NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana State, India
UGC - Autonomous Institute
Accredited by NBA & NAAC with 'A' Grade
Approved by AICTE
Permanently affiliated to JNTUH

10. University Previous Question Papers

R18

Code No: 155DC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, January/ February - 2023
STRUCTURAL ANALYSIS – II
(Civil Engineering)

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) Write the expression for Radial shear at any section of a Two hinged parabolic arch. [2]
b) Define the terms 'rotational stiffness', 'distribution factor' and 'carry over factor', used in the Moment Distribution Method. [3]
c) What is meant by 'Rotational Factor' in Kani's method? What is it's value at a fixed end? [2]
d) What is a Suspension bridge? What are it's components? [3]
e) List the advantages of 'approximate methods' of analysis. [2]
f) What are the assumptions made in the 'Cantilever Method'? [3]
g) Define the term 'Stiffness' of a structure. [2]
h) Define 'Flexibility Coefficient'. What is the relation between 'Flexibility Matrix' and 'Stiffness Matrix'? [3]
i) Define the term 'Influence Line'. [2]
j) State Muller Breslau's principle. [3]

PART – B

(50 Marks)

2. A two hinged parabolic arch of 28 m span and central rise of 4 m. It carries an *udl* of 25 kN/m over the right half of the span and concentrated load of 160 kN at the crown. Locate and find the magnitude of maximum bending moment. Also find the shear force and normal thrust at quarter span section from the left support. Assume that moment of inertia at a section varies as secant of the slope. Neglect the effect of rib shortening. [10]

OR

3. Analyse the portal frame shown in figure 1, using Moment-distribution method. Draw bending moment diagram and elastic curve. [10]

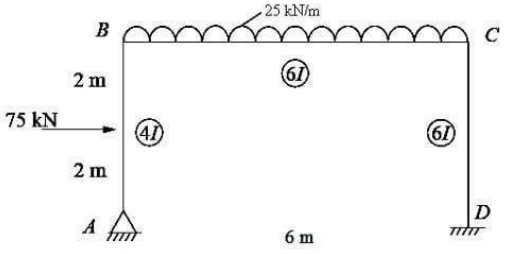

Figure 1

4. Analyse the frame shown in the figure 2 using Kani's method. Assume moment of inertia for the beams as 1.4I. Draw BMD and elastic curve. [10]

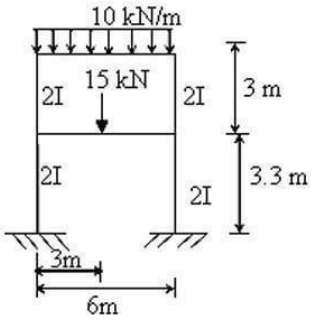

Figure 2

OR

5. A cable is suspended from two points A and B which are 100 m apart. The point A is 4 m below the point B. The lowest point on the cable is 10 m below the point A. The cable supports an *udl* of 15 kN/m over its entire span. Calculate (a) the reactions at the supports A and B and (b) the maximum tension in the cable. [10]

6. Calculate the moment at mid-span BC for portal frame shown in figure 3, if it is loaded with live loads on the spans AB and CD, in addition to the dead load. Use Substitute Frame Method. Dead load = 15 kN/m and Live load = 25 kN/m. [10]

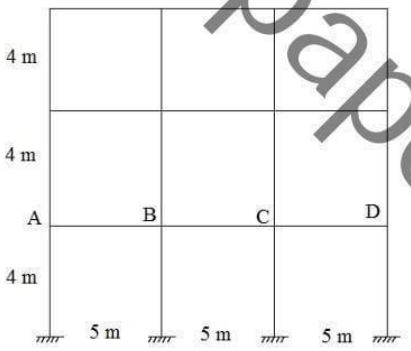

Figure 3

OR

7. Analyse the frame shown in figure 4, using Portal method. Draw the bending moment diagram and sketch elastic curve. Cross-sectional area of all columns is equal. [10]

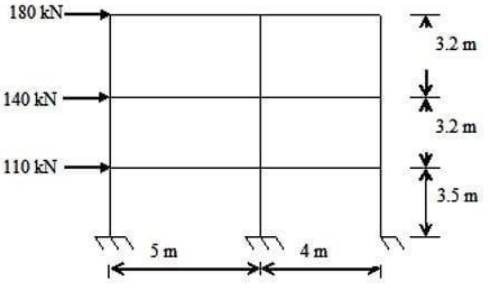

Figure 4

8. Analyse the continuous beam shown in the figure 5 using Stiffness Method. Draw shear force and bending moment diagrams. Also draw Elastic curve. [10]

