R16

Code No: 136AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, May - 2019

ADVANCED STRUCTURAL ANALYSIS

(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) State the Eddy's Theory. [2]
b) Define an arch. How an arch differs from a beam? [3]
c) Write the Generalized form of slope deflection equations. [2]
d) Write the shear equations for the case of frame with side sway. [3]
e) What is Movement distribution and who developed it? [2]
f) Differentiate between absolute stiffness and relative stiffness. [3]
g) What is the basic aim of stiffness Method? [2]
h) What is Flexibility Matrix? [3]
i) Derive Stiffness Matrix for a simply supported beam of span 'L'. [2]
j) State the Muller-Breslau's Principle. [3]

PART - B

(50 Marks)

2. Determine the horizontal thrust at the support of a parabolic two-hinged arch with the area of the cross section of the crown is 4.5×10^{-2} and moment of inertia is 3.375×10^{-4}. The rise of the arch is 14.875 m and its span is 85 m. Find out the maximum moment at the crown, if the arch carries UDL of 15 kN/m. [10]

OR

3. Determine the vertical displacement of joint B, as shown in figure 1. The area of cross-section of member is 550 mm^2 and E = 200 kN/mm^2. [10]

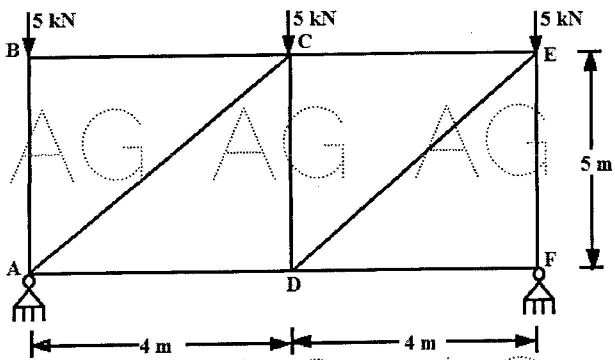

Figure 1

4. Using the slope-deflection method, find out the moments in the frame ash shown in figure 2. [10]

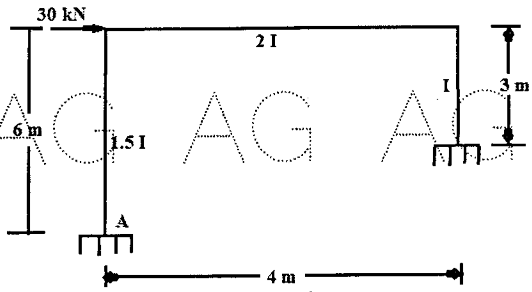

Figure 2

OR

5. Analyse the bend shown in figure 3 by moment distribution method. [10]

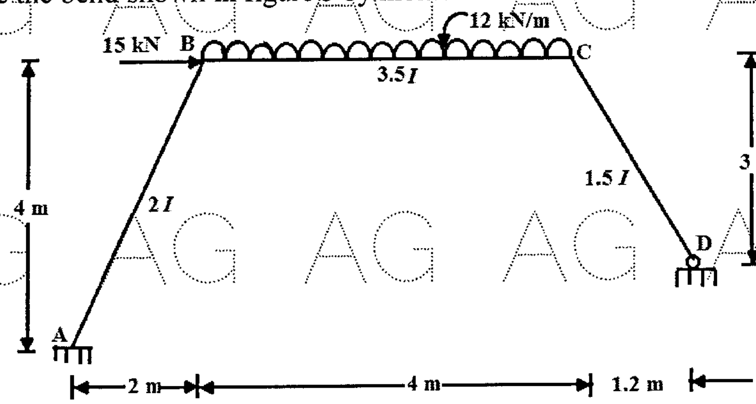

Figure 3

6. Let us consider the continuous beam as discussed in example. The beam is shown in figure 4. in this beam the support B sinks by 15 mm; E = 200 kN/mm^2; and I = 150 × 10^6 mm^4. Using the Kani's method, determine the end moments. [10]

