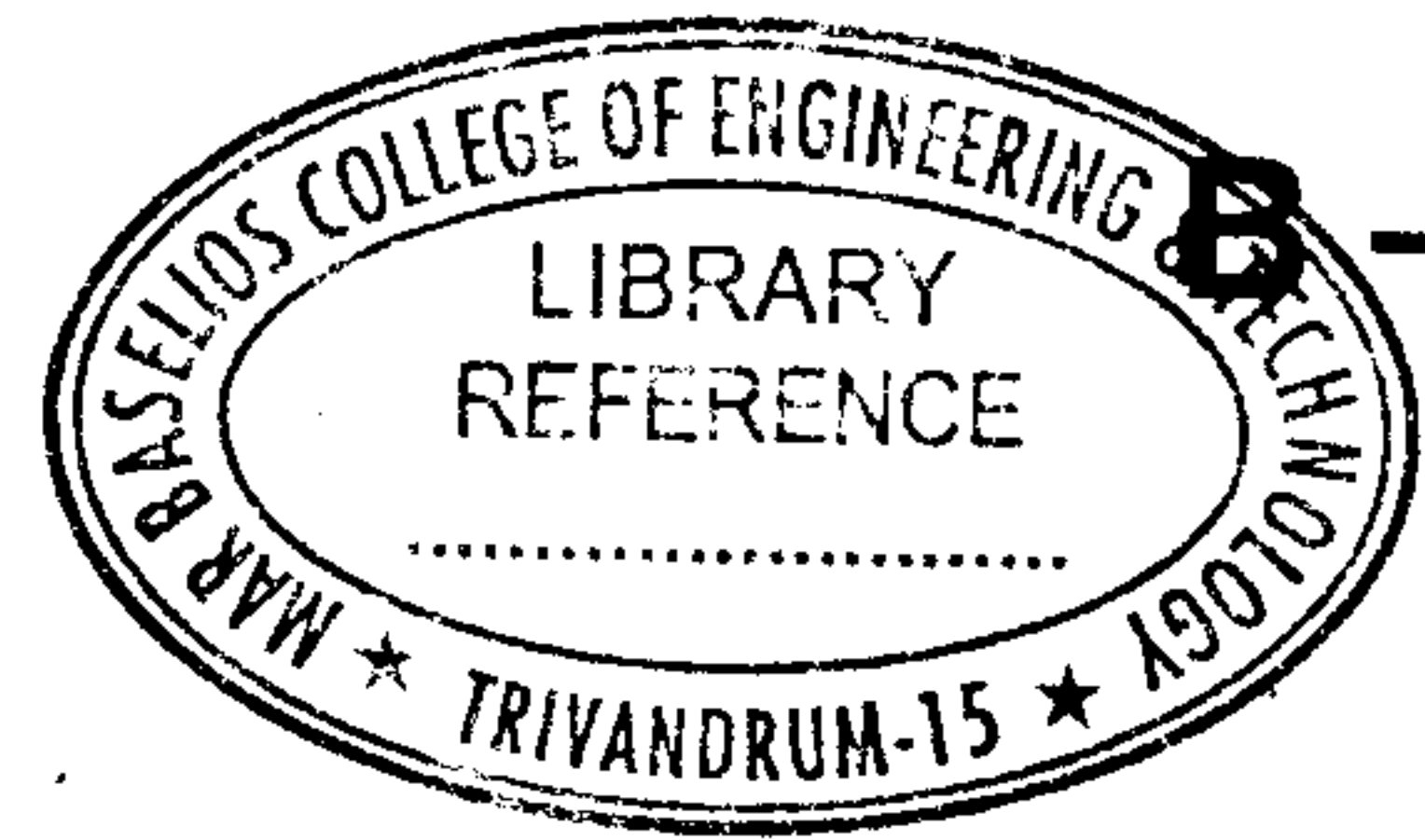




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B - 6065

Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, June 2017
(2008 Scheme)
08.403 : STRUCTURAL ANALYSIS – I (C)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **5** marks. **(8×5=40 Marks)**

1. Distinguish between the real beams and conjugate beam.
2. Briefly explain the Castigliano's first and second theorem.
3. Determine the deflection of cantilever beam carrying a concentrated load at the free end.
4. Write the procedure to find deflection of pin jointed frames by virtual work method.
5. Find the horizontal thrust of a three hinged parabolic arch of span 40 m carrying a point load of 100 kN at point 10 m from the left support.
6. Write the crippling load for all the end conditions of the column.
7. State and explain the Macaulay's method.
8. Draw the influence line for shear force and bending moment at a section 2 m from the left end of a simply supported beam of span 6 m.

PART – B

Answer **one full** question from **each** Module. **Each** question carries **20** marks. **(3×20=60 Marks)**

Module – I

9. A steel girder of uniform section, 14 m long is simply supported at its ends. It carries concentrated loads of 90 kN and 60 kN at two points 3 m and 4.5 m from the two ends respectively. Calculate :
 - i) The deflection of the girder at the points under the two loads.
 - ii) The maximum deflection. Take $I = 64 \times 10^{-4} \text{ m}^4$ and $E = 210 \text{ GN/m}^2$. Use Macaulay's method.

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P.T.O.



10. Using Castigliano's theorem, calculate the vertical deflection at the middle of a simply supported beam which carries a UDL of intensity w over the full span. The flexural rigidity EI of the beam is constant and only strain energy of bending is to be considered. 20

Module – II

11. Using the method of virtual work, calculate the deflection under the load point of a simply supported beam of span 6 m subjected to a concentrated load of 45 kN at 2 m from the left support. Take $E = 200 \text{ GN/m}^2$ and $I = 14 \times 10^{-6} \text{ m}^4$. 20
12. A parabolic three hinged arch carries a UDL of 30 kN/m on the left half of the span. It has a span of 16 m and a central rise of 3 m. Determine the resultant reactions at supports. Find the bending moment, normal thrust and radial shear at a section 2 m from left support. 20

Module – III

13. A 1.2 m long column has a circular cross section of 45 mm diameter one of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 3, calculate the safe load using : 20
- i) Rankine's formula, take yield stress = 560 N/mm^2 and $a = 1/1600$.
 - ii) Euler's formula, Young's modulus for cast iron = $1.2 \times 10^5 \text{ N/mm}^2$.
14. Draw the ILD for shear force and bending moment for a section at 5 m from the left hand support of a simply supported beam, 20 m long. Hence, calculate the maximum bending moment and shear force at the section, due to a uniformly rolling load of length 8 m and intensity 10 kN/m run. 20
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