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Question Paper Code : 20278

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Sixth Semester

Civil Engineering

CE 6602 — STRUCTURAL ANALYSIS - II

(Regulations 2013)

(Common to PTCE 6602 – Structural Analysis II for B.E. (Part-Time)
Fourth Semester – Civil Engineering – Regulations - 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by indeterminate structures?

2. Define internal and external indeterminacies.

3. Compare flexibility method and stiffness method.

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

5. Define Shape function.

6. List out the advantages of FEM.

7. State lower bound theory.

8. Define load factor.

9. Give the expression for determining the tension T in the cable.

10. What are the main functions of stiffening girders in suspension bridges?

PART B — (5 × 13 = 65 marks)

11. (a) Find the slopes at A and B of the simply supported beam loaded as given in Fig Q. 11(a).

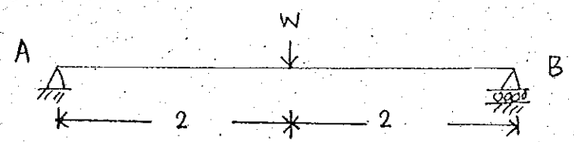

Fig Q. 11(a)

EI = 8 units

I = 4 units.

Or

(b) Analyse the continuous beam in Fig. Q. 11(b) by flexibility method.

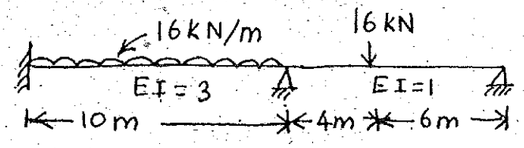

Fig. Q. 11(b)

12. (a) Analyse the continuous beam shown in Fig. Q. 12(a) by stiffness method . Draw the bending moment diagram.

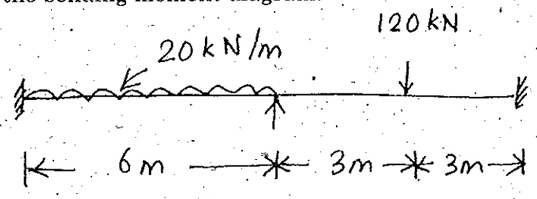

Fig. Q. 12(a)

Or

(b) Analyse the frame shown in Fig. Q. 12(b) by stiffness method.

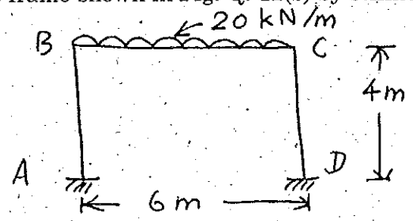

Fig. Q. 12(b)

13. (a) Write down the expression for shape function for plane truss element.

Or

(b) Derive the expression for CST element.

14. (a) A suspension cable of 130m horizontal span is supported at the same level, It is subjected to a uniformly distributed load of 28.5 kN per horizontal metre . If the maximum tension in the cable is limited to 5000kN, calculate the minimum central dip needed.

Or

(b) A suspension bridge of 100 m span has two numbers of three hinged stiffening girder supported by two cables with a central dip of 10 m. If three point loads of 20 kN each are placed along the center line of the roadway at 10, 15 and 20 m from left hand hinge, find the shear force and bending moment in each girder at 30 m from each end, Calculate the maximum tension in the cable.

15. (a) A mild steel I section 200 mm wide and 250 mm deep has a mean flange thickness of 20 mm and a web thickness of 10 mm. Calculate the shape factor. Find the fully plastic moment if the yield stress is 252 N/mm².

Or

(b) Determine the collapse load of the beam load as shown in Fig. Q. 15(b).

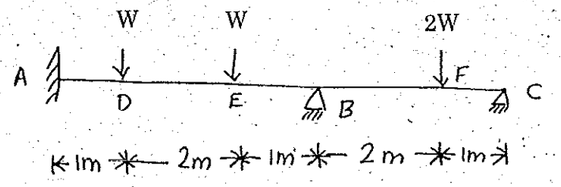

Fig. Q. 15(b)

PART C — (1 × 15 = 15 marks)

16. (a) Derive the collapse load for the frame shown in Fig. Q. 16(a).

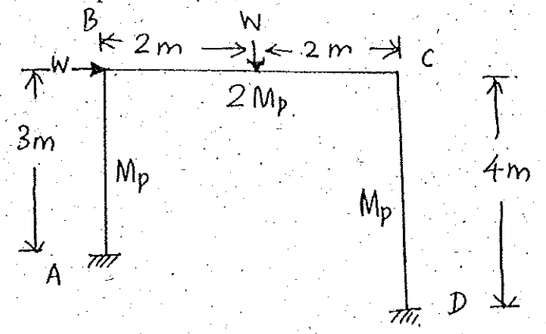

Fig. Q. 16(a)

Or

(b) A suspension bridge is of 160 m span. The cable of the bridge has a dip of 12m. The cable is stiffened by a three hinged girder with hinges at the either end and at centre. The dead load of the girder is 15 kN/m. Find the greatest positive and negative bending moments in the girder when a single concentrated load of 340 kN passes through it. Also find the maximum tension in the cable.