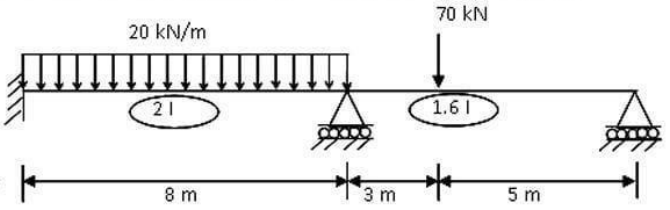

Figure 5

OR

9. Analyse the continuous beam shown in the figure 6 using Flexibility Method. Draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Also draw Elastic curve. [10]

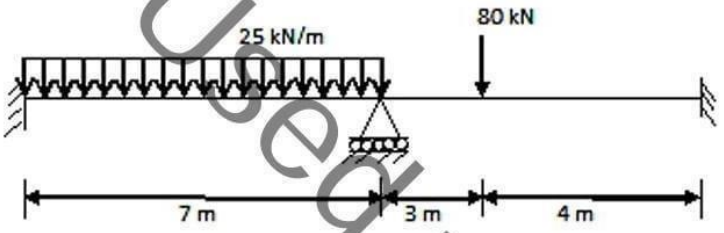

Figure 6

10. Draw the influence for reaction at the middle support. Compute the ordinates at 2 m intervals (figure 7). [10]

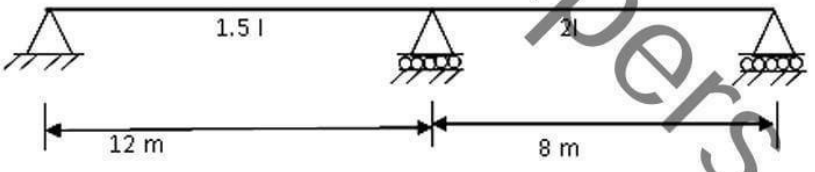

Figure 7

OR

11. Draw the influence diagram for the middle support moment M_B and determine its value (figure 8). [10]

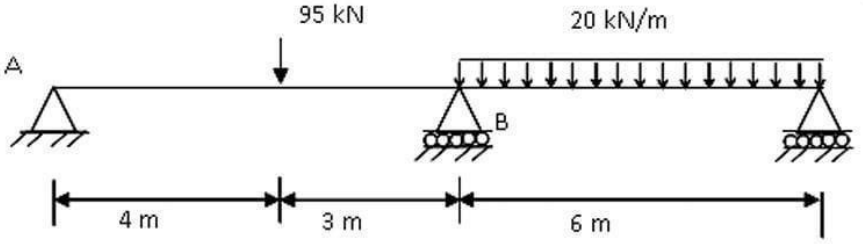

Figure 8

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R18

Code No: 155DC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, August - 2022
STRUCTURAL ANALYSIS – II
(Civil Engineering)

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

Answer any five questions
All questions carry equal marks

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1. A two-hinged parabolic arch has 30 m span and 5 m central rise. It is subjected to a concentrated load of 80 kN at a distance of 10 m from the right support in addition to uniformly distributed load of 25 kN/m over the left half of the span. The second moment of the area of the arch rib varies as the secant of the slope of the rib axis. Determine the horizontal thrust and maximum positive bending moments in the arch. [15]

2. Using moment distribution method, analyse the frame shown in figure 1 and draw the bending moment diagram and Elastic curve. [15]

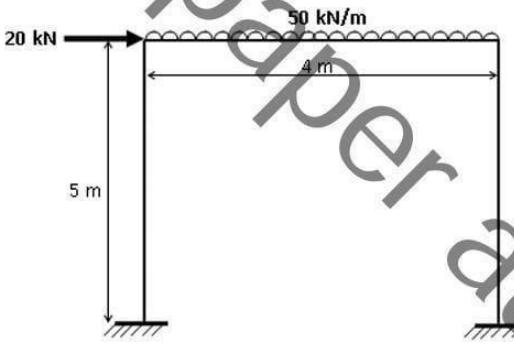

Figure 1

3. Using Kani's method, analyse the continuous steel beam supported and loaded as shown in figure 2, if the support 'C' settles by 20 mm. Assume $I = 30\times10^{-5}\ m^4$. Draw BMD and elastic curve. [15]

