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

Question Paper Code : X 20311

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020
Sixth Semester
Civil Engineering
CE 6602 – STRUCTURAL ANALYSIS – II
(Regulations 2013)

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. Why is the stiffness matrix method also called equilibrium method ?
4. Write a short note on global stiffness matrix.
5. Write down the advantages of FEM.
6. What is constant strain triangle ?
7. Define load factor.
8. What are the assumptions made in plastic analysis of structures ?
9. Give any two examples of beams curved in plan.
10. Write the difference between plane truss and space truss.

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.

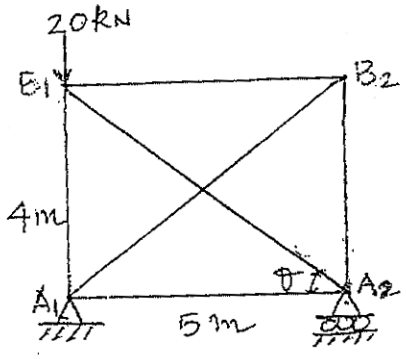


Fig. Q. 11(a)

(OR)

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

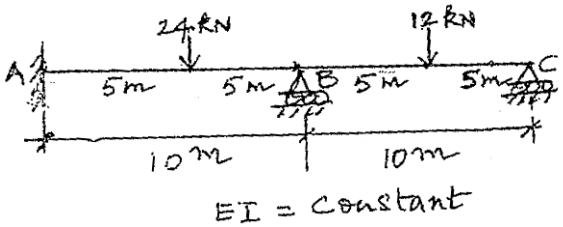
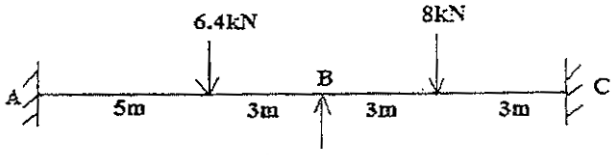


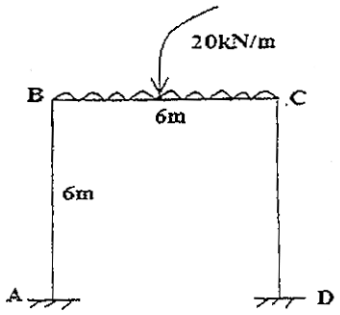
Fig. Q. 11(b)

12. a) Analyse the continuous beam shown in figure using stiffness matrix method.



(OR)

b) Analyse the given frame by stiffness matrix method.



13. a) Derive the element strain displacement matrix of a triangle element.

(OR)

b) Compose the shape functions for cubic element. Shape functions should be specified in both natural and global coordinate systems.

14. a) A suspension cable of 130 m 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 5000 kN, 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 suspension cable, having supports at the same level, has a span of 45 m and the maximum dip is 4 m. The cable is loaded with the udl of 15 kN/m run over the whole span and two point loads 35 kN each at middle third points. Find the maximum tension in the cable. Also calculate the length of cable required.

(OR)

b) A curved beam in the form of a quadrant of a circle of radius R and having a uniform cross section in a horizontal plane. It is fixed at A and free at B. It carries a vertical concentrated load P at the free end B. Determine the vertical deflection of the end B.

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).

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