

Fourth Semester B.E. Degree Examination, June/July 2015
Structural Analysis – I

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.
2. Missing data, if any, may be suitably assumed.

PART – A

- 1 a. Distinguish between statically determinate and indeterminate structures with examples. (08 Marks)
- b. Find degree of indeterminacy of following structure shown in Fig. Q1(b). (06 Marks)

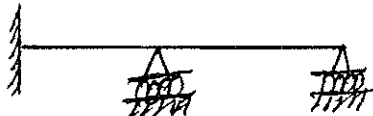


Fig.Q1(b)(i)

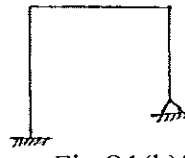


Fig.Q1(b)(ii)

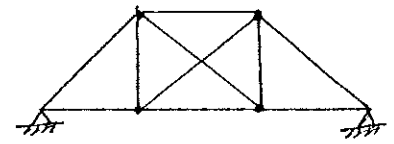


Fig.Q1(b)(iii)

- c. Derive an expression for strain energy stored due to bending. (06 Marks)
- 2 a. A cantilever beam of length 4 m is loaded as shown in Fig. Q2(a). Calculate the deflection and slope at free end by moment area method. Taking EI is constant. (10 Marks)

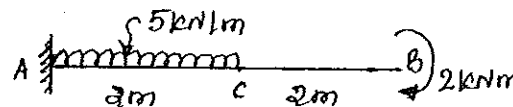


Fig.Q2(a)

- b. For the beam shown in Fig. Q2(b). Determine slope at left support and deflection at 100 kN load, using conjugate beam method. (10 Marks)

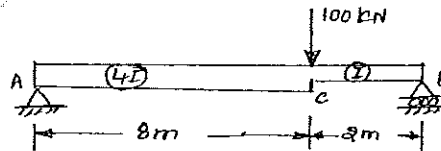


Fig.Q2(b)

- 3 a. Find the vertical deflection at C for the bent shown in Fig. Q3(a), by real work method [strain energy]. Take EI is constant. (10 Marks)

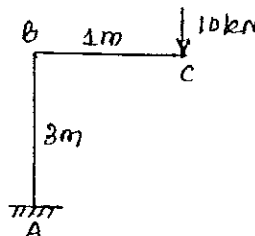


Fig.Q3(a)

- b. Determine the deflection under 60 kN loads in the beam shown in Fig.Q3(b), by strain energy method. (10 Marks)

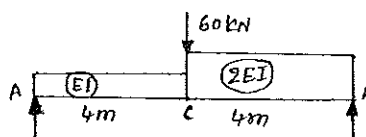


Fig.Q3(b)

- 4 a. Determine the reaction at prop for a propped cantilever beam carrying of UDL of w /unit length throughout span. Take EI is constant using strain energy method. (08 Marks)
 b. Analyse the fixed beam by strain energy method and draw SFD and BMD. Shown in Fig.Q4(b). (12 Marks)

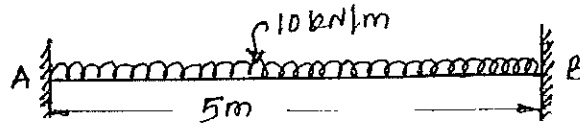


Fig.Q4(b)

PART – B

- 5 a. A three hinged parabolic arch has a span of 20 mts and rise of 5 mts. It carries a udl of 2 kN/m over the left half of the span and a point load of 12 kN at 5 mts from the right end. Find the BM, normal thrust and radial shear at a section 4 mts from left end. (12 Marks)
 b. A cable is suspended between two points A and B 100 mts apart and a central dip of 8 mts. It carries udl of 20 kN/m. Find : i) length of the cable ii) maximum and minimum tension in the cable. (08 Marks)
- 6 a. Draw SFD and BMD for the propped cantilever beam loaded as shown in Fig. Q6(a). Using consistent deformation method. (10 Marks)

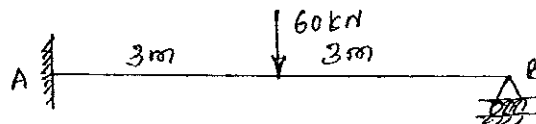


Fig.Q6(a)

- b. Analyse the fixed beam shown in Fig.Q6(b). draw BMD and SFD by consistent deformation method. (10 Marks)

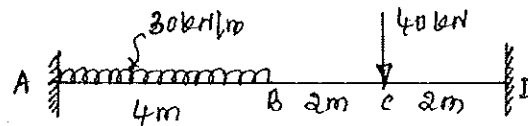


Fig.Q6(b)

- 7 Analyse the continuous beam shown in Fig.Q7, by Clapeyron's three moment theorem. Draw SFD and BMD. Take EI is constant. (20 Marks)

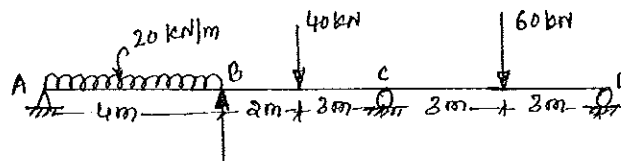


Fig.Q7

- 8 Find the horizontal thrust for the two hinged arch as shown in Fig.Q8. The moment of inertia at any section is $I_c \sec \theta$ where θ is the slope at section and I_c is MI at the crown. Neglect the effect of rib shortening. Draw BMD. (20 Marks)

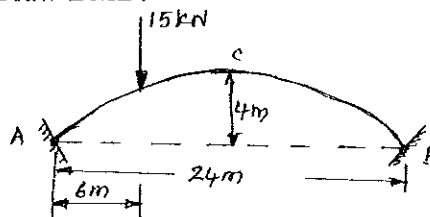


Fig.Q8
