

R16

Code No: 134CE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, February - 2024

STRUCTURAL ANALYSIS

(Common to CE, CEE)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What are the merits of indeterminate structures over determinate structures? [2]
- b) Distinguish between static and kinematic indeterminacies of beams. [3]
- c) What is the significance of method of sections for the analysis of pin jointed Trusses? [2]
- d) What are the different types of frames? [3]
- e) What is a Linear Arch? [2]
- f) Obtain an expression for strain energy due to axial load? [3]
- g) Define the distribution factor and carryover factor. [2]
- h) Explain the effect of settlement of support on shear force at any section of a continuous beam? [3]
- i) Define an influence line for Shear force. [2]
- j) State and explain Muller Breslau's Principle. [3]

PART - B

(50 Marks)

2. Draw the shear force and bending moment diagrams of the beam supported and loaded as shown in Figure.1 [10]

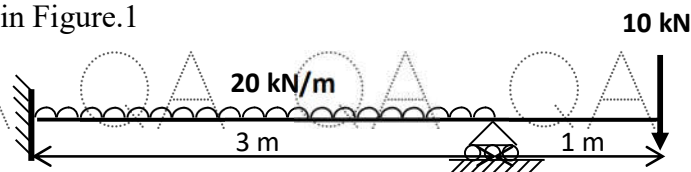


Figure. 1

OR

3. Find the deflection under the point of action of the concentrated load and maximum deflection of a beam of span 6 m supported and loaded as shown in Figure.2. Adopt $E = 200$ GPa and $I = 90 \times 10^6$ mm⁴. [10]

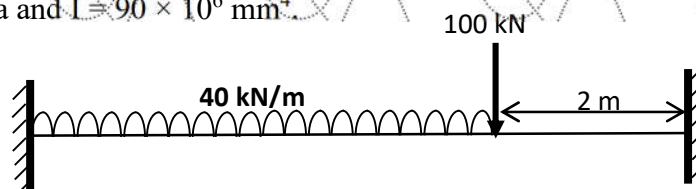


Figure.2

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7. Find the vertical deflection at the node '3' of a plane truss supported and loaded as shown in Figure.6. Assume the axial rigidity is the same for all the members of the truss. Use Unit Load Method. [10]

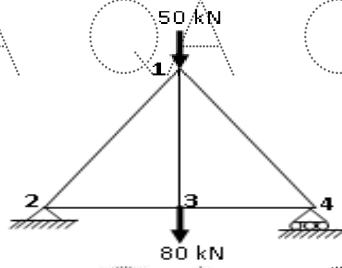


Figure. 6

8. Analyse the continuous beam supported and loaded as shown in Figure.7, if the support B sinks by 10 mm. Use slope-deflection method. Adopt $E = 200 \text{ GPa}$ and $I = 90 \times 10^6 \text{ mm}^4$. [10]

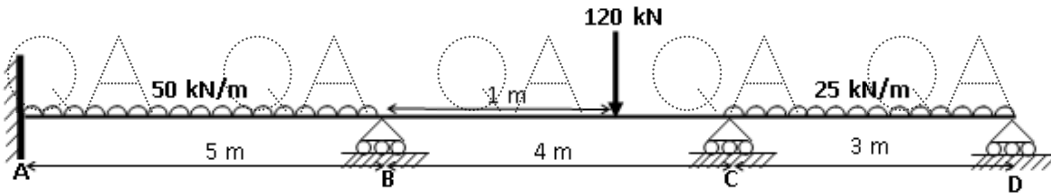


Figure. 7

OR

9. Analyse the continuous beam shown in Figure.8, by Moment Distribution Method. [10]

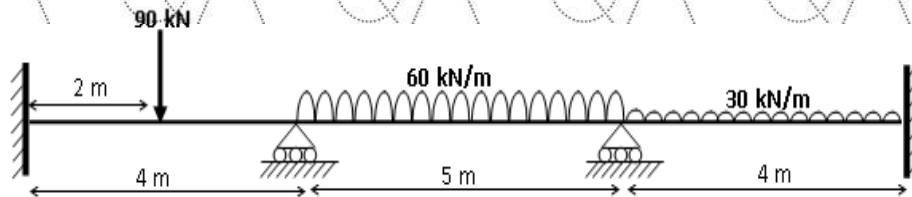


Figure. 8

10. An uniformly distributed load of intensity 30 kN/m, 6 m long crosses a simply supported girder of span 24 m from left to right. Calculate the maximum positive and negative shear forces at a section 9 m from the right support. Also find the absolute maximum bending moment and its location. [10]

OR

11. Draw the influence-line diagrams for shear force and bending moment at a section 8 m from the left support of a simply supported girder of span 15 m. Also, determine the maximum bending moment and shear force at the same section due to moving uniformly distributed load of intensity 45 kN/m of length 6 m. [10]

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