R16

Code No: 134CE

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, April - 2018

STRUCTURAL ANALYSIS

(Common to CE, CEE)

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) List out the merits of an indeterminate structure over a determinate structure. [2]

b) Determine the fixed end moments of a fixed beam subjected to the loads as shown in figure 1. [3]

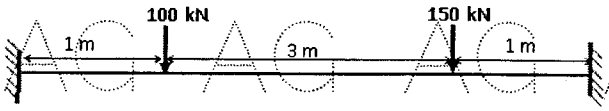

Figure: 1

c) What are the characteristics of different types of frames? [2]

d) What are the advantages and disadvantages of different method of analysis of pin jointed frames? [3]

e) What is a linear arch? [2]

f) Derive an expression for strain energy stored in a beam subjected to pure bending. [3]

g) Determine the distribution factors of a beam supported and loaded as shown in figure 2. [2]

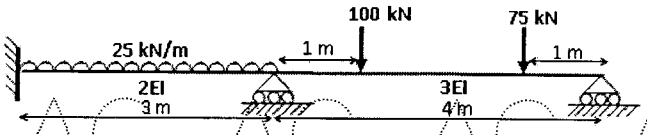

Figure: 2

h) Determine the Reaction at the prop of a beam loaded as shown in figure 3. [3]

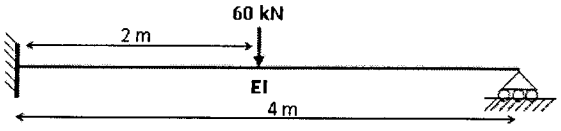

Figure: 3

i) Define focal length of a beam. [2]

j) Determine the magnitude of an equivalent distributed load of a udl of intensity 50 kN/m and 6 m long rolls across a simply supported beam of span 18 m. [3]

PART-B

(50 Marks)

2. Analyse a propped cantilever beam shown in figure 4 and draw the shear force and bending moment diagrams. [10]

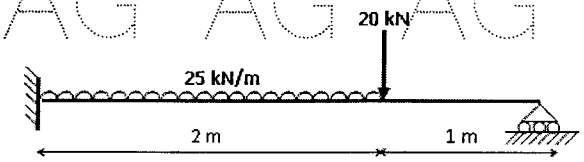

Figure: 4

OR

3. Analyse a fixed beam of span 6 m subjected to loading as shown in figure 5 and draw the bending moment diagram. Also find the magnitude and location of maximum deflection. [10]

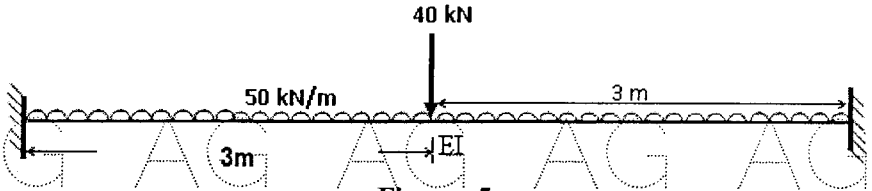

Figure: 5

4. Analyse the plane cantilever truss loaded as shown in figure 6. [10]

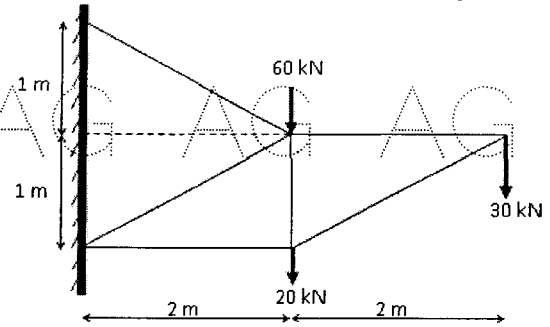

Figure: 6

OR

5. Using the method of sections, determine the forces in the members 1, 2, 3 and 4 of a plane truss supported and loaded as shown in figure 7. [10]

