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Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 31211

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Civil Engineering

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

(Regulation 2008/2010)

(Common to PTCE 2351 – Structural Analysis – II for B.E. (Part-Time) Fourth Semester – Civil Engineering – Regulation 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are equilibrium equations?

2. Explain Indeterminacy of structures.

3. Write a note on global stiffness matrix.

4. What is Rotation matrix?

5. Mention the applications of beam element.

6. Define plane stress.

7. Explain pure bending.

8. State plastic moment of resistance.

9. Differentiate curved beams and beams curved in plan.

10. Give the applications of three hinged stiffening girders.

PART B — (5 × 16 = 80 marks)

11. (a) A two span continuous beam ABC is fixed at A and hinged at supports B and C. Span of AB = span of BC = 13 m. Set up flexibility influence co-efficient matrix assuming vertical reaction at B and C as redundant.

Or

(b) A cantilever of length 20 meters is subjected to a single concentrated load of 45 kN at the middle of the span. Find the deflection at the free end using flexibility matrix method. EI is uniform throughout.

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 following (i) Constant strain triangle (ii) Linear strain triangle.

Or

(b) Explain the types and applications of Truss elements in finite element method.

14. (a) A uniform beam of span 5 m and fully plastic moment M_p is simply supported at one end and rigidly clamped at other end. A concentrated load of 20 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.

Or

(b) Explain the following :

(i) Plastic modulus

(ii) Shape factor

(iii) Load factor.

15. (a) A suspension bridge cable of span 90 m and central dip 6 m is suspended from the same level at two towers. The bridge cable is stiffened by a three hinged stiffening girder which carries a single concentrated load of 25 kN at a point of 40 m from one end. Sketch the SFD for the girder.

Or

(b) Analyse a semicircular beam simply supported on three supports equally spaced. The beam carries a load w per unit length. R be the radius of the centre line of the beam.

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