R18

Code No: 155DC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, July/August - 2023

STRUCTURAL ANALYSIS – II

(Civil Engineering)

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

Note: i) Question paper consists of Part A and 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) Define Carry Over Factor. [2]

b) What is the stiffness of a member of length '*L*' and flexural rigidity '*EI*', if far end is hinged? [3]

c) What is the effect of settlement of a support on bending moment at any section of a continuous beam? [2]

d) What are the various components of a suspension bridges? [3]

e) What are the advantages of approximate methods of analysis? [2]

f) State the assumptions made in the portal method of analysis. [3]

g) Define flexibility coefficient f_{ij}. [2]

h) Obtain the stiffness matrix of an axial element (A, L, I and EI). [3]

i) What is an influence line diagram? [2]

j) Find the ordinate of the influence line diagram, at a section 2 m from the fixed end, for the support reaction at the prop of a beam (EI) shown in Figure.1. [3]

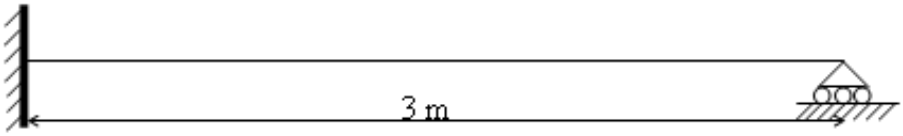

Figure.1

PART – B

(50 Marks)

2. A two-hinged parabolic arch has 30 m span and central rise of 8 m. It is subjected to a concentrated load of 100 kN at 10 m from the right support. The second moment of the arch rib varies as the secant of the inclination of the arch axis. Determine the reactions at the supports and the bending moment at the point of action of the concentrated load. [10]

OR

3. Analyse the frame shown in Figure. 2, by moment distribution method. Draw BMD. [10]

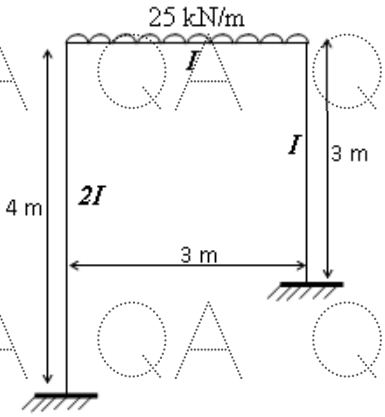

Figure 2

4. Using Kani's method, analyse the beam shown in Figure.3. Draw BMD. [10]

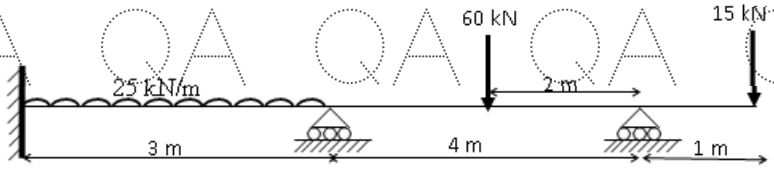

Figure.3

OR

5. The suspension bridge of horizontal span 180 m and central dip of 20 m has a two stiffening girders hinged at both ends. The width of the road way is 7 m. The roadway carries a dead load of 2 kN/m^2 over the whole span and a live load of 5 kN/m^2 over the right half of the span. Find the bending moment and shear force at a point 50 m from the left hinge. Also find the maximum tension in the cable. [10]

6. Using cantilever method, analyse the frame shown in figure 4. Draw BMD. [10]

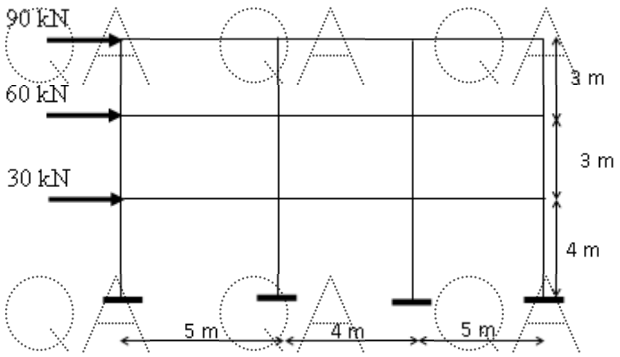

Figure.4

OR

7. Using the factor method, analyse a building frame subjected to the loads as shown in Figure.5. Assume the cross-sectional area and moment of inertia the same for all members of the frame. Also draw the bending moment diagram. Draw BMD. [10]

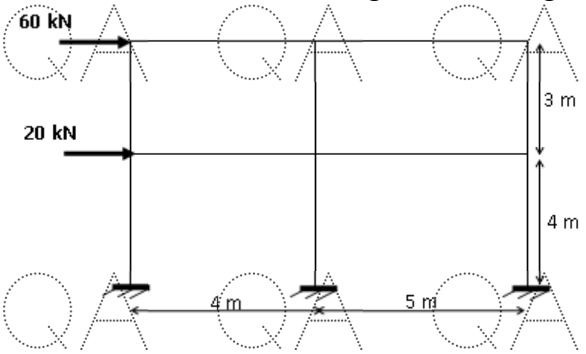

Figure.5

8. Analyse the beam supported and loaded as shown in Figure.6. Use stiffness method. Draw BMD. [10]

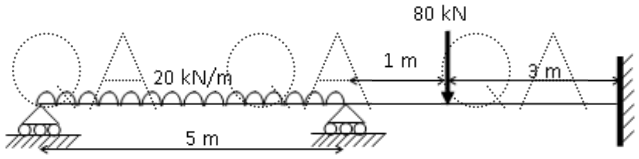

Figure. 6

OR

9. Using flexibility method, analyse the pin-jointed plane frame supported and loaded as shown in Figure.7. [10]

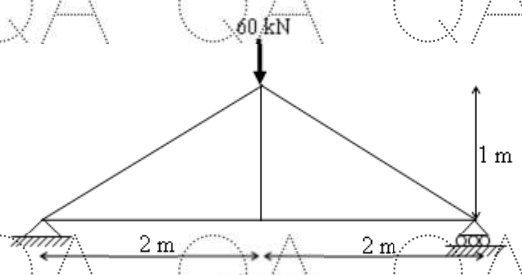

Figure.7

10. Draw the influence line diagram for shear force at a section 3 m from the hinged support of a continuous beam shown in Figure.8. [10]

Figure.8

OR

11. Draw the influence line diagram for the moment at fixed support of a beam shown in Figure.9. [10]

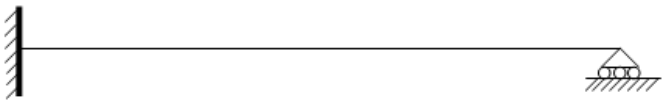

Figure.9

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