Code No: 154CB **R18**

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

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

Answer any Five questions
All questions carry equal marks

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1. Determine the forces in the members of the pin-jointed truss shown in figure 1. [15]

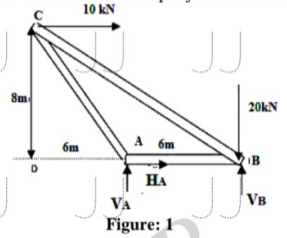

Figure: 1

2. Determine the forces in all the members of the truss shown in figure 2 by using method of joints. [15]

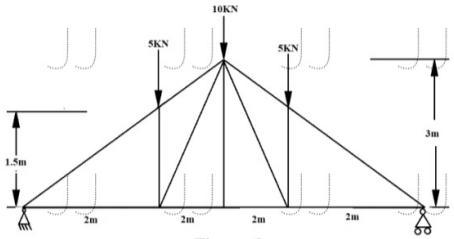

Figure: 2

3. A mild steel bar 100mm diameter is bent as shown in figure 3. It is fixed horizontally at A and a load of 500N hangs at D. Draw the bending moment diagram for the parts AB, BC and CD, indicating the maximum values. Find the maximum bending stress. Find also the deflection at D. Take $E = 2\times10^5$ N/mm^2. [15]

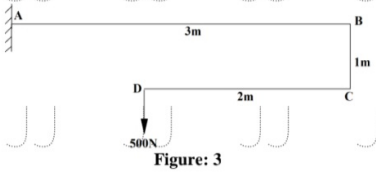

Figure: 3

4. A three hinged arch has span 20m and a rise 4m. The arch carries a uniformly distributed load of 20KN/m on the left half of the span. Find the horizontal thrust at each support and location and magnitude of the maximum bending moment of the arch. [15]

5. Determine the prop reaction and the deflection at mid-span of a propped cantilever beam shown in figure 4. The prop sinks by 30mm. Take EI = 15,000 KNm^2. [15]

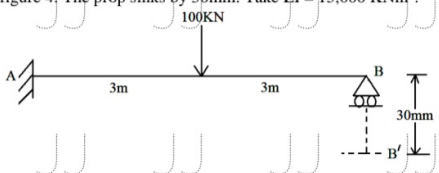

Figure: 4

6.a) Determine the fixed end moments for the loaded beam shown in figure 5. Draw also BMD for the beam of span 'l'.

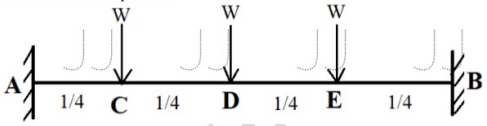

Figure: 5

b) A beam 10m long fixed at both ends carries a uniformly distributed load of 4500N/m over the entire span. Find the maximum bending and maximum bending deflection. Take E = 200KN/m^2, I = 5×10^7 mm^4. [8+7]

7. The support B of a continuous beam shown in figure 6 has settled by 12mm. Find out the moments at supports. [15]

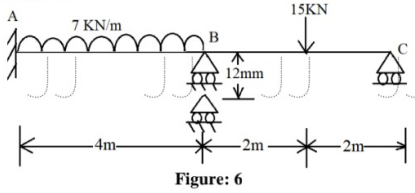

Figure: 6

8. Construct the influence line for a diagonal member U_5L_4 of a warren truss with verticals shown in figure 7. [15]

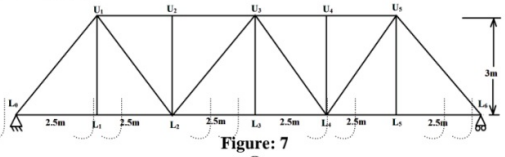

Figure: 7

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Code No: 154CB **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester (Special) Examinations, January/February - 2021
STRUCTURAL ANALYSIS – I
(Civil Engineering)

Time: 2 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
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1. Using the method of sections, determine the force in the members 1, 2 and 3 of a plane truss supported and loaded as shown in Figure 1. [15]

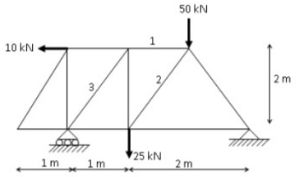

Figure: 1

2. Using tension coefficient method, analyse the plane truss supported and loaded as shown in Figure 2. [15]

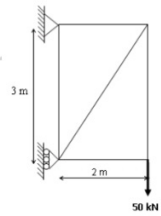

Figure: 2

3. Using unit load method, determine the vertical deflections at the joint C of a steel pin-jointed frame subjected to a concentrated load of 20 kN as shown in Figure 3. All the members have the same cross-sectional area = 500 mm^2. [15]

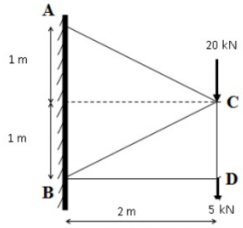

Figure: 3

4. A three-hinged parabolic arch of span 24 m has central rise of 5 m is subjected to two concentrated loads 60 kN and 25 kN at a distance of 8 m and 10 m from left hinge and uniformly distributed load of 150 kN/m on the right half of the span. Find the horizontal thrust and bending moment at a section 9 m from the left support. [15]

