(Pages : 4)

E – 2801

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, June 2018
(2008 Scheme)
08.701 : ADVANCED STRUCTURAL ANALYSIS (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

PART – A **(8×5=40 Marks)**

1. A) Differentiate between kinematic and static indeterminacy using an example. **2**

   B) Explain equations of equilibrium and equations of compatibility for the beam shown in figure 1. **3**

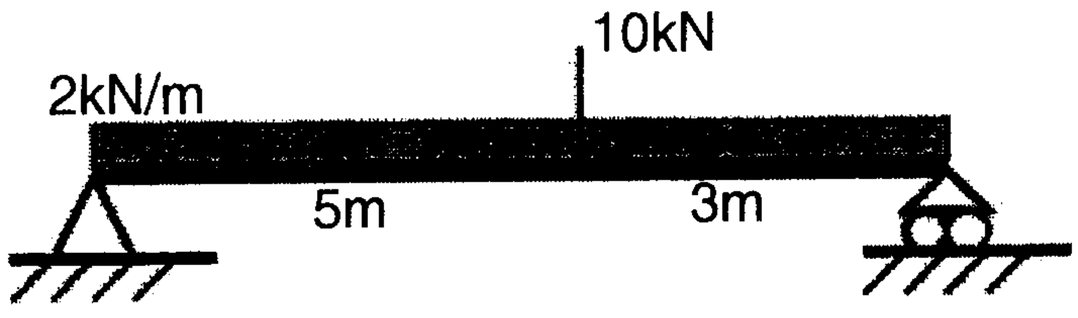

Figure 1

2. Write short notes on transformation of information in structures.

3. Write in detail about the discretisation of a structure.

4. Explain the procedure of obtaining the overall stiffness matrix for a stable structure by the direct stiffness method.

5. Distinguish between “sway” and “non-sway” type problems. What difficulties arise while dealing with the former, compared to the latter ?

P.T.O.

6. For the beam AB shown in Fig. 2 find (i) axial stiffness corresponding to coordinate (1) (ii) Transverse stiffness corresponding to coordinate (2) and (iii) flexural stiffness corresponding to corresponding to coordinate (3). A is the cross sectional are a and E is the Young's modulus of the beam.