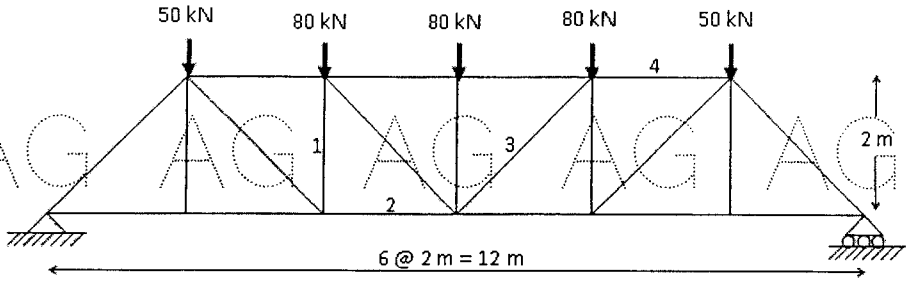

Figure: 7

6. Using unit load method, determine the vertical deflection at mid-span of a simply supported beam loaded as shown in figure 8. Assume the flexural rigidity is 3000 kNm^2. [10]

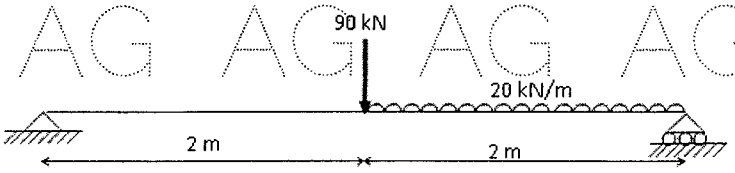

Figure: 8

OR

7. A three-hinged circular arch of span 25 m and central rise of 5 m is subjected to two concentrated loads 125 kN and 75 kN at a distance of 5 m and 10 m from the left hinge respectively and uniformly distributed load of 30 kN/m over the right half of the span. Find the resultant support reactions and the horizontal thrust, bending moment and the radial shear at a section 10 m from the right support. [10]

8. Analyse the continuous beam shown in figure 9, by slope-deflection method. [10]

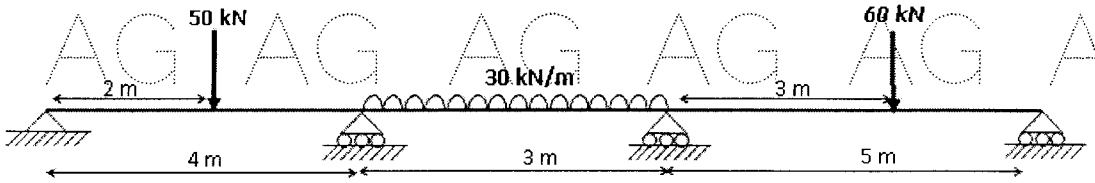

Figure: 9

OR

9. Using moment distribution method, analyse the continuous beam shown in figure 10. [10]

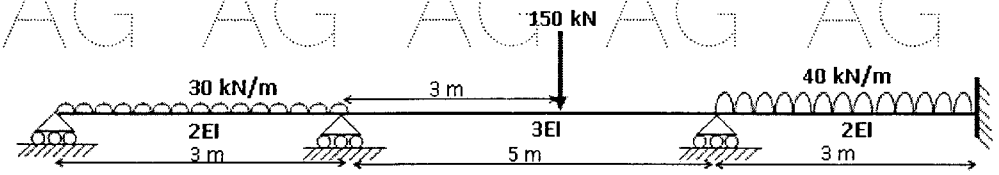

Figure: 10

10. A uniformly distributed load of intensity 50 kN/m and length 5 m moves across a simply supported girder of span 25 m from left to right. Find the maximum bending moment and maximum positive shear force at a section 16 m from the left support. Also find the absolute maximum bending moment and shear force. [10]

OR

11. Draw the influence lines for the members 1, 2, and 3 of a truss shown in figure 11. [10]

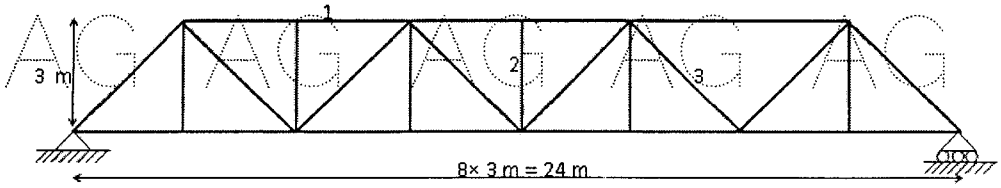

Figure: 11

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