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Question Paper Code : 51259

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 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. Differentiate pin-jointed plane frame and rigid jointed plane frame.

2. Mention any two methods of determining the joint deflection of a perfect frame.

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

4. When is stiffness method preferred over flexibility method ?

5. Mention the applications of beam element.

6. Define plane stress.

7. List the assumptions made in pure bending.

8. What is plastic modulus ?

9. The load transfer mechanism in suspension cables are through axial force, bending moment and shear Force. State true or false with an explanation.

10. What is the shape of the cable with a stiffened three hinged girder ? Give brief explanation.

PART – B (5 × 16 = 80 Marks)

11. (a) A cantilever of length 15 metres is subjected to a single concentrated load of 50 kN at the middle of the span. Find the deflection at the free end using flexibility matrix method. El is uniform throughout.

OR

(b) A two span continuous beam ABC is fixed at A and hinged at supports B and C. Span of AB = span of BC = 9m. Set up flexibility influence co-efficient matrix assuming vertical reaction at B and C as redundant.

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

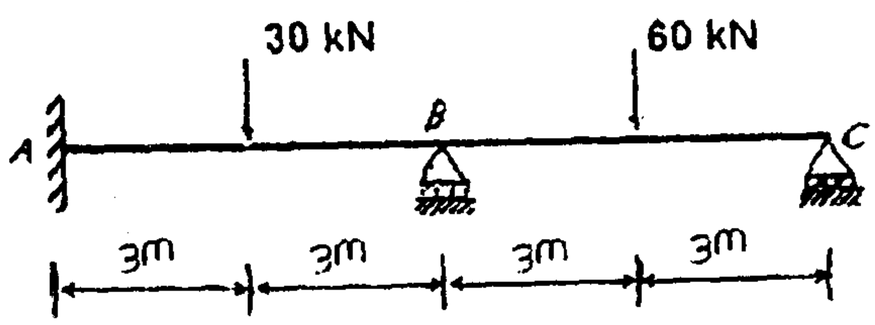

Fig. Q. 12 (a)

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.

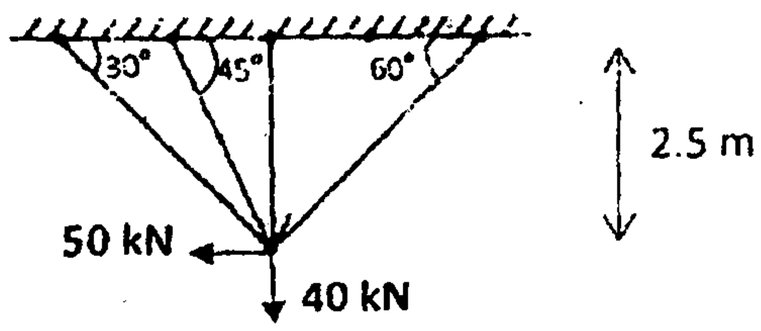

Fig. Q. 12 (b)

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

OR

(b) Explain the procedure involved in solving plane stress and plane strain problems in finite element analysis.

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) Using the method of Tension Coefficient, determine the forces in the members of the crane structure shown in Fig. Q. No. 15 (a)

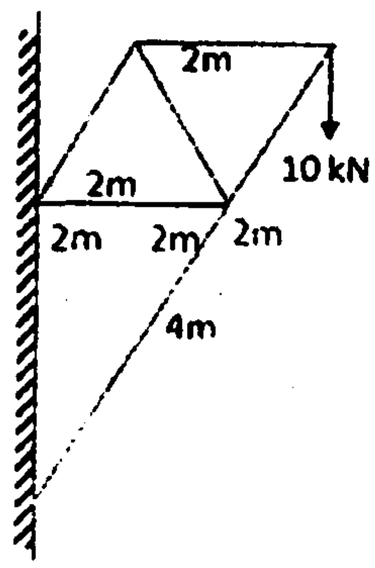

Fig. Q. No. 15 (a)

OR

(b) Find the value of plastic moment for the portal frame shown in Fig. Q. No. 15 (b) loaded upto collapse.

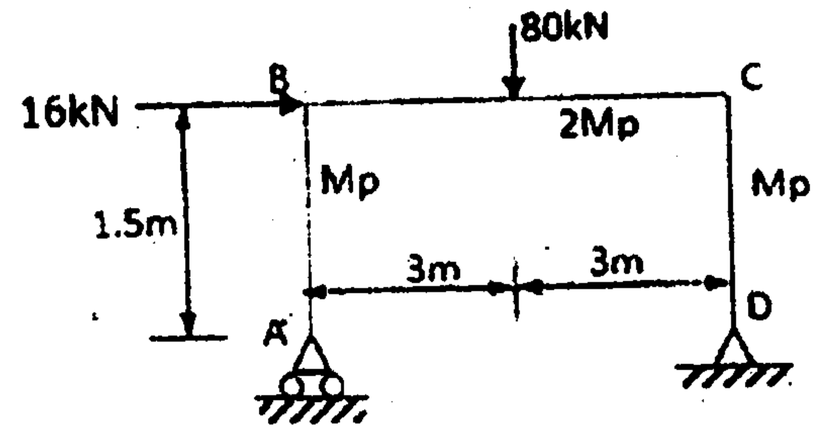

Fig. Q. No. 15 (b)