

[5869]-209

S.E. (Civil)

STRUCTURAL ANALYSIS

(2019 Pattern) (Semester - IV) (201011)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.
- 5) Use of electronic pocket calculator is allowed.
- 6) Use of cell phone is prohibited in the examination hall.

Q1) a) Analyze the beam shown in figure 1 by slope deflection method and draw BMD. Assume uniform flexural rigidity. [12]

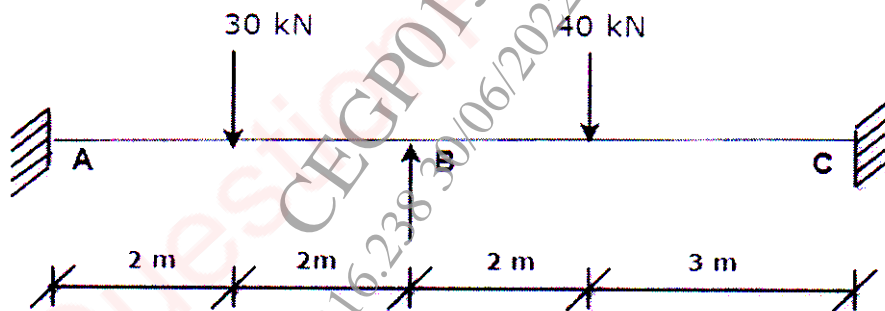


Figure 1

b) Find the rotation at B (θ_B) for the beam with uniform flexural rigidity as shown in figure 2. [6]

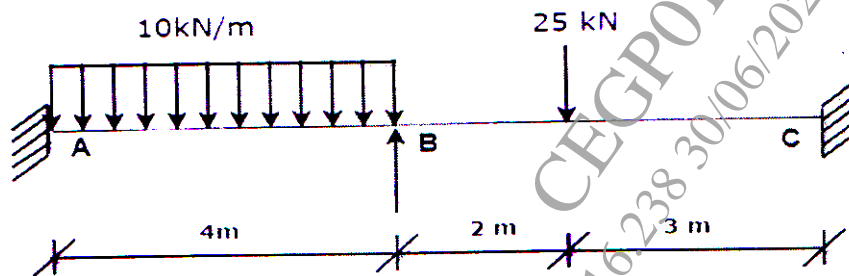


Figure 2

OR

- Q2) a) Analyze the frame shown in figure 3 by slope deflection method and draw BMD. Assume uniform flexural rigidity. [12]

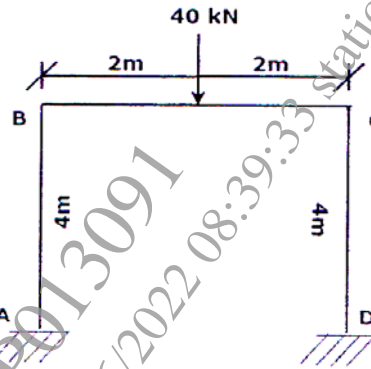


Figure 3

- b) Analyse the bent shown in figure 4 by slope deflection method. Assume uniform flexural rigidity. [6]

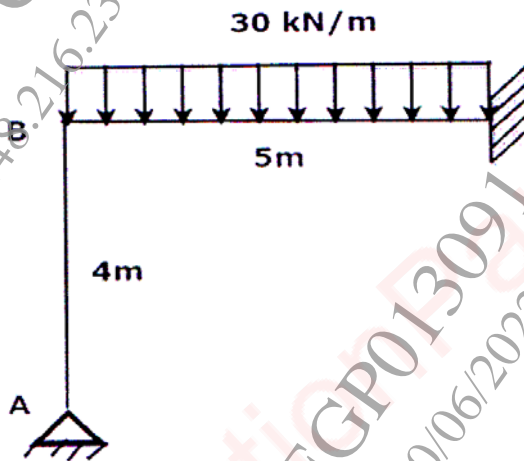


Figure 4

- Q3) a) Analyze the continuous beam ABC shown in figure 5 by moment distribution method. Assume uniform flexural rigidity. [9]

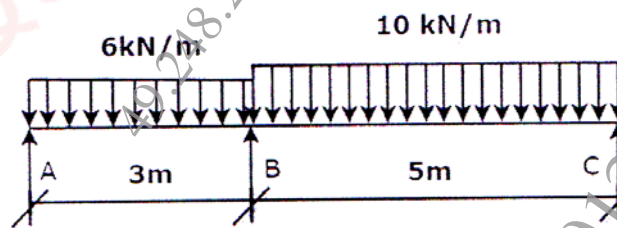


Figure 5

- b) Analyse the continuous beam shown in figure 6 by moment distribution method. Assume uniform flexural rigidity. [9]