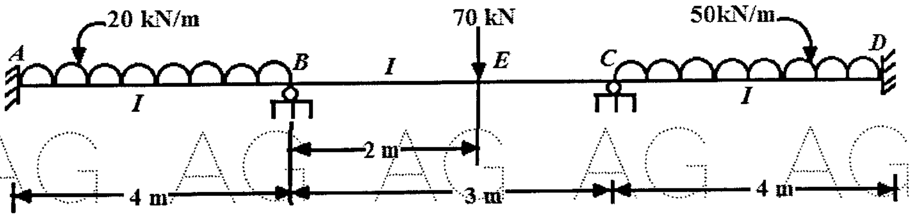

Figure 4

OR

7. Analyse the rigid frame shown in figure 5 using the kani's method. [10]

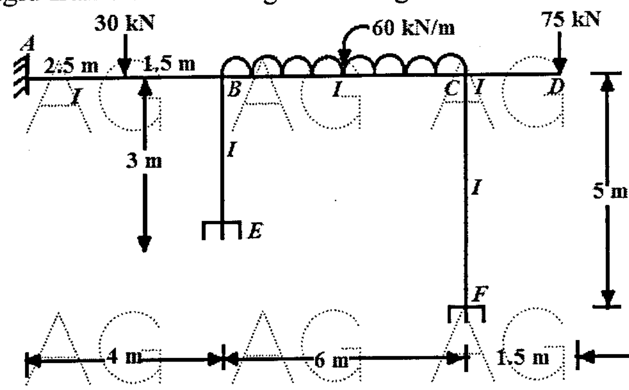

Figure 5

8. Analyse the continuous beam shown in figure 6 by flexibility method. [10]

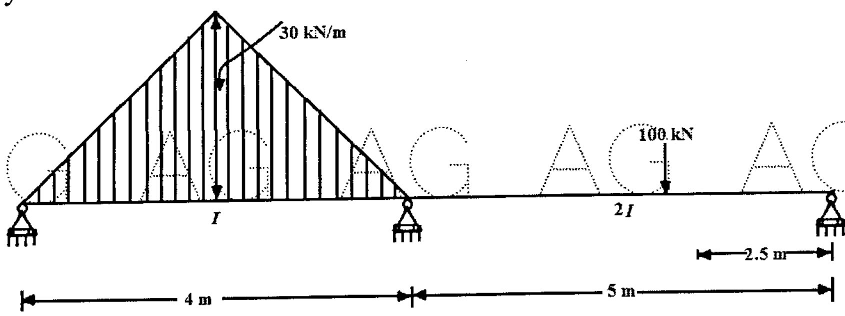

Figure 6

OR

9. Analyse the frame shown figure 7 by stiffness method. [10]

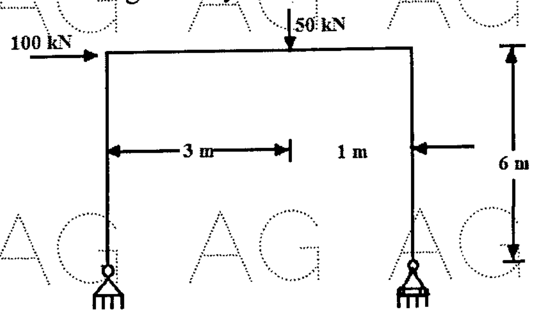

Figure 7

10. In a multistoreyed building, the frame shown in figure 8. are spaced at 4 m intervals. Dead load from the slab is 3 kN/m^2 and the live load is 5 kN/m^2. Analyse the beam BC for midspan positive bending moment. Self weight of the beams may be ignored. Use two-cycle moment distribution method. [10]

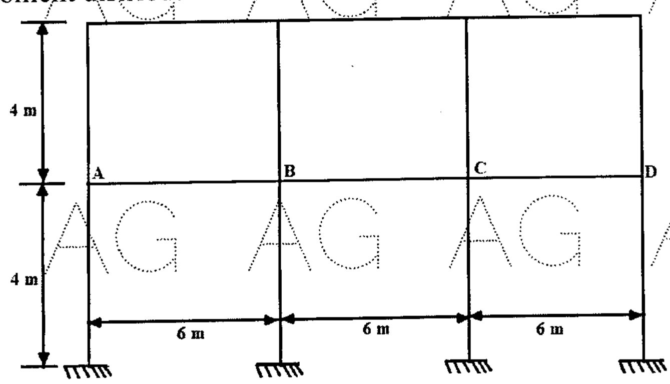

Figure 8

OR

11. Construct the influence line for shear using Muuler-Breslau's principle at section X of member BC of a continuous beam as shown in figure 9. Determine the maximum shear at X when the beam carries a UDL of 25 kN/m which can occupy a single span fully or a portion of a span. EI of the ebam is constant throughout. [10]

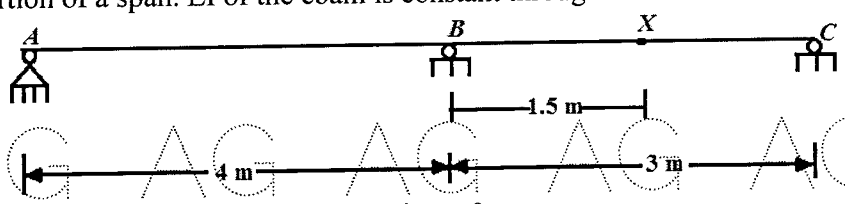

Figure 9

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