Reg. No. :

Question Paper Code : X10247

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
Fifth Semester
Civil Engineering
CE 8502 – STRUCTURAL ANALYSIS – I
(Regulations 2017)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. Recall degrees of freedom.
2. What causes redundancy in a structure ?
3. Mention the effect of support displacement in a structure.
4. Enlist the assumptions made in the analysis of structures by slope deflection method ?
5. List the causes of sway in a frame.
6. Outline the need of distribution of moments in an intermediate support.
7. What are flexibility coefficients ?
8. What is a primary structure ?
9. Mention the stiffness coefficient for an axial element.
10. Develop the stiffness matrix for a simply supported beam.

PART – B **(5×13=65 Marks)**

11. a) Find the axial forces in the members of the braced cantilever truss shown in Fig. 1. All members are of the same material and have the same cross-sectional area.

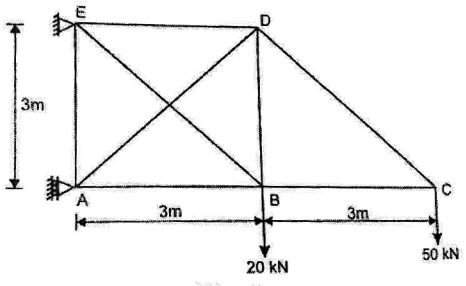


Fig.1

(OR)

b) Analyse the beam shown in Fig. 2 by strain energy method.

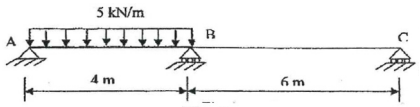


Fig.2

12. a) Analyse the continuous beam shown in Fig. 3 and plot the bending moment and shear force diagram by slope deflection method.

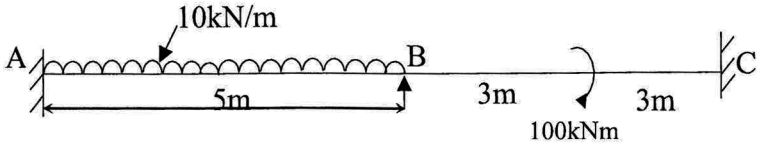


Fig. 3

(OR)

b) Analyse the frame shown in Fig. 4 and plot the bending moment and shear force diagram by slope deflection method.

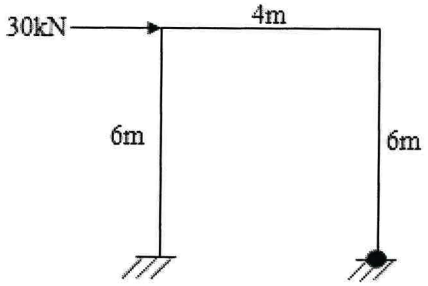


Fig.4

13. a) Analyse the continuous beam shown in Fig. 5 and plot the bending moment and shear force diagram by moment distribution method.

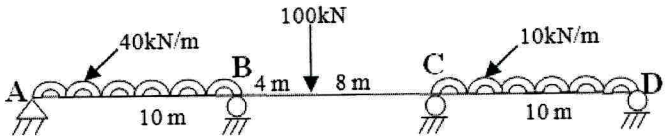


Fig.5

(OR)

b) Analyse the frame shown in Fig.6 and plot the bending moment and shear force diagram by moment distribution method.

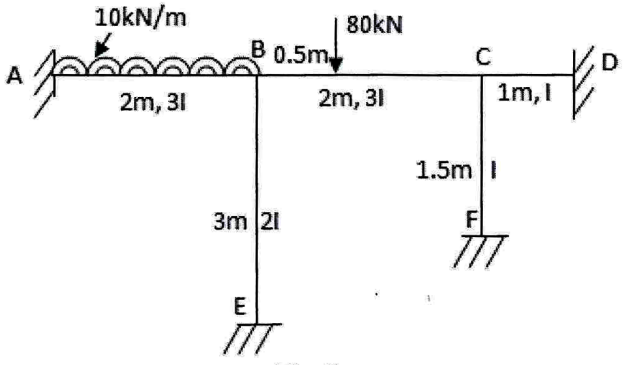


Fig.6

14. a) Analyse the continuous beam shown in Fig. 7 by direct flexibility approach.

Take EI constant throughout.

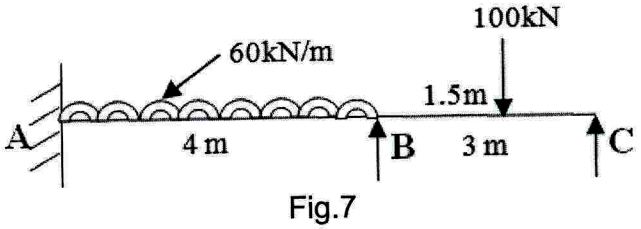
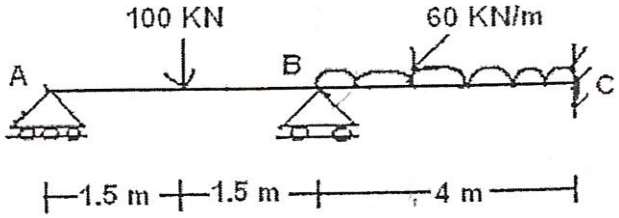


Fig.7

(OR)

b) Analyze the continous beam shown in the following figure by the flexible matrix method and draw the bending moment diagram.



15. a) Using the direct stiffness approach, analyse the frame shown in Fig. 9.

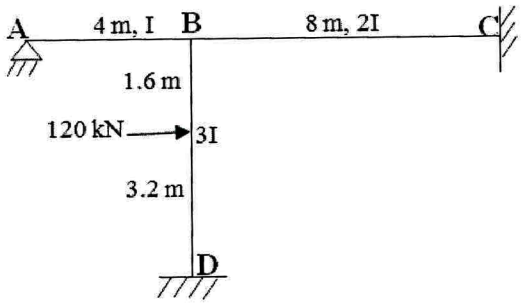


Fig.9

(OR)

b) Analyse the beam shown in Fig. 10 using direct stiffness approach.

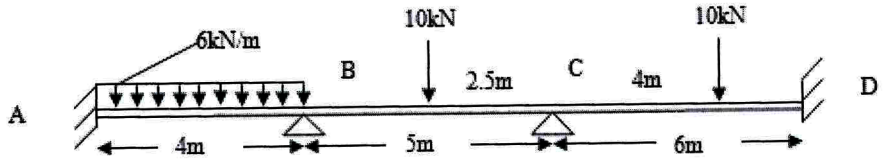


Fig.10

PART – C **(1×15=15 Marks)**

16. a) Analyse the sway frame shown in Fig. 11 using moment distribution method.

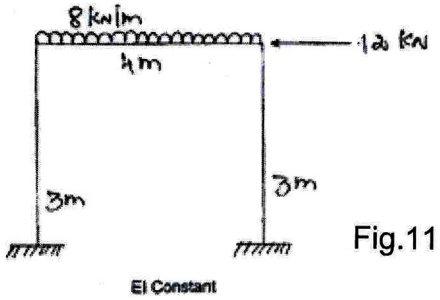


Fig.11

(OR)

b) Analyse a three span continuous beam ABCD each span of 6 m length fixed at the left end and simply supported at the right end, by slope deflection method. The supports B and C sinks by 10 mm and 5 mm respectively and the support A rotates through an anticlockwise angle of 0.1 radian. There are no loads on the beam. Take E = 200 GPa; I = 4×10^7 mm^4. Sketch the bending moment diagram and shear force diagram.

———————