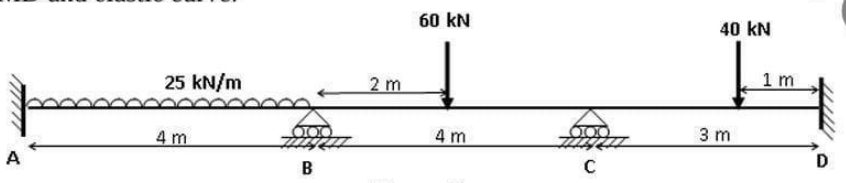

Figure 2

4. A simply supported suspension bridge of span 200 m has three stiffening girders supported by two cables with a central dip of 20 m. If four concentrated loads, each of 250 kN, are placed along the centre line of the roadway at 20 m, 40 m, 60 m and 80 m from the left end. Find the shear force and bending moment at a section located at 75 m from the right end, in each girder. Also find the maximum tension in the cable. [15]

5. Analyse the frame shown in figure 3, using cantilever method. Assume that the columns have equal sectional properties. Draw BMD. [15]

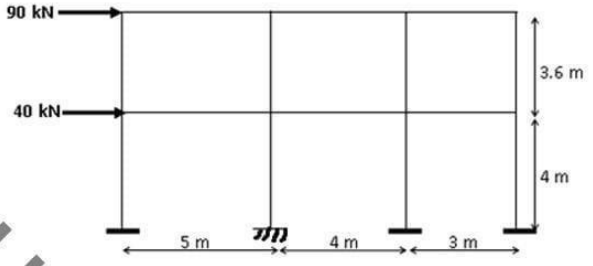

Figure 3

6. In a multistoreyed building, the frames as shown in figure 4 are spaced at 4.2 m. The dead and live loads carried by the slab are 1.5 kN/m^2 and 2.5 kN/m^2 respectively. Using substitute frame method, analyze an intermediate beam of the first floor for mid-span positive bending moment. Use substitute frame method. [15]

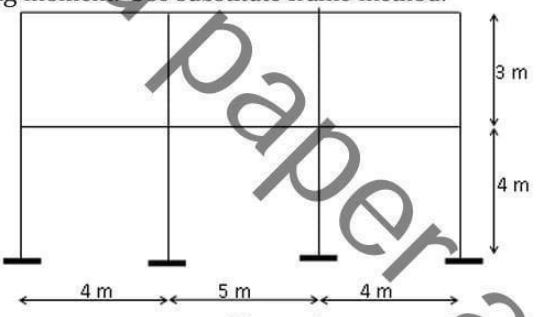

Figure 4

7. Using the stiffness method, analyze the beam supported and loaded as shown in figure 5. Draw BMD and Elastic curve. [15]

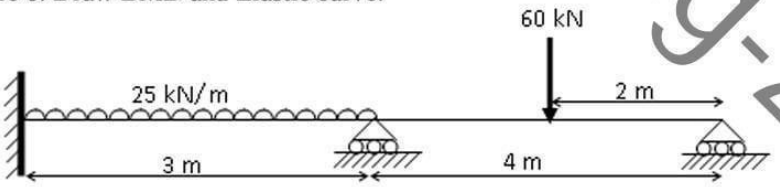

Figure 5

8. Draw the influence line diagram for the reaction at intermediate support of a continuous beam shown in figure 6. [15]

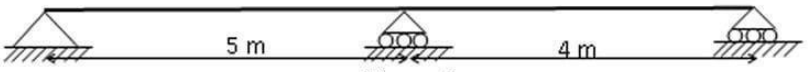

Figure 6

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R18

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, February - 2022
STRUCTURAL ANALYSIS – II
(Civil Engineering)

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

Answer any five questions
All questions carry equal marks

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1. An RCC two-hinged parabolic arch has 40 m span and central rise of 6 m, is subjected to a concentrated load of 90 kN at centre. Determine the horizontal thrust, if the arch is subjected to rise in temperature of 30^0C. The second moment of the area of the arch rib varies as the secant of the slope of the rib axis. Assume the cross-section of the arch is 900 mm × 400 mm and concrete of grade M35. [15]

2. Using moment distribution method, analyse the frame shown in figure 1 and draw the bending moment diagram and Elastic curve. [15]

