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Question Paper Code : 71259

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Sixth Semester

Civil Engineering

CE 2351/CE 61/CE 1352/080100036/10111 CE 602 — STRUCTURAL ANALYSIS — II

(Regulation 2008/2010)

(Common to PTCE 2351/10111 CE 602 — Structural Analysis – II for B.E. (Part-Time) Fourth Semester – Civil Engineering – Regulation 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between determinate and indeterminate structures.

2. Find the degree of indeterminacy of a propped cantilever beam.

3. Write the element stiffness matrix for a beam element.

4. When is stiffness method preferred over flexibility method?

5. List the factors governing the selection of element type in finite element analysis.

6. What do you understand by plane stress condition? Give examples.

7. List the assumptions made in plastic analysis.

8. State the upper and lower bound theorems.

9. Why are stiffening girders used in suspension bridges?

11. (a) A continuous beam ABC is fixed at A and has roller supports at B and C. AB = 5 m and BC = 3 m. It is subjected to a udl of intensity 15 kN/m throughout the span. Analyse the beam using flexibility matrix method. EI is constant throughout.

Or

(b) Analyse the portal frame shown in Fig. Q. 11 (b) using flexibility matrix method. EI is constant throughout.

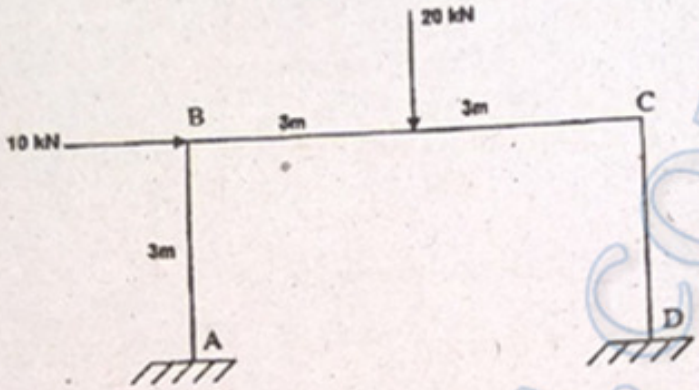

Fig. Q. 11 (b)

12. (a) Analyse the continuous beam shown in Fig. Q. 12 (a) using displacement method. EI is constant throughout.

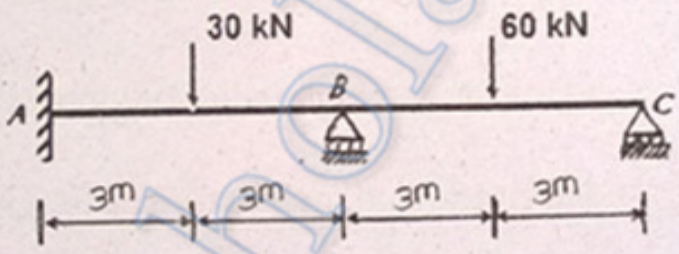

Fig. Q. 12 (a)

Or

(b) Analyse the pin-jointed truss shown in Fig. Q. 12 (b) by stiffness matrix method. Take area of cross-section for all members = 1000 mm^2 and modulus of elasticity E = 200 kN/mm^2.

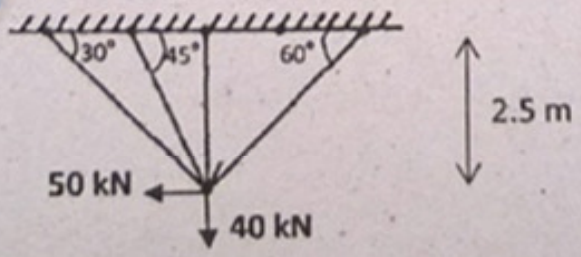

Fig. Q. 12 (b)

13. (a) Analyse the truss shown in Fig. Q. 13 (a) using finite element method. AE is constant.

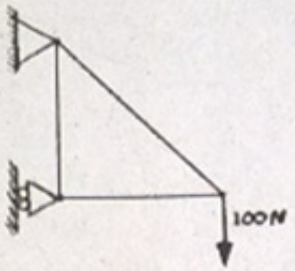

Fig. Q. 13 (a)

Or

(b) Discretise a fixed beam of length 'L' subjected to udl of intensity W kN/m and develop the element and global load vectors for the system.

14. (a) Find the plastic moment capacity of the beam shown in Fig. Q. 14 (a). EI is constant throughout.

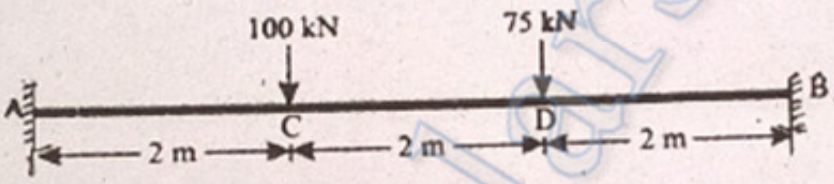

Fig. Q. 14 (a)

Or

(b) Determine the plastic moment capacity of the frame for the loading given in Fig. Q. 14 (b).

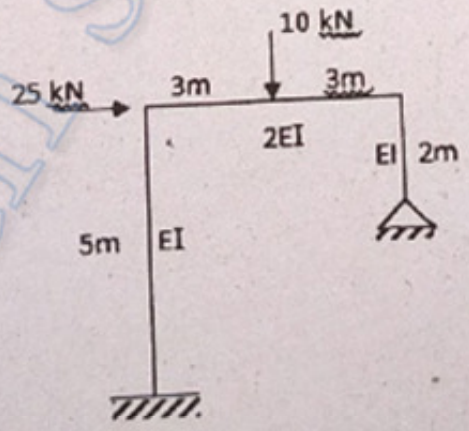

Fig. Q. 14 (b)

15. (a) A cable of span 100 m and dip 10 m is subjected to a rise in temp of 20° C. If the coefficient of thermal expansion of the cable material is 12×10^{-6}/°C, determine the increase in the dip of the cable. What are the changes in reactions and maximum tension, if the cable carries a load of 20 kN/m?

Or

(b) A suspension cable 80 m span and 12 m dip is stiffened with a two-hinged girder. The girder carries a dead load of 10 kN/m over the entire span and a concentrated load of 600 kN at 50 m from the left support. Determine the maximum tension in the cable and the shear force and bending moment at a section 35 m from the left support.