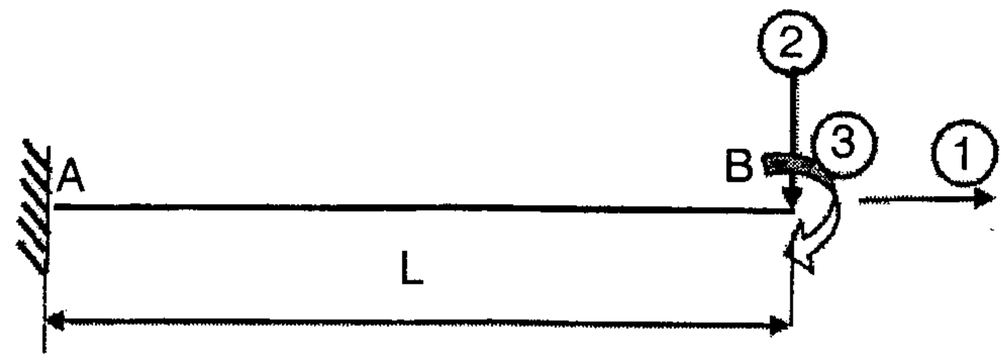

Fig. 2

7. State the difference between force and displacement method of analysis.

8. Develop the stiffness matrix for a bar element.

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module I

9. Analyse the continuous beam shown in Fig. 3 by force method. Draw SFD and BMD.

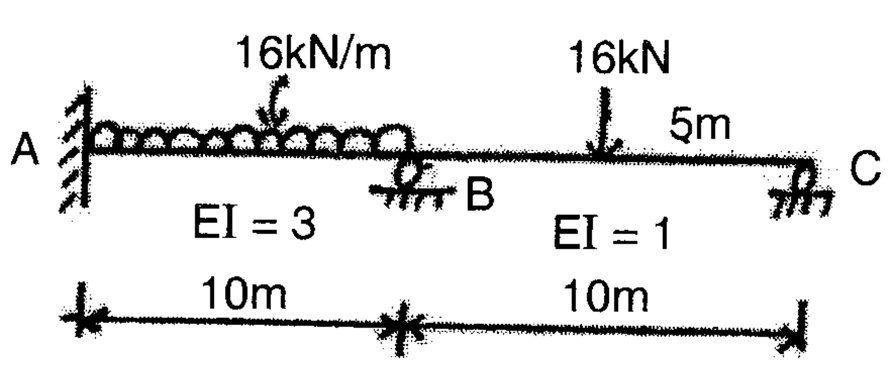

Fig. 3

10. Analyse the portal frame shown in Fig. 4 by force method. Assume EI = constant.

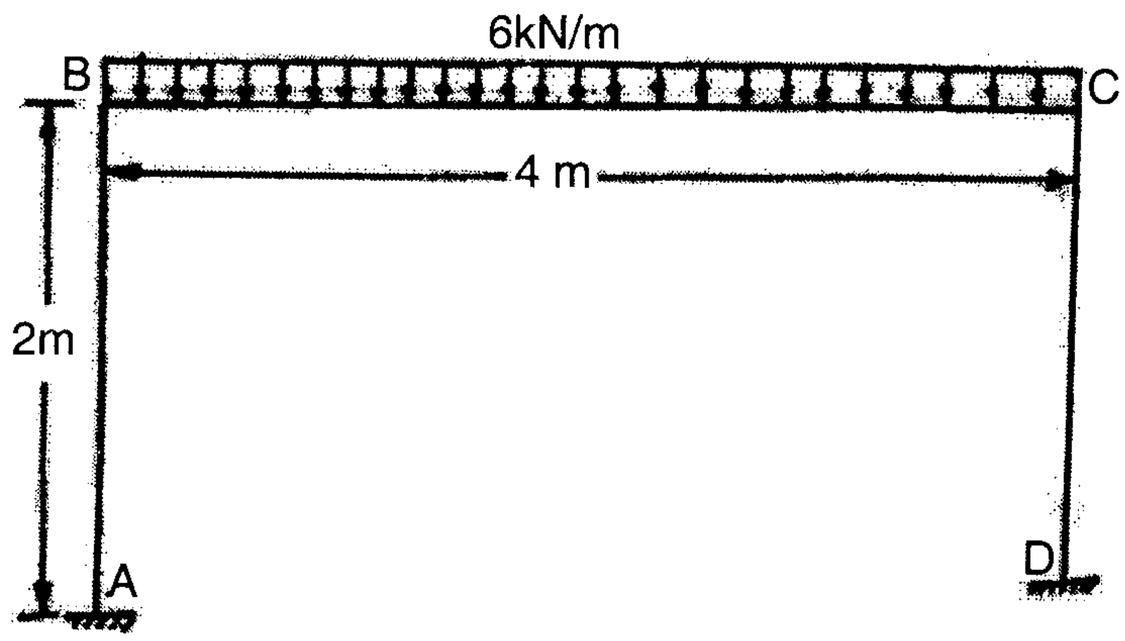

Fig. 4

Module – II

11. Analyse the frame shown in Fig. 5 by equilibrium method. All members have the same flexural rigidity. Draw SFD and BMD.

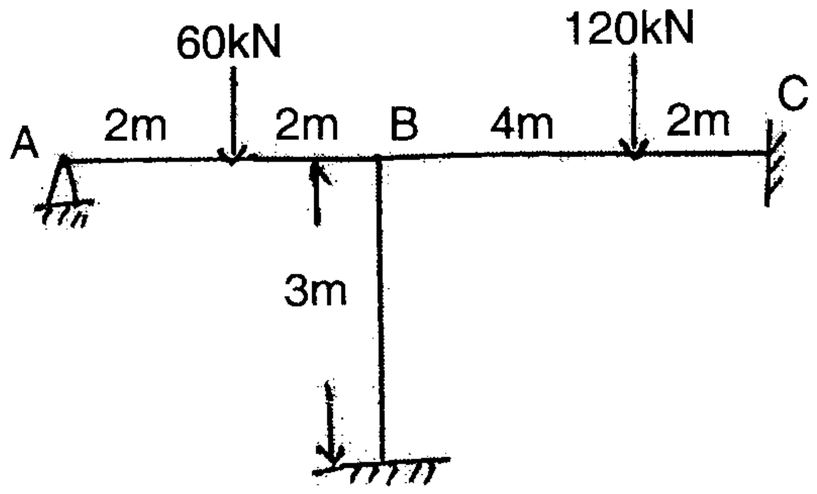

Fig. 5

12. A) For the truss shown in Figure 6, what is the element stiffness matrix for the three members ? $E = 200 \times 10^6$ kN/m^2 and cross sectional area for each bar = 150×10^{-6}m^2. **3**

