Regulation: R17 *Subject code:* 1P4AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Year II Semester Supplementary Examinations, July 2021

STRUCTURAL ANALYSIS-I

(CIVIL ENGINEERING)

Maximum Marks: 70 Date:20.07.2021 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 What are the relative merits of indeterminate over determinate structures?
2 Derive the compatibility equation for the propped cantilever.
3 Define frame.
4 Distinguish between pin jointed and rigidly jointed structure.
5 State the Castigliano's theorem.
6 How three hinged arches is different from two hinged arch and explain it.
7 What is the effect of sinking of support in slope deflection method
8 Define Elastic curve.
9 Define the term Focal Length.
10 List out the uses of Influence lines.

Part-B

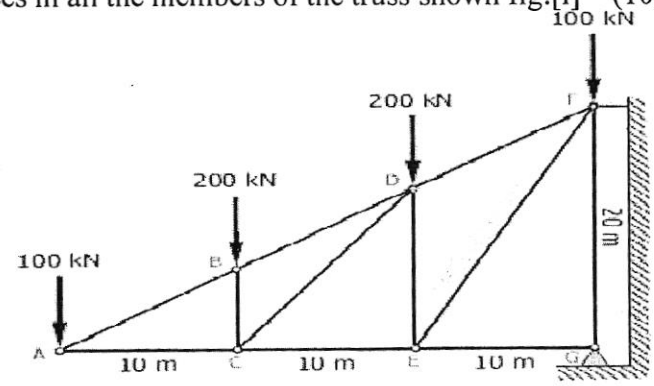
Answer All the following questions. (10M X 5=50Marks)

11 A beam AB is simply supported over a span 5m in length. A concentrated load of 30kN is acting at a section 1.25m from support. Find the deflection under the load point. Take $E = 200 \times 10^6$ kN/m^2 and $I = 13 \times 10^{-6}$ m^4. (10M)

OR

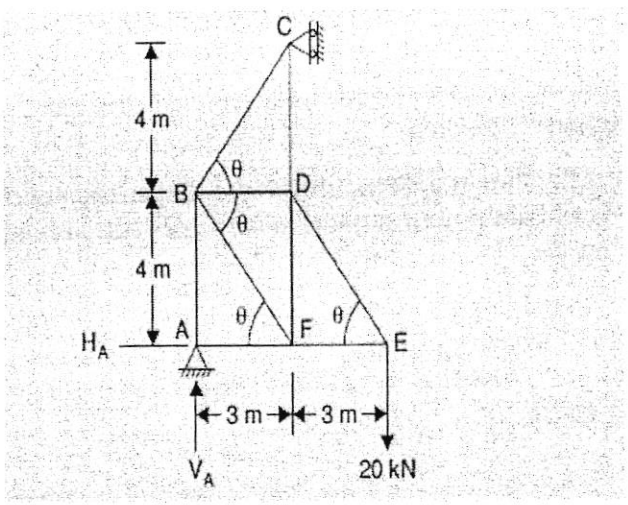
12 A fixed beam of length 8m length is loaded with equal point loads of 130 KN each at distance 3m from each support. Draw the BMD & SFD where $E=2X10^8$KN/m^2 $I=8x10^8$ mm^4. (10M)

13 Determine the forces in all the members of the truss shown fig.[i] (10M)



OR

14 Analyze the truss shown in Fig. All inclined members have the same inclination to horizontal. (10M)

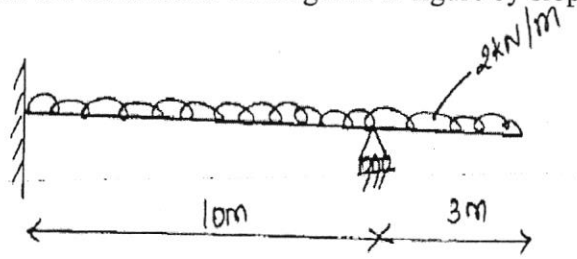


15 Derive the expression of strain energy due to axial load bending moment and shear forces. (10M)

OR

16 A three hinged symmetric parabolic arch hinged at the crown and springing, has a span of 15m with a central rise of 3m. It carries a distributed load which varies uniformly form32kN/m (horizontal span) over the left hand half of the span. Determine the normal thrust; shear force and bending moment at 5 meters from the left end hinge. (10M)

17 Analyze the continuous beam given in figure by slope deflection method and draw BMD.

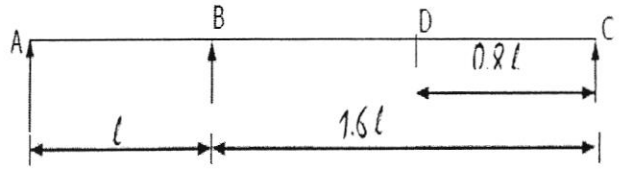


(10M)

OR

18 A beam ABCD, 16m long is continuous over three spans AB=6m, BC = 5m & CD = 5m the supports being at the same level. There is a udl of 15kN/m over BC. On AB, is a point load of 80kN at 2m from A and CD there is a point load of 50 KN at 3m from D, Determine the moments by using moment distribution method. Assume EI const. (10M)

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) (10M)



OR

20 Two concentrated rolling loads of 12 KN and 6 KN placed 4.5 m apart, travel along a freely supported girder of 16m span. Draw the diagrams for maximum positive shear force, maximum negative shear force and maximum bending moment. (10M)