Regulation: R18 *Subject code: 2P4AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech IV Semester Supplementary Examinations, July 2022

STRUCTURAL ANALYSIS-I

CIVIL ENGINEERING

Maximum Marks: 70 Date:28.07.2022 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.
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 Define static indeterminacy

2 Distinguish between cantilever beam and propped cantilever beam.

3 What methods are used to analyze the frame?

4 Define tension coefficient.

5 Define strain energy.

6 What are the types of arches?

7 Write Slope deflection equation for two span continuous beam?

8 Define Carryover factor.

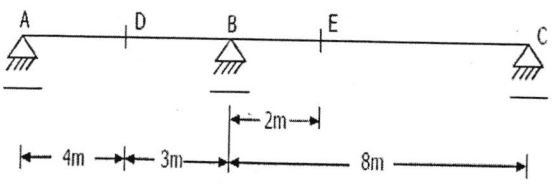
9 Define Influence Line.

10 State Muller Breslau's Principle.

Part-B

Answer All the following questions. (10M X 5=50Marks)

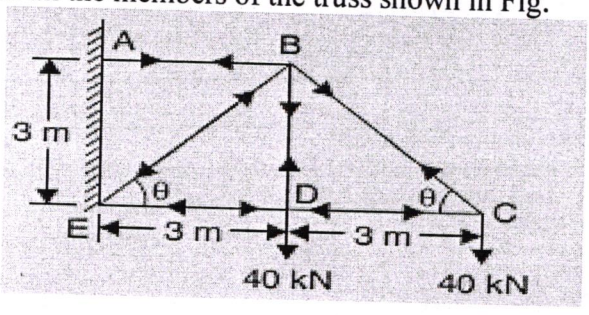
11 a) What is meant by compatibility equation and equilibrium equation? 04
b) Find the degree of static indeterminacy of the beam as shown in fig. 06



OR

12 A fixed beam of length 8m length is loaded with equal point loads of 130 KN each at distance 3m from each support. Draw the BMD & SFD where $E=2X10^8 KN/m^2$ $I=8x10^8$ mm^4. 10

13 Determine the forces in all the members of the truss shown in Fig. 10



OR

14 The Warren truss loaded as shown in Fig. P-418 is supported by a roller at C and a hinge at G. By the method of sections. Determine the forces in the members DE, DF, and CE. 10

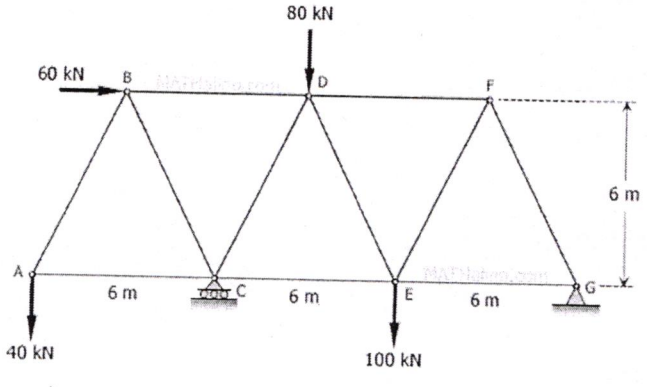
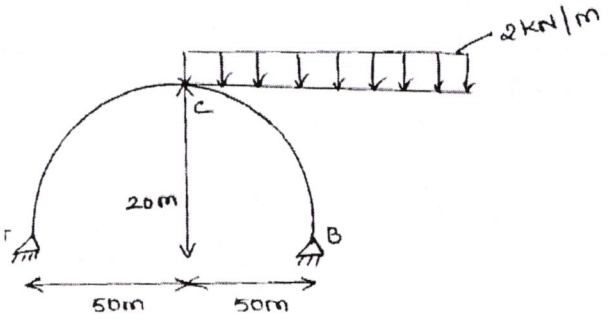


Figure P-418

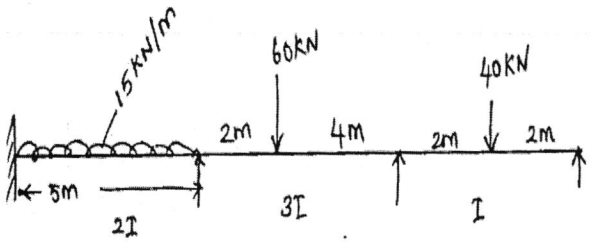
15 a) Derive Castigliano's First Theorem 05
b) Derive strain energy due to axial bending. 05

OR

16 A three hinged parabolic arch of span 100m and rise 20m carries a uniformly distributed load of 2KN/m length on the right half as shown in the figure. Determine the maximum bending moment in the arch. 10



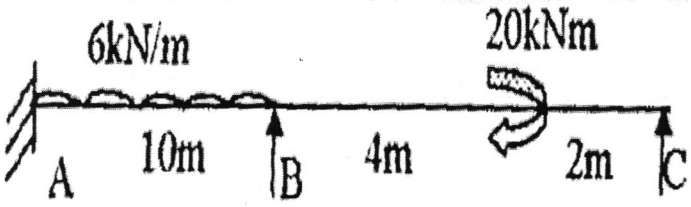
17 Analyze the continuous beam given in figure by slope deflection method and draw the B.M.D



10

OR

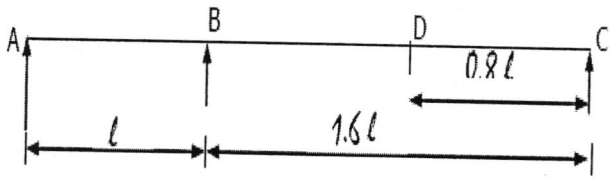
18 Analyze the continuous beam as shown in figure below by using moment distribution method. EI is constant.
Draw the bending moment diagram and shear force diagram.



10

19 Sketch qualitatively the influence line for shear at D for the beam in Fig. (Your sketch shall clearly distinguish between straight lines and curved lines)

10



OR

20 A single rolling load of 100 KN moves on a girder of span 20m. (a) Construct the influence lines for (i) Shear force (ii) Bending moment for a section 5m from the left support. (b)Construct the influence lines for points at which the maximum shears and maximum bending moment develop. Determine the maximum values. 10