B) Establish the force displacement relationship for the truss in the X and Y axis shown in figure. **14**

C) Find the horizontal and vertical deflection at joint C. **3**

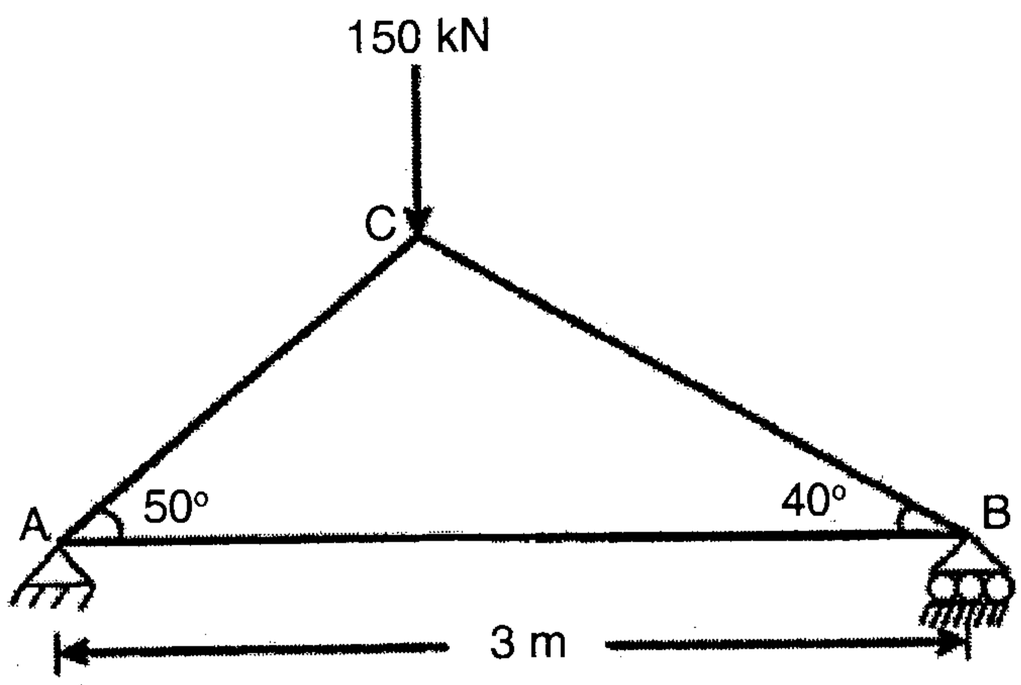

Fig. 6

Module – III

13. Determine the shape functions N_1, N_2 and N_3 at the interior point P for the triangular element shown in Fig. 7.

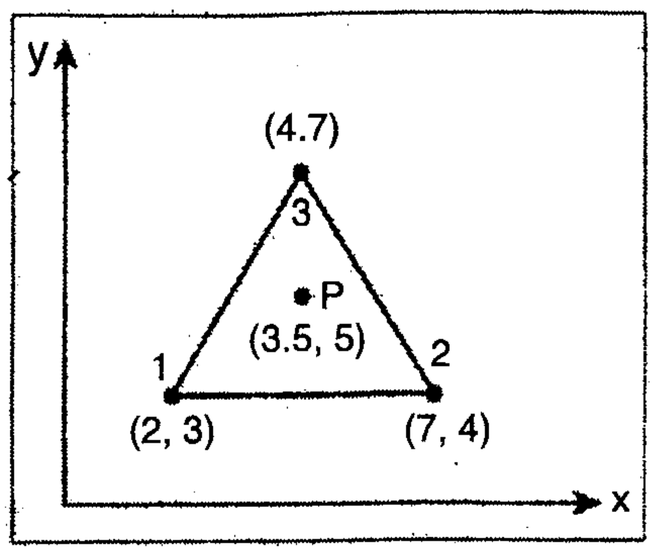

Fig. 7

14. Define shape function. Write in detail about the finite element analysis general procedure.