15. (a) A semi circular beam of radius 'R' curved in plan is subjected to a uniformly distributed load (w/m) throughout the length and simply supported by three columns spaced equally. Determine the expression for bending moment and torsional moment. Assume flexural rigidity (EI) = torsional rigidity (GJ).

Or

(b) A suspension bridge with 3-hinged stiffening girder has a span 100 m and central dip of 10 m. The self-weight of the bridge carried by one set of cable is 15 kN/m. The bridge carries a live load of 30 kN/m that to be equally divided between two set of cables. The working stress of 150 MPa for cables and 120 MPa for girder. Find the cross sectional area of one set of cables and section modulus of the stiffening girders.

PART C — (1 × 15 = 15 marks)

16. (a) Determine the shape factor of a T-section of flange dimensions 100 × 12 mm and web dimension 138 × 12 mm thick.

Or

(b) A quarter circular beam of radius 'R' curved in plan is fixed at A and free at B having a uniform cross section. It carries a vertical load- P at its free end. Determine the deflection at free end, and draw the bending moment and torsional moment diagrams. Assume flexural rigidity (EI) = torsional rigidity (GJ).

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

Question Paper Code : 52777

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Civil Engineering

CE 6602 — STRUCTURAL ANALYSIS — II

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

(Regulation 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the expression for the degree of static indeterminacy of rigid jointed plane frames.

2. Define Force-Transformation matrix.

3. Define Kinematic indeterminacy of the structure.

4. Write a short note on global stiffness matrix.

5. Write down the advantages of FEM.

6. What is constant strain triangle?

7. Define plastic hinge.

8. Define load factor.

9. Define tension coefficient.

10. What are the types of stiffening girders?

PART B — (5 × 13 = 65 marks)

11. (a) Compute the forces in the members of a pin-jointed plane frame shown in Fig. Q 11(a) by flexibility matrix method. The flexibility for each member is 0.03 mm/kN.

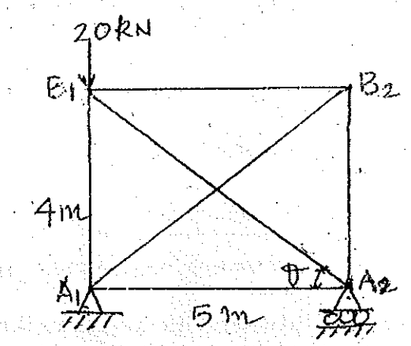

Fig. Q 11(a)

Or

(b) Analyze the beam ABC shown in Fig. Q 11(b) by flexibility matrix method.

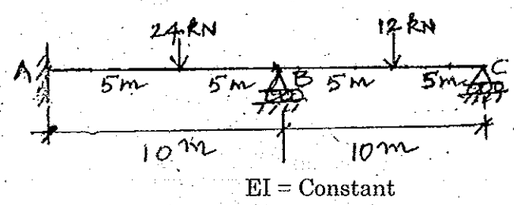

Fig. Q 11(b)

12. (a) Analyze the beam ABC shown in Fig. Q 12(a) by stiffness matrix method.

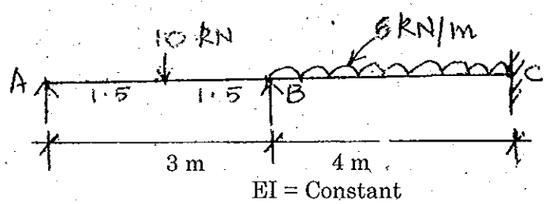

Fig. Q 12(a)

Or

(b) Analyze the portal frame ABCD shown in Fig. Q 12(b) by stiffness matrix method.

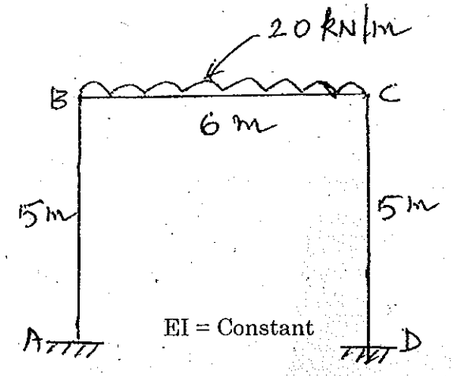

Fig. Q 12(b)

13. (a) Derive for the displacement in the matrix form for a two dimensional triangular element.

Or

(b) For a 4-noded rectangular element, formulate the stiffness matrix.

14. (a) Analyze a propped cantilever of span 'L' and subjected to a uniform distributed load (w/m length) for the entire length of span. Also determine the collapse load.

Or

(b) Determine the collapse load factor for the frame loaded as shown in Fig. Q 14(b).

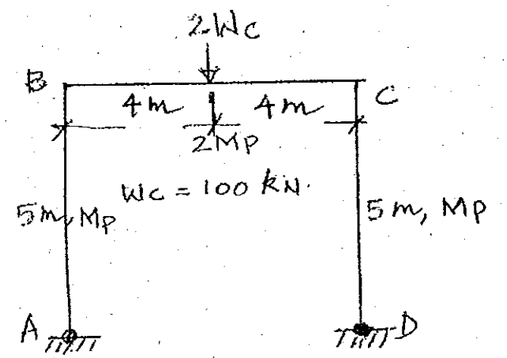

Fig. Q 14(b)