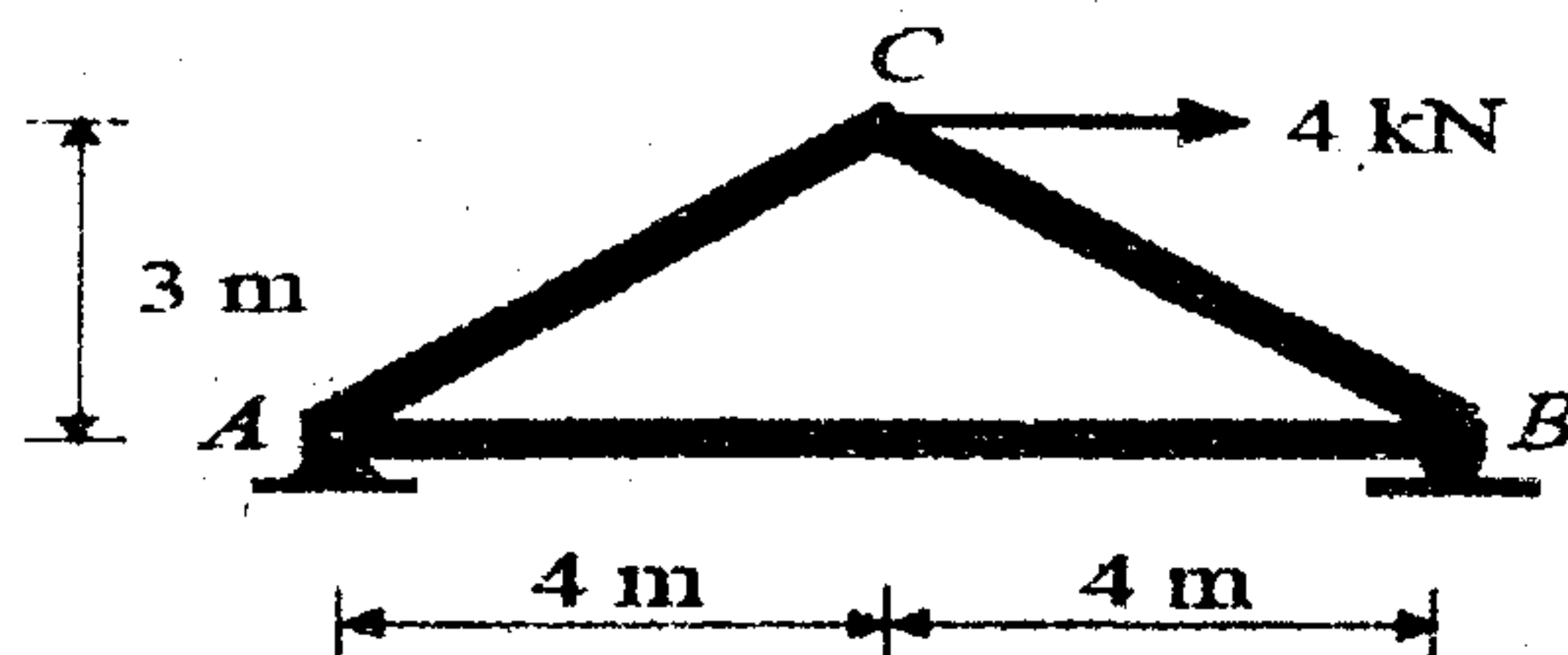
Answer **one full** questions from **each** Module. Each question carries 20 marks.

Module – I

9. A cantilever 2 m long is loaded with a point load of 1.4 kN at free end and distributed loaded load of 3.4 kN per meter run over 1.2 m from the fixed end. If the section is rectangular 80 mm × 160 mm. calculate the slope and deflection at the free end. Take $E = 1 \times 10^7$ kN/m². **20**
10. Find an expression for the strain energy due to bending for a beam of length L simply supported at the ends and carrying a uniformly distributed load w per unit run over whole of its span. The beam is of constant cross section throughout its length having flexural rigidity as EI . **20**

Module – II

11. The cross sectional area of each member of the truss shown in the figure is 400 mm² and $E = 200$ GPa. Using the principle of virtual work determine the vertical displacement of joint C is a 4 kN force is applied to the truss at C. **20**



12. A three hinged circular arch of span 16 m and rise 4 m is subjected to two point loads of 100 kN and 80 kN at the left and right quarter span points respectively. Find the reactions at supports. Find also the bending moments, radial shear and normal thrust at 6 m from the left support. **20**

Module – III

13. A short length of tube 4 cm internal diameter and 5 cm external diameter failed in compression at a load of 240 kN. When a 2 m length of the same tube was tested as a strut with fixed ends, the load was 158 kN. Assuming that 'a' in Rankine's formula is given by the first test, find the value of the constant 'a' in the same formula. What will be the crippling load of this tube if it is used as a strut 3 m long with one end fixed and the other hinged? **20**

14. Two point loads of 100 kN and 200 kN spaced 3 m apart cross a girder of span 15 m from left to right with the 100 kN load leading. Draw influence line for shear force and bending moment and find the value of maximum shear force and bending moment at a section 6 m from the left hand support. Also, find the absolute maximum bending moment due to the given load system. 20

(3 × 20 = 60 Marks)