5. Analyse and draw the shear force diagram for a beam supported and loaded as shown in Figure 4. [15]

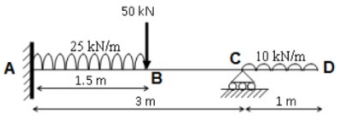

Figure: 4

6. Analyse and draw the bending moment diagrams for a fixed beam supported and loaded as shown in Figure 5. [15]

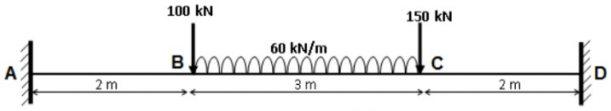

Figure: 5

7. Analyse and draw BMD for the continuous beam supported and loaded as shown in Figure 6, if the support B sinks by 10 mm. Use Clapeyorn's theorem of three moments. Adopt E = 200 GPa and I = 75 × 10^6 mm^4. [15]

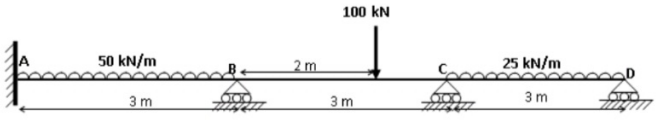

Figure: 6

8. An uniformly distributed load of intensity 25 kN/m, 4 m long crosses a simply supported girder of span 16 m from right to left. Calculate the maximum positive and negative shear forces at a section 6 m from the left support. [15]

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Code No: 154CB **R18**

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

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

Answer any five questions
All questions carry equal marks
- - -

1. Find the force in all members of the truss shown in figure 1 by method of sections. [15]

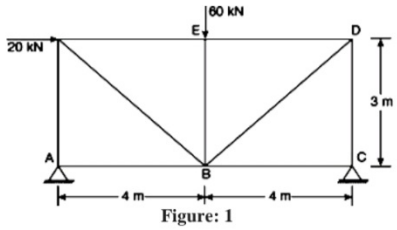

Figure: 1

2. A three hinged circular arch of span 16m and rise 4m is subjected to two point loads of 100 kN and 80 kN at the left and right quarter span points respectively. Find the reaction at the supports. Find also the bending moment, radial shear and normal thrust at 6m from left support. [15]

3. A propped cantilever beam is shown in figure 2. Calculate the prop Reaction and also draw the BM and SF diagrams. [15]

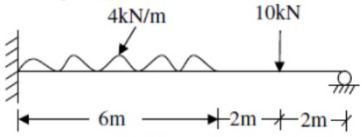

Figure: 2

4. A continuous beam ABCD 12 m long is fixed at A and D, and is loaded as shown in figure 3. Analyze the beam completely if the following moments take place simultaneously a) the end A yields, turning through 1/250 radians in a clock-wise direction b) end B sinks 30 mm in downward direction, c) end C sinks 20 mm in downward direction. The beam has constant $I=33.20\times10^5$ mm^4 and $E=2\times10^5$ N/mm^2. Use slope-deflection method. [5+5+5]

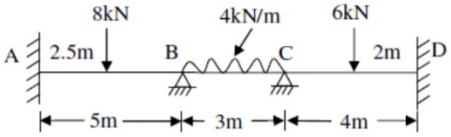

Figure: 3

5. Construct the influence line for the force in member L_2U_3 of the bridge truss shown in figure 4. [15]

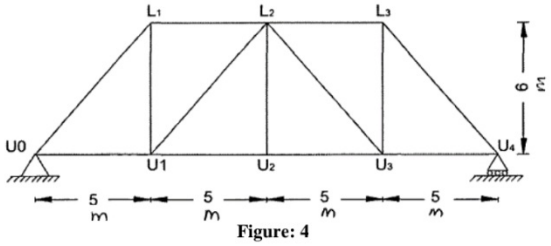

Figure: 4

6. Determine the horizontal and vertical component of deflection at the Point 'C' of the frame shown in figure 5. Take $E=200\times10^3$ N/mm^2 and $I=6\times10^7$ mm^4. Use Strain Energy method. [15]

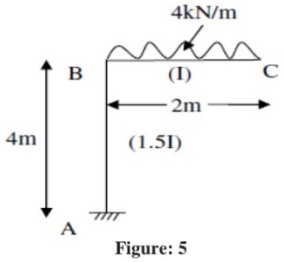

Figure: 5

7. Explain about different types of frames with the help of figures. [15]

8. Two point loads of 60 kN and 80 kN spaced 2.5 m apart cross a girder of span 15 m from left to right with the 60 kN load leading. Determine the maximum values of shear force and bending moment that can occur at any point of the girder using influence lines. Also plot the maximum positive and negative shear force and bending moment diagrams stating their absolute maximum values. [15]

