Question Paper Code : 40812

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

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 do you mean by Static and Kinematic Indeterminacy ?

2. Write down the flexibility matrix for a simply supported beam with reference to coordinates shown in Fig. 1.
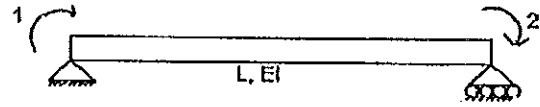

Fig.1

3. Formulate the stiffness matrix for the beam show in Fig.1.

4. State and prove the relationship between stiffness matrix and flexibility matrix.

5. What is a shape function ?

6. What do you mean by plane stress problems ?

7. Define plastic hinge.

8. State the upper bound theorem.

9. Define tension coefficient.

10. Give examples of beams curved in plan.

PART – B (5×13=65 Marks)

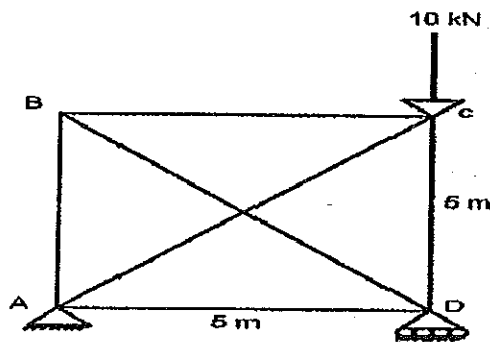11. a) Analyse the truss shown in Fig.2 by flexibility approach. AE is Constant for all members.

Fig.2

(OR)

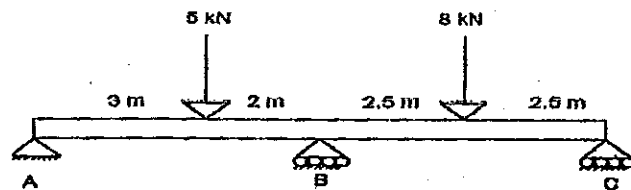b) Analyse the continuous beam shown in Fig.3 by flexibility approach. EI is constant throughout.

Fig.3

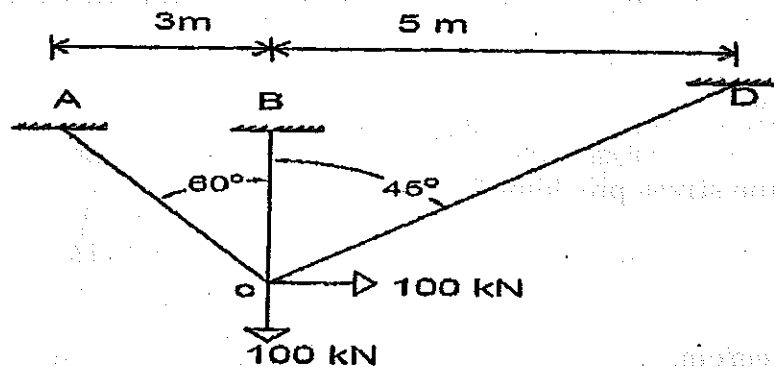12. a) Analyse the truss shown in Fig.4 by stiffness method. AE is constant for all members.

Fig.4

(OR)

b) Analyse the continuous beam shown in Fig.5 by stiffness method. EI is constant for all members.
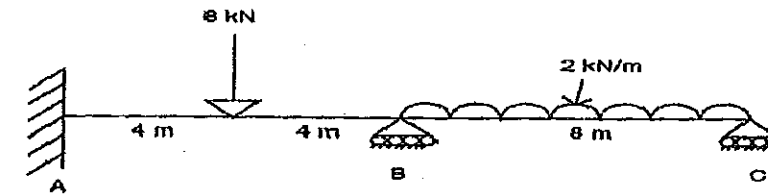

Fig.5

13. a) i) Enumerate the steps involved in the finite element method. (8)

   ii) What are the different types of elements used in FEM ? (5)

   (OR)

   b) i) State the requirements of shape functions for convergence. (8)

   ii) What are generalized coordinates and natural coordinates ? (5)

14. a) Determine the shape factor of a T section of size (120 × 120 × 10 mm).

   (OR)

   b) Calculate the plastic moment capacity required for the continuous beam shown in Fig.6 with working loads.
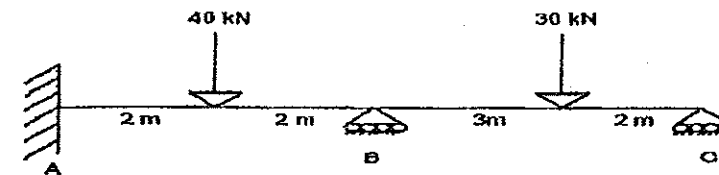

Fig.6

15. a) Explain the procedure involved in tension coefficient method for space trusses.

   (OR)

   b) A cable of span 100 m has its ends at heights 8 m and 15 m above the lowest point of the cable. It carries a UDL of 10 kN/m per horizontal run of the span. Determine the horizontal and vertical reactions at the supports. What is the length of the cable ?

PART – C (1×15=15 Marks)
Case Study

16. An overhead circular water tank is to be supported by a number of columns placed at regular intervals. Number of columns may be 4, 6, 8, 10, 12 or 16. They are connected by means of a beam. Explain how will you find the stress resultants, choosing any one of these number (of the columns).