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

Question Paper Code : 91312

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Sixth Semester
Civil Engineering
CE 6602 – STRUCTURAL ANALYSIS – II
(Regulations 2013)
(Common to PTCE 6602 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. How are indeterminate structures identified ?
2. Give the general expression for the degree of redundancy of the pin jointed plane frames.
3. Define Force-Transformation Matrix.
4. Write a short note on global stiffness matrix.
5. What is the basic idea of mesh generation scheme ?
6. Define Shape function.
7. Define plastic hinge.
8. Define shape factor.
9. What are the significant features of circular beams on equally spaced supports ?
10. What are the types of stiffening girders ?

PART – B **(5×13=65 Marks)**

11. a) Analyze the pin-jointed plane frame shown in Fig. Q. 11 (a) by flexibility matrix method. The flexibility for each member is 0.02 mm/kN.

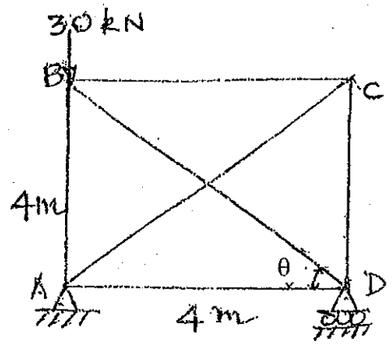


Fig. Q. 11 (a)

(OR)

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

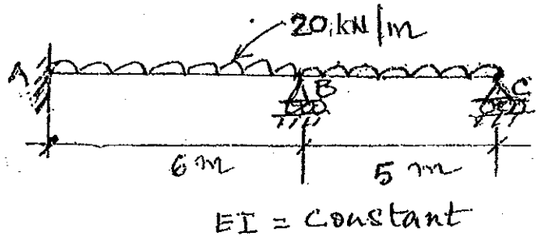


Fig Q. 11 (b)

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

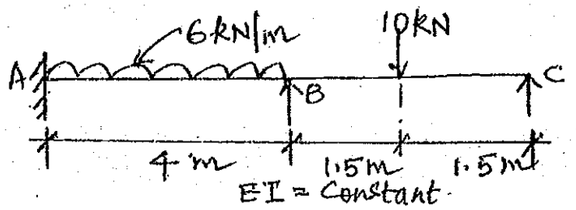


Fig. Q. 12 (a)

(OR)

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

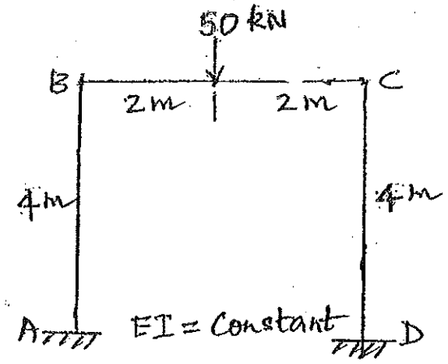
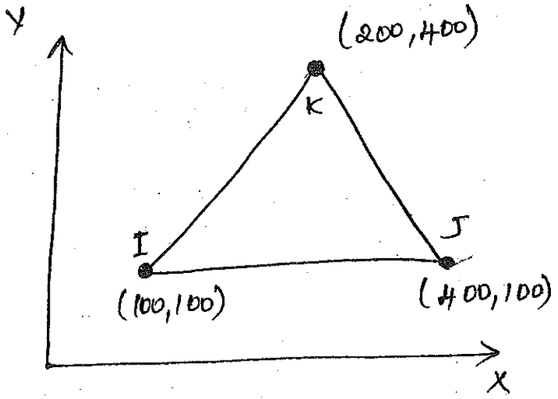


Fig. Q. 12 (b)

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

(OR)

b) For the constant strain Triangle shown in Figure Q. 13 b), write the strain displacement matrix.Take t = 20 mm and E = 2×10^5MPa.