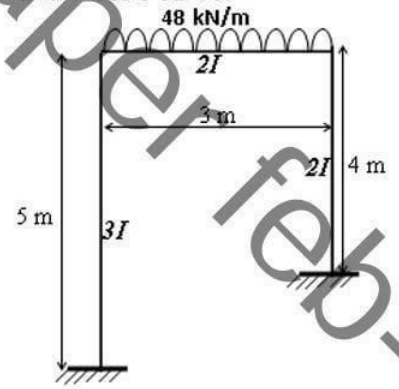

Figure 1

3. Using Kani's method, analyze the frame shown in figure 2 and draw the bending moment diagram. Elastic curve. [15]

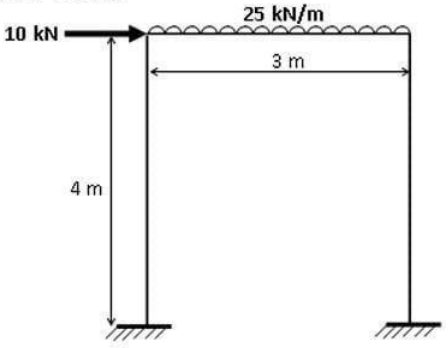

Figure 2

4. A suspension bridge of 150 m span has two three-hinged stiffening girders supported by two cables with a central dip of 15 m. If four concentrated loads of 125 kN each are placed along the centre line of the roadway at 15 m, 30 m, 45 m and 60 m from the right end. Find the shear force and bending moment at a section located at 50 m from the right end, in each girder. Also find the maximum tension in the cable. [15]

5. Using Portal method, analyze the plane frame shown in figure 3. And draw the bending moment diagram. [15]

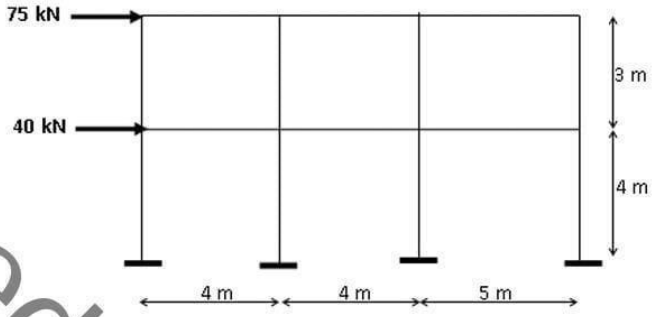

Figure 3

6. In a multi-storeyed building the frames, as shown in figure 4, are spaced at 3.6 m c/c. The dead and live loads carried by the slab are 1 kN/m^2 and 3 kN/m^2 respectively. Using substitute frame method, analyse an intermediate span of the first floor for maximum negative bending moment. [15]

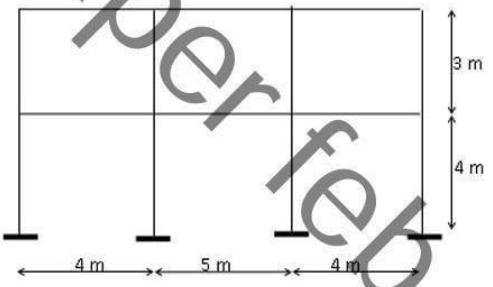

Figure 4

7. Using the stiffness method, analyze the frame supported and loaded as shown in figure 5. [15]

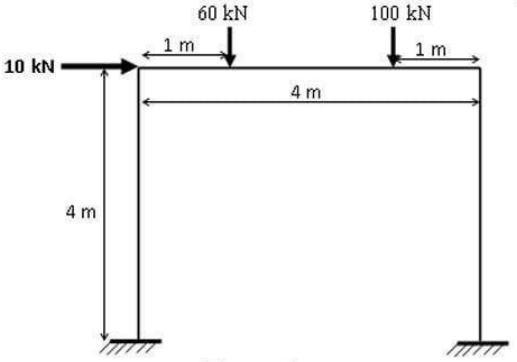

Figure 5

8. Draw the influence line diagram for the reaction at the left support of a continuous beam shown in figure 6. [15]

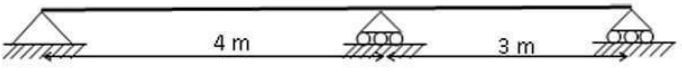

Figure 6

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2021
STRUCTURAL ANALYSIS – II
(Civil Engineering)

