

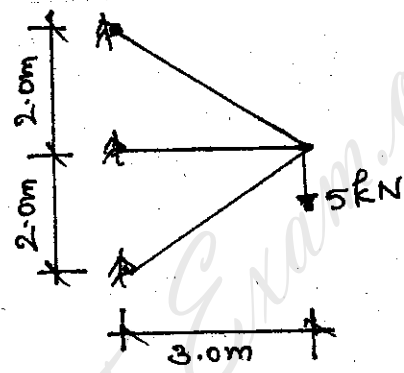
# B. Tech Degree IV Semester Examination, April 2009

## CE 403 ANALYSIS OF STRUCTURES I (Common for 1999 & 2002 Schemes)

Time : 3 Hours

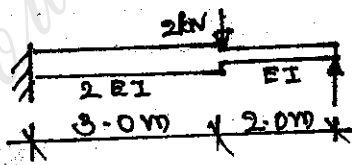
Maximum Marks : 100

- I. (a) State Castigliano's theorems and deduce useful expression from these two for structural analysis. (8)
- (b) Find the deflection at the point D using principle of virtual work. All members are of same cross sectional area  $10 \text{ cm}^2$  and of material with Young's modulus  $2 \times 10^5 \text{ N/mm}^2$ . (12)



OR

- II. (a) State and prove Maxwell's law of reciprocal deflections. (8)
- (b) Analyse the beam shown in figure using strain energy method. (12)



- III. (a) What are enveloping curves? Explain their uses. (6)
- (b) A moving load of 10 kN and 5 kN of 5 m length apart passes over a beam of span 18.0 m. Find the maximum effects of this load on the beam, if the ends simply supported. (14)

OR

- IV. (a) Explain the Muller Breslav's principles. (6)
- (b) Explain the procedure to evaluate the maximum forces in the diagonal member of a truss bridge while considering the live loads due to traffic. (14)

- V. From first principle derive the influence coordinate for bending moment and shear force and reactions of a simply supported beam. (20)

OR

- VI. Explain the procedure for plotting influence line for shear force and bending moment in the members of a braced girder. (20)
- VII. A suspension cable is supported at points A and B which are 20 m apart. The level difference between A and B is 2.0 m. It carries a central load of 5 kN and another load of 3 kN, 2 m right of the central load. The dip at centre is 3.0 m with respect to A. Find the tension in the cable, and length of the cable. (20)
- OR**
- VIII. Derive the equation for the shape of a cable under self weight. Also find the length of the cable. (20)
- IX. A symmetrical 3 hinged semi circular arch of radius 10 m carried a uniformly distributed load of 15 kN/m on the whole span. Besides it carries two concentrated loads of 2 kN, symmetrically located, 1 m left and right of crown hinge. Calculate (i) the support reactions (ii) bending moment, shear force and axial thrust below the left concentrated load. Also plot the bending moment diagram. (20)
- OR**
- X. A parabolic arch, hinged at the two supports is of uniform moment of inertia and has a span of 20 m, and central rise 5.0 m. It carries a udl of 40 kN/m on the left half of the span. Draw the bending moment diagram and find the shear force and normal thrust at the left quarter point. (20)

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