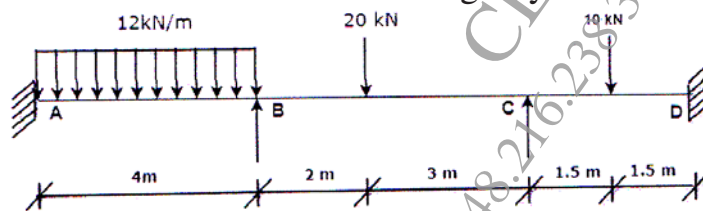


Figure 6

OR

- Q4) a) Calculate moment at supports for the frame as shown in figure 7 by moment distribution method and draw BMD. Assume uniform flexural rigidity. [12]

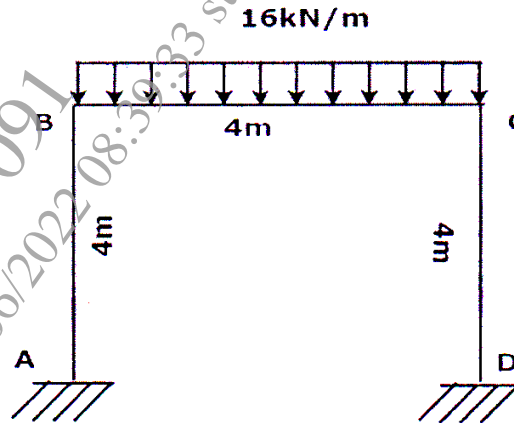


Figure 7

- b) Define member stiffness; carry over moment and distribution factor. [6]
- Q5) a) Analyse the continuous beam as shown in figure 8 by stiffness method. Assume same flexural rigidity of all members. [12]

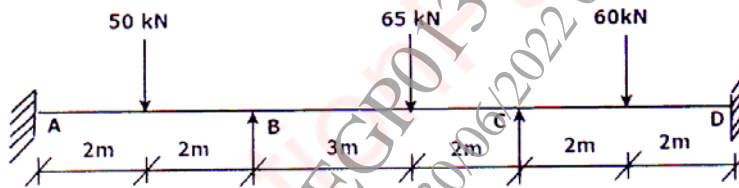


Figure 8

- b) Write note on stiffness method and write elements of displacement matrix for following figure. [5]

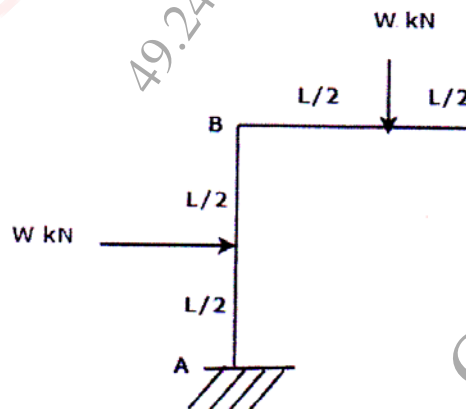


Figure 9

OR

- Q6) a) Explain degrees of freedom, stiffness. [4]
 b) Analyse the frame shown in figure 10 by stiffness method and draw bending moment diagram. [13]

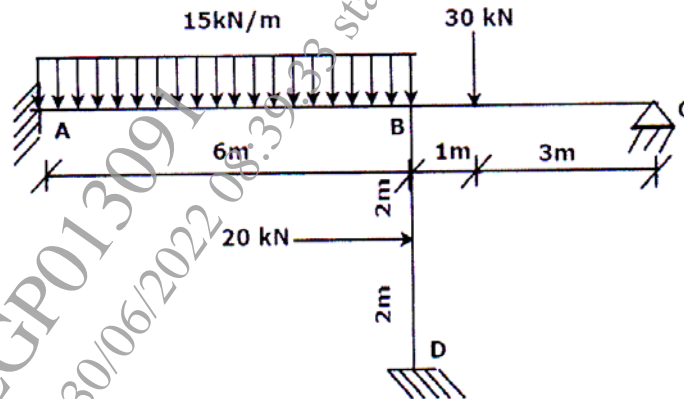


Figure 10

- Q7) a) Define plastic hinge, load factor and shape factor. [6]
 b) A three span continuous beam ABCD is loaded with ultimate loads as shown in figure 11. Determine the required plastic moment of resistance when the beam is of uniform section. [11]

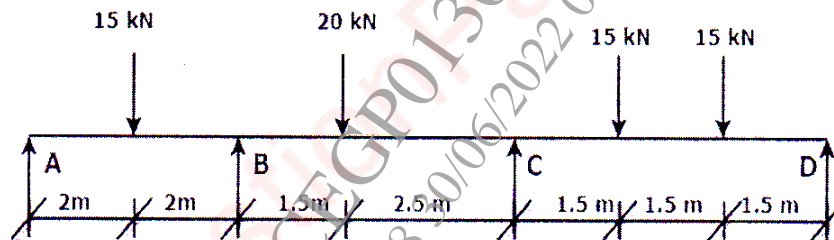


Figure 11

OR

- Q8) a) Explain the idealized stress strain curve for plastic analysis with diagram and state the assumption for plastic analysis. [6]
 b) Calculate shape factor for I section as per the dimension given :
 Top and bottom flange : 150 mm wide and 9.4 mm deep
 Web : 6.7 mm wide and 281.2 mm deep. [11]