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

Answer any five questions
All questions carry equal marks

- - -

1. A two-hinged parabolic arch of span 24 m has central rise of 6 m and the moment of inertia of the cross-section of the arch varies as the secant of the slope of the arch axis. The arch is subjected to a concentrated load of 60 kN at a distance of 8 m from the right support. Find the support reactions and the maximum bending moment in the arch. [15]

2. Using the moment-distribution method, analyse the continuous beam supported and loaded as shown in Figure 1. Also draw the shear force and bending moment diagrams. [15]

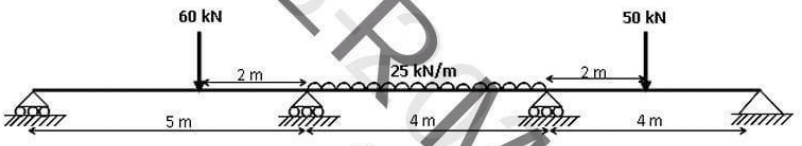

Figure 1

3. Using Kani's method, analyse the frame shown in Figure 2 and draw the bending moment diagram. [15]

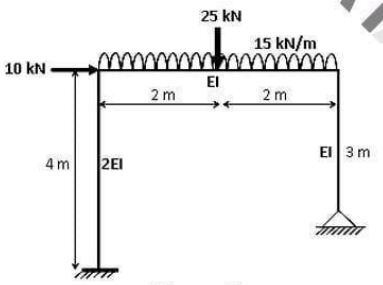

Figure 2

4. Analyse the frame shown in Figure 3, using portal method. Also draw the bending moment diagram. Assume the geometrical and material properties are the same for the elements of the frame. [15]

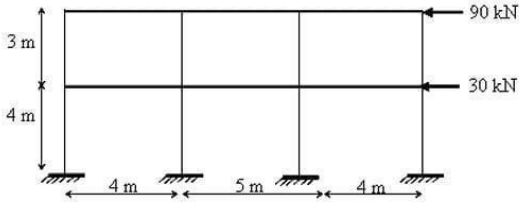

Figure 3

5. Analyze the frame shown in Figure 3 using portal method. [15]

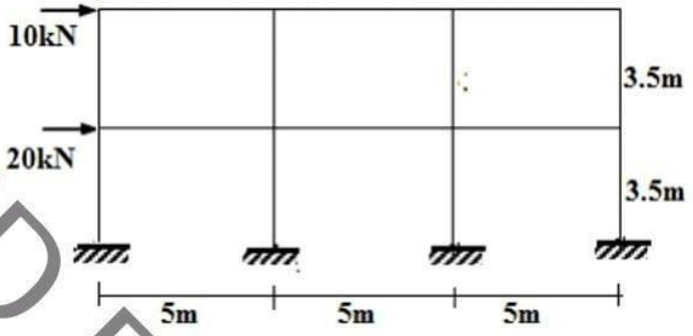

Figure 3

6. Analyze the frame shown in Figure 4 by Cantilever method. [15]

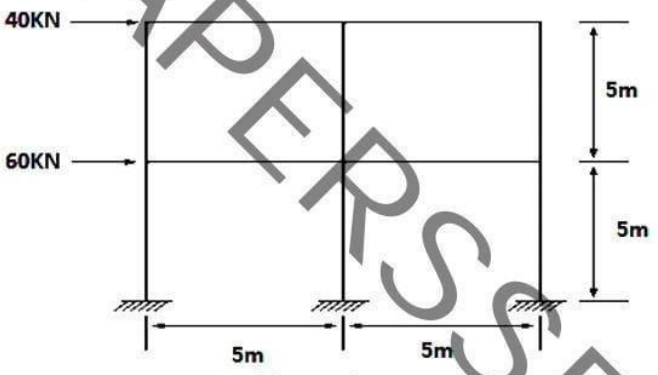

Figure 4

7. Analyze the frame by stiffness matrix method, and draw BMD, take EI as constant (figure 5). [15]

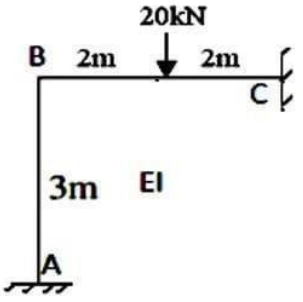

Figure 5

8. Derive ILD ordinates and draw influence lines for Shear force and B.M's at any point in a Propped cantilever. [15]

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