[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]**
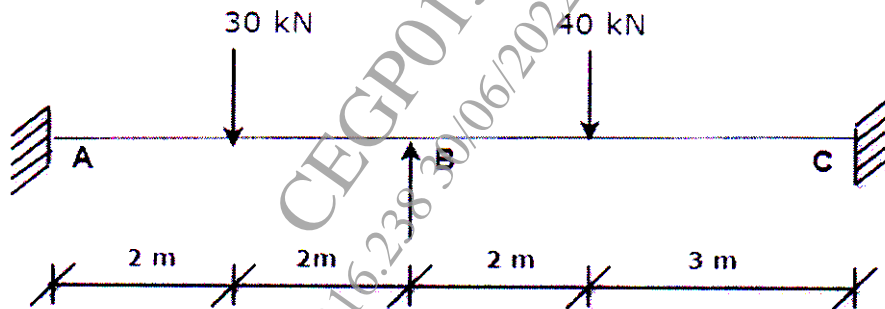

Figure 1

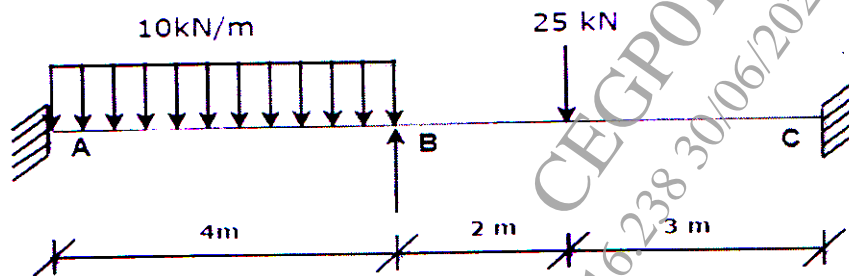   b) Find the rotation B (θ_B) for the beam with uniform flexural rigidity as shown in figure 2.   **[6]**

Figure 2

OR

P.T.O.

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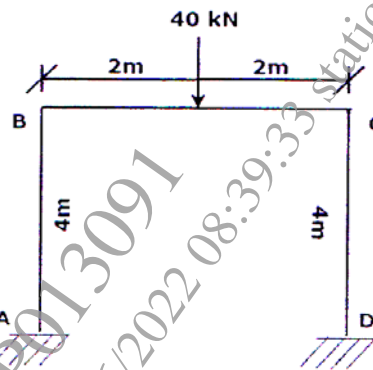

Figure 3

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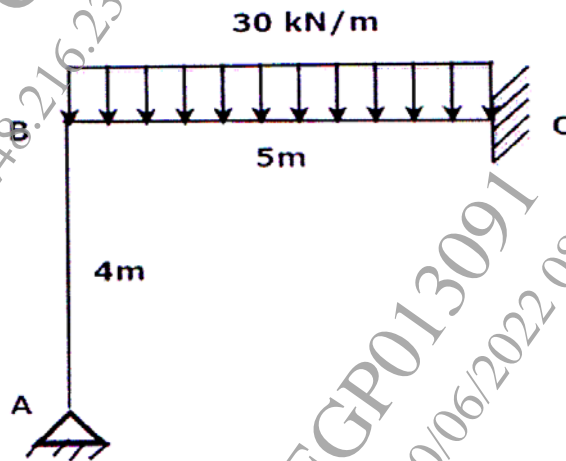

Figure 4

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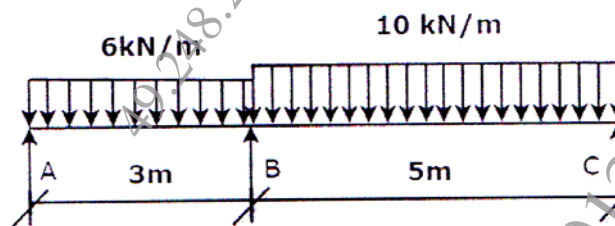

