Code No. : 5031/S

FACULTY OF ENGINEERING

B.E. 3/4 (Civil) I Semester (Suppl.) Examination, June 2012

THEORY OF STRUCTURES – I

Time : 3 Hours] [Max. Marks : 75

***Note** : Answer **all** questions from Part – **A**. Answer **any five** questions from Part – **B**.*

PART – A **(25 Marks)**

1. The number of simultaneous equations to be solved in slope deflection method is equal to
   a) The degree of statical indeterminacy
   b) The degree of kinematic indeterminacy
   c) The number of joints in the structure
   d) None of the above **2**
2. Define distribution factor. **2**
3. Two members are meeting at a joint, if the rotation contribution for one of the members is –0.5, what is the relative stiffness of the other member. **2**
4. Write the expression for strain energy of a truss member. **2**
5. Define principal axes. **2**
6. Write the shear equation for the portal frame shown in fig. 1. **3**

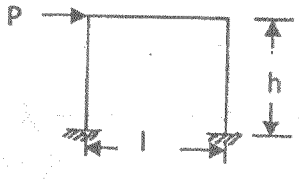

Fig. 1

7. A propped cantilever beam of span 5.0 m is subjected to a clock wise moment of 10 kN-m at the propped end. Find the moment at the fixed end. **3**

8. Write the advantages and disadvantages of Kani's method. **3**

9. State and explain Castigliano's theorem for calculation of deflections. **3**

10. What are Knee braced trusses and write the assumptions made in their analysis. **3**

PART – B

(50 Marks)

11. Analyse the continuous beam shown in fig. 2, using slope-deflection method and draw the shear force diagram. Assume EI is same for all spans.

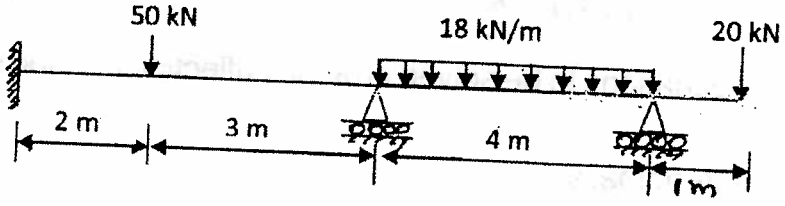

Fig. 2

12. Analyse the frame shown in fig. 3, using moment distribution method and draw the bending moment diagram.

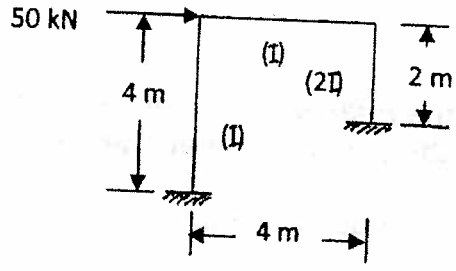

Fig. 3

13. Analyse the continuous beam shown in fig. 4, using Kani's method and draw the shear force diagram.

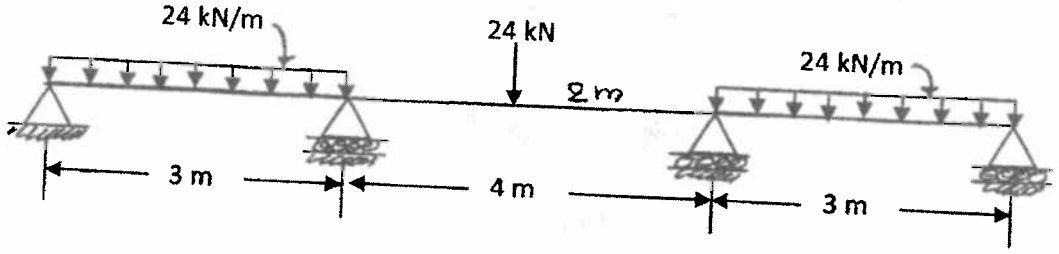

Fig. 4

14. For the pin-jointed plane truss shown in fig. 5, find the vertical displacement of the joint D. Assume AE = 2×10^6 N.

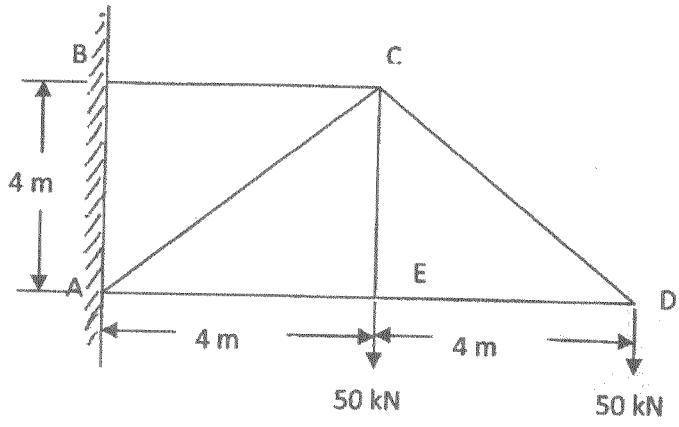

Fig. 5

15. A 50 mm × 50 mm × 10 mm equal angle is subjected to a sagging bending moment of 500 N-m. Find the maximum stresses induced in the cross section.

16. Find the forces in the members of the truss shown in fig. 6.

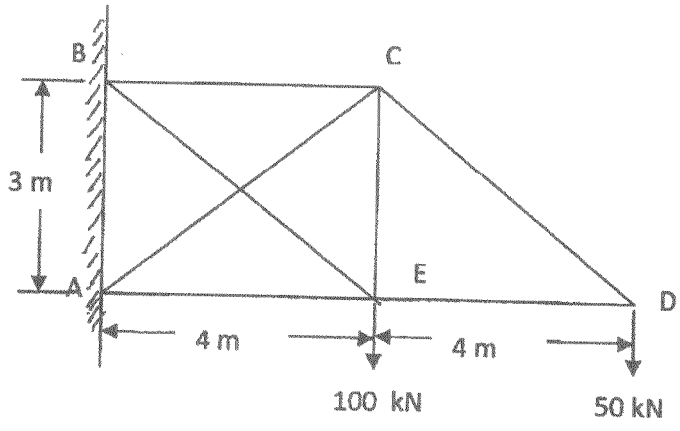

Fig. 6