



R17 Regulation
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 1P4AC

B.Tech II Year II Semester Supplementary Examinations, September 2023

STRUCTURAL ANALYSIS-I
(CIVIL ENGINEERING)

Maximum Marks: 70

Date:19.09.2023 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Explain fixed moments for a fixed beam of uniform cross section for concentrated load acting at the center of the span.
- 2 Define degree of freedom?
- 3 What is zero force condition?
- 4 What is a truss?
- 5 Distinguish between two hinged and three hinged arches
- 6 What is Unit load method?
- 7 What is the moment at a hinged end of a simple beam when the other end of the span is fixed?
- 8 Write down the equilibrium equations used in slope deflection method for one span beam with support fixed?
- 9 What do you mean by influence line diagram?
- 10 What is meant by absolute maximum bending moment in a beam?

Part-B

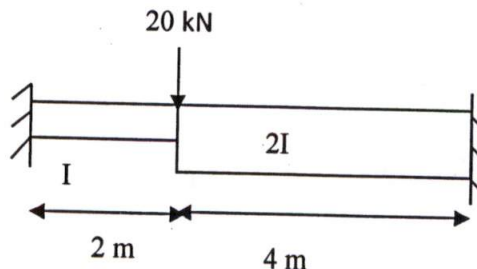
Answer All the following questions.

(5X10M=50Marks)

- 11 A Cantilever of length 5m carries a point load of 24kN at its center. The cantilever is propped rigidly at the free end. Determine the reactions at the rigid prop. [10]

OR

- 12 For a fixed beam shown in Fig. 1, the left support of beam rotates by 0.03 radians clockwise, $EI = 10^4 \text{ kN-m}^2$. Compute the fixed end moments. Draw BMD. [10]



- 13 Determine the unknown forces in the members of truss CD, CF and GF by using method of section. Tabulate the results and also indicate the members, whether tension or compression. [10]

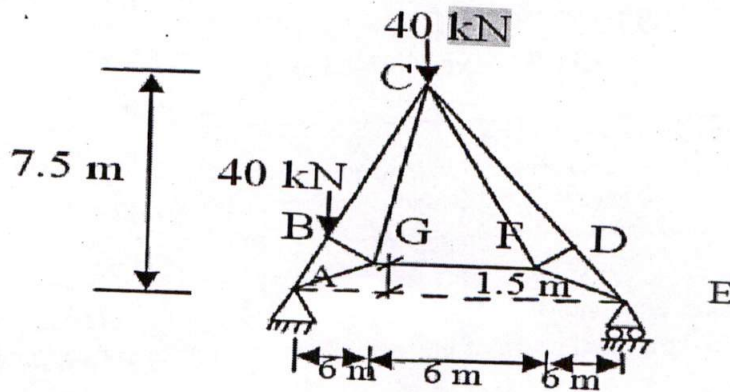
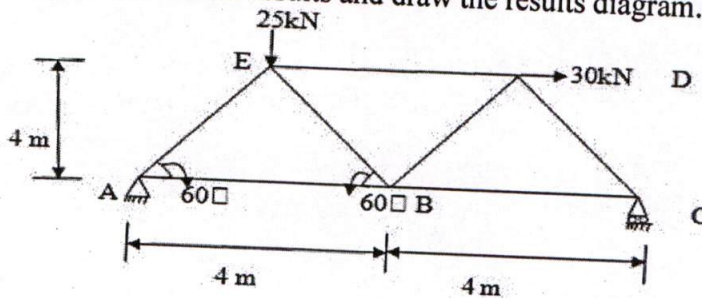


Fig. 10

OR

- 14 Determine the unknown forces in the member of a truss as shown in figure. By using method of joints. Tabulate the results and draw the results diagram. [10]

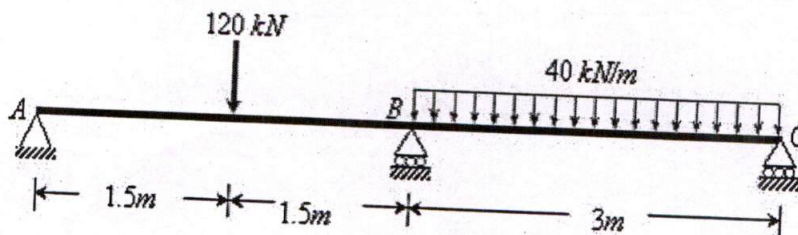


- 15 A three hinged parabolic arch of span 100m and rise 20m carries a uniformly distributed load of 2kN/m length on the right half of span. Determine the maximum bending moment in the arch. [10]

OR

- 16 A simply supported beam of span 'L' carries a concentrated load 'P' at a distance 'a' from the left hand support. Using Castigliano's theorem determine the deflection under the load. Assume uniform flexural rigidity as EI. [10]

- 17 Draw SFD and BMD for following beam using slope deflection method. [10]



OR

- 18 Using moment distribution method analyse the two span continuous beam ABC, having end supports A and C fixed. There is a load of 5kN in span AB=5m at 3m from A, While on span BC=6m there is a load of 8KN at 2.5m from C. Sketch the BMD. [10]
- 19 An uniformly distributed load of 40 kN/m on the length of 3m transverse across the span of simply supported length of 18m. Compute maximum moment at 4m from left support and absolute bending moment. [10]

OR

- 20 A train of 4 wheel loads of magnitude 45 kN, 90 kN, 95 kN and 90 kN passes over a span of 40 m. The horizontal distance between the load is 5m, 7 m and 10 m . Find the Maximum positive SF, Maximum negative SF, Absolute BM at section 12 m from left support. The train is moving with 90 kN load at heading position. [10]