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Code No: 154CB **R18**

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

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

Answer any five questions
All questions carry equal marks
- - -

1. Analyze the pin jointed truss as shown in figure 1 by the method of joints. [15]

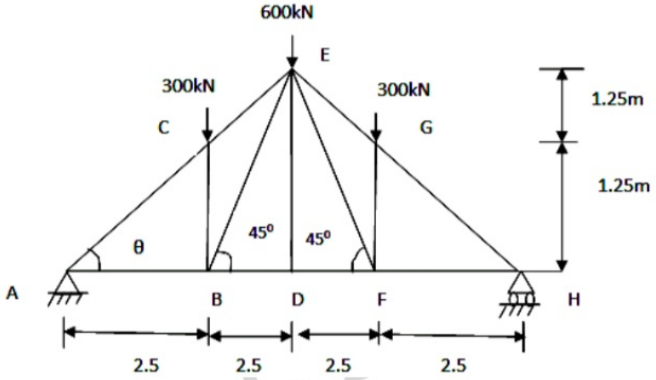


Figure: 1

2. Analyze the truss shown in figure 2 by method of sections. [15]

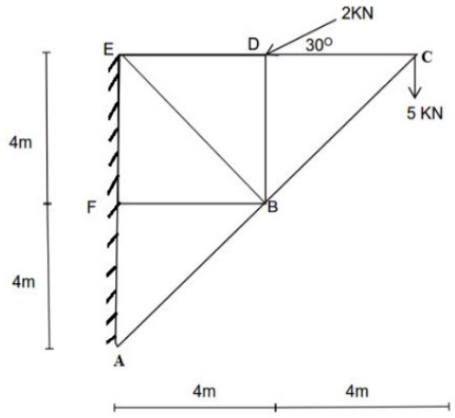


Figure: 2

3. An unsymmetrical 3-hinged parabolic arch is loaded as shown in figure 3. Locate the position of third hinge C and determine
   a) Support reactions.
   b) NT and RSF at section 'D' 10 m away from A.
   c) Location and magnitude of maximum BM in portion CB
   Also draw BMD for the arch. [15]

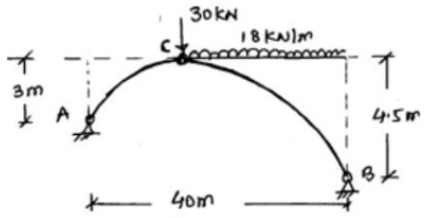
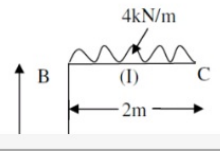


Figure: 3

4. Determine the horizontal and vertical component of deflection at the Point 'C' of the frame shown in figure 4. Take E=200×10^3 N/mm^2 and I =6×10^7 mm^4. Use Strain Energy method. [15]



Code No: 154CB **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, November/December - 2020
STRUCTURAL ANALYSIS – I
(Civil Engineering)

Time: 2 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
- - -

1. A plane truss, made up of equilateral triangles of side 3 m, is supported and loaded as shown in Fig.1. Using the method of sections, determine the forces in the members 1, 2 and 3. [15]

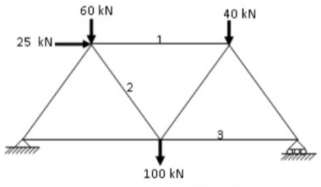


Fig.1

2. Analyse the plane truss shown in Fig.2, using tension coefficient method. [15]

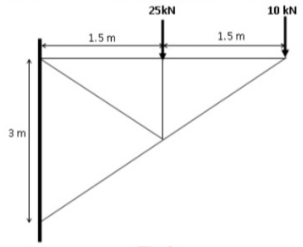


Fig.2

3. Using unit load method, determine the deflection under the concentrated load and the slope at the right hand side support of a beam, span 6 m, supported and loaded as shown in Fig. 3. [15]

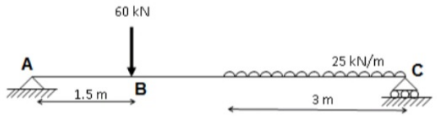


Fig. 3

4. A three-hinged circular arch of span 30 m and a central rise of 6 m is subjected to two concentrated loads 150 kN and 100 kN at a distance of 8 m and 18 m from the left hinge. Find the support reactions and the horizontal thrust at a section 12 m from the right support. [15]

5. Find the maximum deflection and the slope at the prop of a beam supported and loaded as shown in Fig.4. [15]

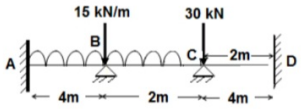


Fig.4

6. Determine the deflection and slope, under the point of action of 50 kN load, of a beam supported and loaded as shown in Fig.5. [15]

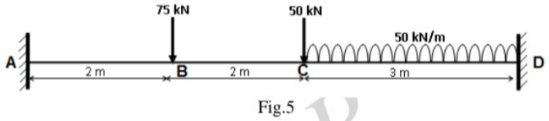


Fig.5

7. Using the slope-deflection method, analyse the frame shown in Fig. 6. [15]

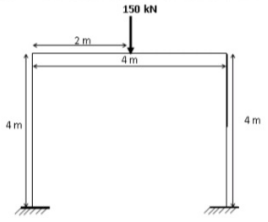


Fig. 6

8. An uniformly distributed load of intensity 20 kN/m, 5 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 10 m from the right support. [15]

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