14. a) Determine the shape factor of a T-section of flange dimension 120 × 12 mm and web dimension 138 × 12 mm thick.

(OR)

b) A portal frame ABCD shown in Fig. Q. 14 (b) has uniform section throughout. Determine the value of the plastic moment of the resistance in terms of the load, Wc at collapse. Take Wc = 150 kN.

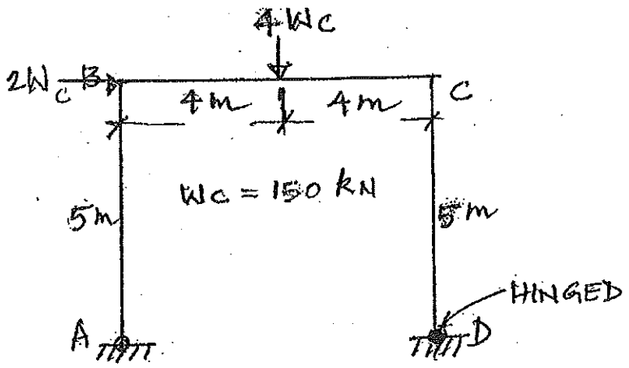
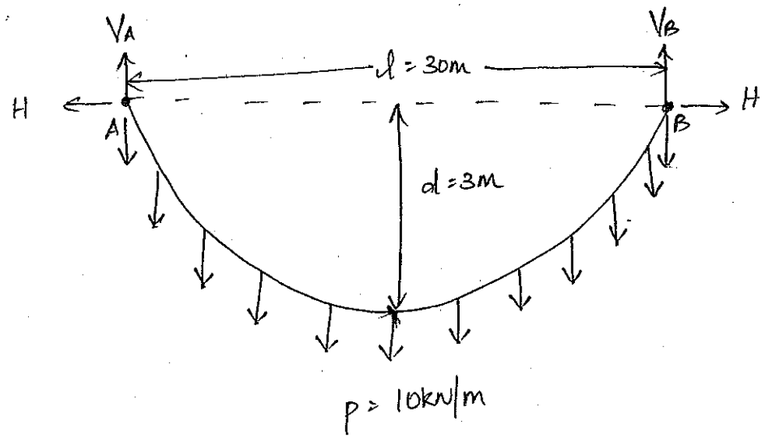


Fig. Q. 14 (b)

15. a) A suspension cable having supports at the same level, has a span of 30 m and a maximum dip of 3 m. The cable is loaded with a udl of 10kN/m throughout its length. Evaluate the maximum tension in the cable.



(OR)

b) A suspension bridge has a span 60 m with a 15 m wide runway. It is subjected to a load 35 kN/m including self-weight. The bridge is supported by a pair of cables having a central dip of 6m. Find the cross sectional area of the cable necessary, if the maximum permissible stress in the cable material is not to exceed 650 MPa.

PART – C (1×15=15 Marks)

16. a) For the two dimensional truss structure shown in Fig. Q. 16 (a), formulate the global stiffness matrix [K]. The geometry and loading are symmetrical about centre line. Assume the area of cross section of all members is same Take $E = 2 \times 10^5$ kN/m^2.

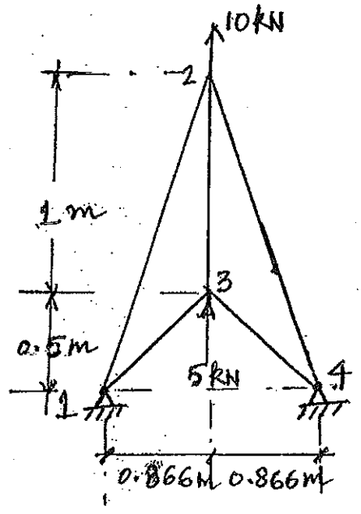


Fig. Q. 16 (a)

(OR)

b) Analyze a propped cantilever of length 'L' and subjected to a uniformly distributed load of w/m length for the entire span and also find the collapse load.