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Question Paper Code : 60259

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Civil Engineering

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

(Regulations 2008/2010)

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

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are equilibrium equations?

2. Briefly explain indeterminacy of structures.

3. Write a short note on element stiffness matrix.

4. Define displacement vector.

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

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

7. What is meant by shape factor? What is the shape factor for a Triangular section?

8. What is the minimum number of members required to develop a stable space truss having four joints?

9. What are the methods available for the analysis of space trusses?

10. What is the need for cable structures?

PART B — (5 × 16 = 80 marks)

11. (a) Analyse the continuous beam shown in Fig. Q. 11(a) using force method.

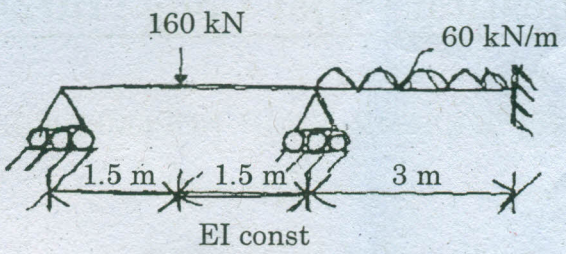

Fig. Q. 11(a)

Or

(b) Analyse the portal frame ABCD shown in Fig. Q. 11(b) using force method.

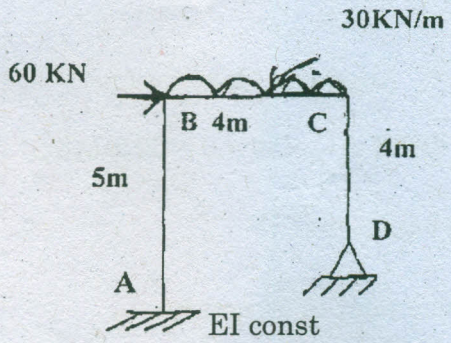

Fig. Q. 11(b)

12. (a) A portal frame ABCD with supports A and D are fixed at same level carries a uniformly distributed load of 4 tons/meter on the span BC. Span AB = span BC = span CD = 6 meters. EI is constant throughout. Analyse the frame by stiffness matrix method.

Or

(b) A two span continuous beam ABC is fixed at A and simply supported over the supports B and C. AB = 8 m and BC = 6 m. Moment of inertia is constant through out. A uniformly distributed load of 4 Ton/m acts over AB and a single concentrated central load of 8 Tons acts on BC. Analyse the beam by stiffness matrix method.

13. (a) Explain the types and applications of beam elements in finite element method.

Or

(b) Explain the methods of solving plane stress and plane strain problems using finite element method.

14. (a) Explain the following :

(i) Pure bending (8)

(ii) Plastic moment of resistance. (8)

Or

(b) A uniform beam of span 10 m and fully plastic moment M_p is simply supported at one end and rigidly clamped at other end. A concentrated load of 40 kN may be applied anywhere within the span. Find the smallest value of M_p such that collapse would first occur when the load is in its most unfavourable position.

15. (a) A cable of span 100 m and dip 10 m is subjected to a rise in temperature 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.

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