Figure 5

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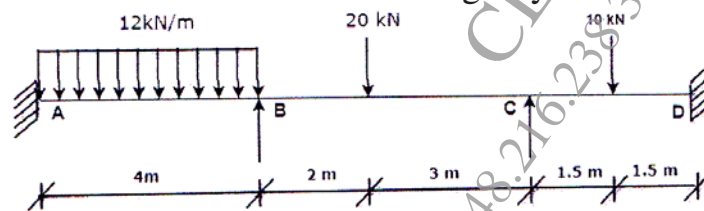

Figure 6

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]**
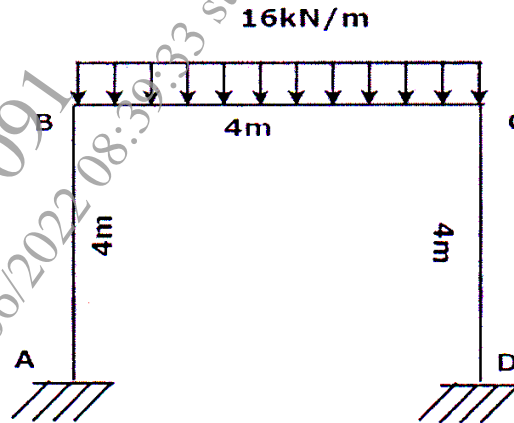

Figure 7

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 or all members. **[12]**
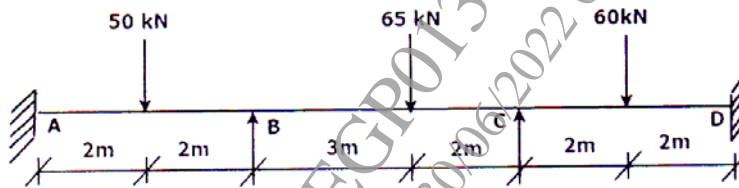

Figure 8

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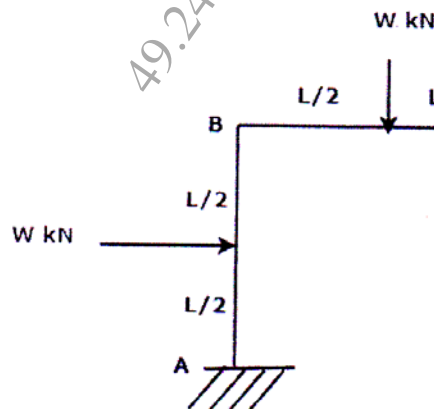

Figure 9

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]**
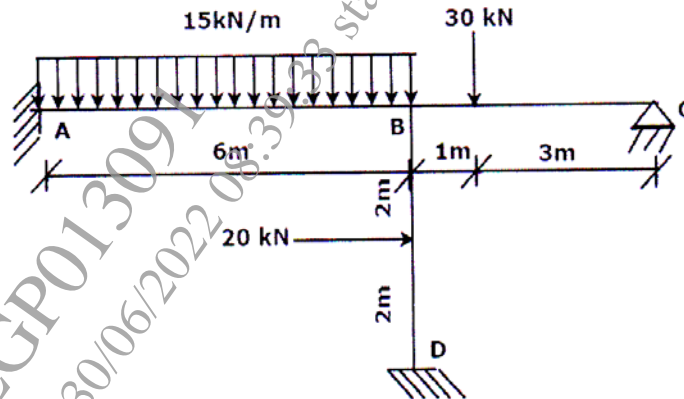

Figure 10

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]**
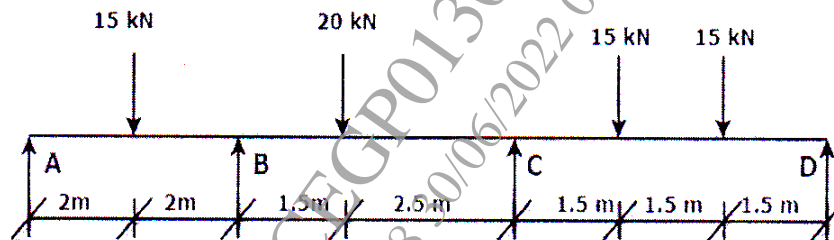

Figure 11

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]**

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