Course Code: 1950119 Roll No: MLRS- R19

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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III B.Tech I Sem Supply End Examination, July 2022

Structural Analysis – II

(CIVIL)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. 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

(10*2 Marks = 20 Marks)

a. Write the expression for Radial shear at any section of a Two hinged parabolic arch.
b. Define the terms 'Stiffness factor' and 'Distribution factor'.
c. Write the expression for BM due to settlement of a support.
d. What is meant by 'Rotation factor'?
e. List the advantages of approximate methods of analysis?
f. What are the assumptions made in the Cantilever Method?
g. What is meant by Static indeterminacy?
h. Define the 'Stiffness'?
i. What are the uses of 'influence lines?
j. Define the term 'Inflence line'.

PART- B

(10*5 Marks = 50 Marks)

2) A two hinged parabolic arch of 38 m span and central rise of 5 m. It carries a *udl* of 18 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.

(OR)

3) Analyse the portal frame shown in Fig.1, using Moment Distribution method. Draw bending moment diagram and elastic curve.

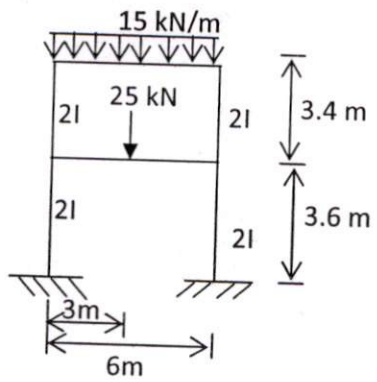


Fig.1

4) A continuous beam is loaded as shown in Fig.2. During loading the support B sinks by 10 mm. Using Kani's method, determine the bending moments and hence sketch the bending moment diagrams. Given that $I=86\times10^4$ mm^4 ; E=210 GPa.

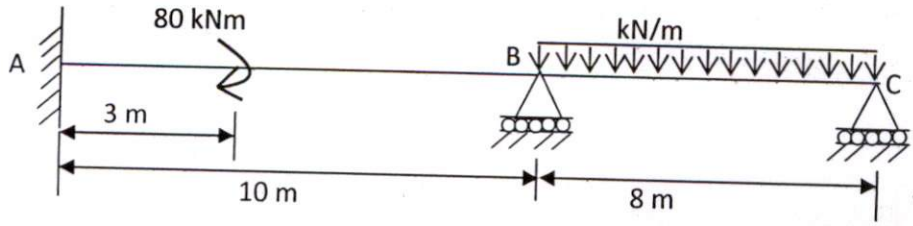


Fig.2

(OR)

5) A cable in a suspension bridge has a span of 100 m and a central dip of 8 m. It carries a load of 16 kN/m. Find the maximum tension and inclination of the cable at supports. Also determine the forces transmitted to the tower if the cable is :

a) Passing over smooth pulley on the top of the pier.
b) Clamped to the saddle with roller support.
The anchor cable is inclined at 34° with the horizontal.

6) Calculate the moment at mid-span BC for portal frame shown in Fig.3, if it is loaded with live loads on the spans AB and CD, in addition to the dead load. Use Cantilever Method. Dead load = 16 kN/m and Live load = 20 kN/m.

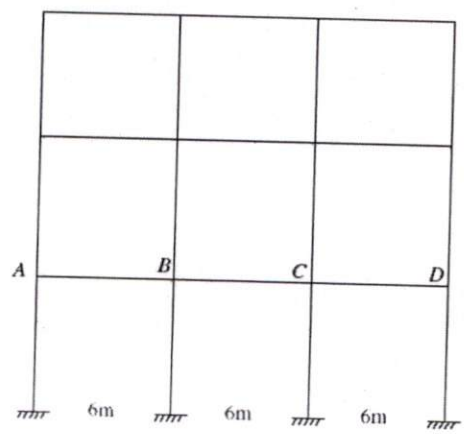


Fig.3

(OR)

7) Calculate the moment at mid-span BC for portal frame shown in Fig.3, if it is loaded with live loads on the spans AB and CD, in addition to the dead load. Use Cantilever Method. Dead load = 16 kN/m and Live load = 22 kN/m.

8) Analyse the continuous beam shown in the Fig.4 using Stiffness Method. Draw shear force and bending moment diagrams. Also draw Elastic curve.

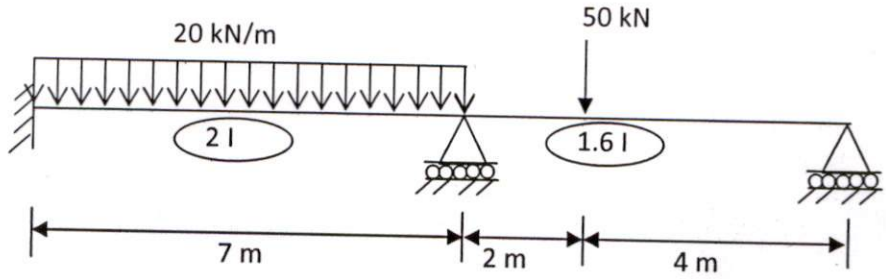


Fig.4

(OR)

9) Analyse the continuous beam shown in the Fig.5 using Flexibility Method. Draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Also draw Elastic curve.

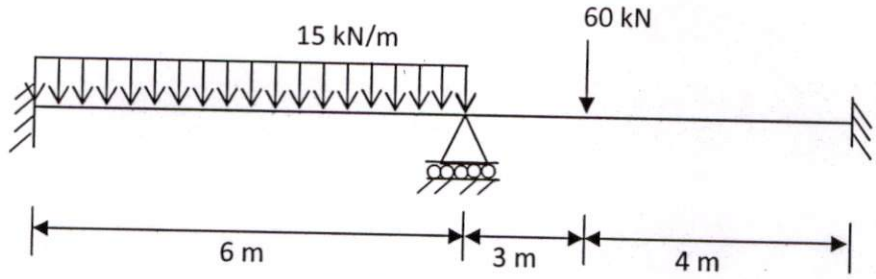
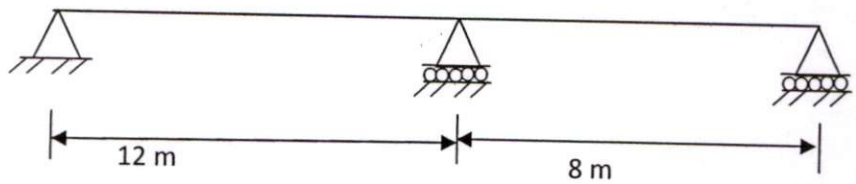
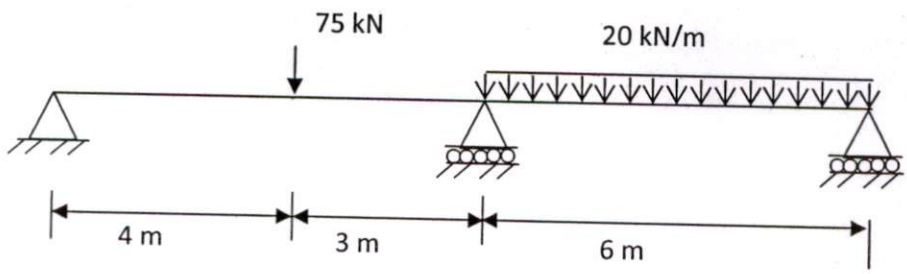


Fig.5

10) Draw the influence for reaction at the middle support. Compute the ordinates at 2 m intervals.



11) Draw the influence diagram for the middle support moment M_B and determine its value.



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