



Regulation: R17

Subject Code: IP4AC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Year II Semester Supplementary Examinations, July 2022

Structural Analysis-I

Civil Engineering

Maximum Marks: 70

Date: 26.07.2022 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. 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. Define Energy theorem.
6. State Castagliano's theorem
7. Define continuous beam.
8. Define distribution factor
9. Define moving load and give one example.
10. Define influence line

Part-B

Answer all the following questions.

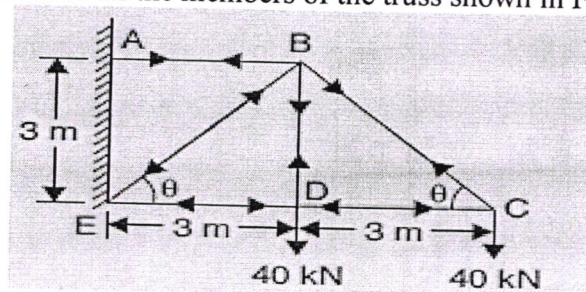
(10M X 5 = 50Marks)

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. [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 $E=2 \times 10^8 \text{ kN/m}^2$ $I=8 \times 10^8 \text{ mm}^2$. [10M]

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



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 [10M]

DE, DF, and CE.

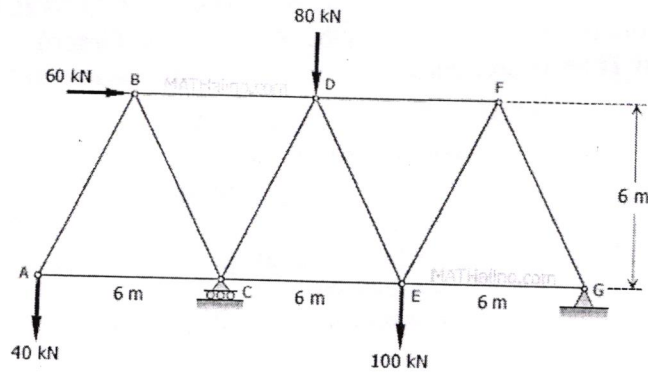


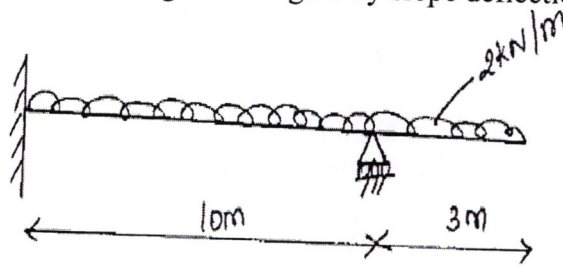
Figure P-418

15. Derive the equation of strain energy due to axial bending. [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 from 32kN/m (horizontal span) over the left-hand half of the span. Determine the normal thrust; radial shear 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 [10M]

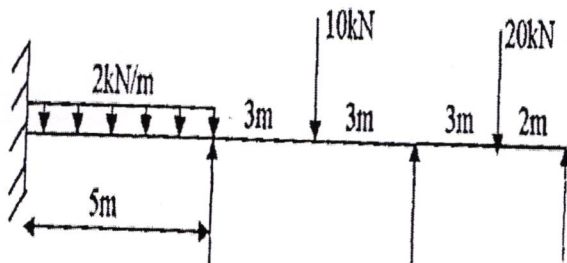


draw BMD.

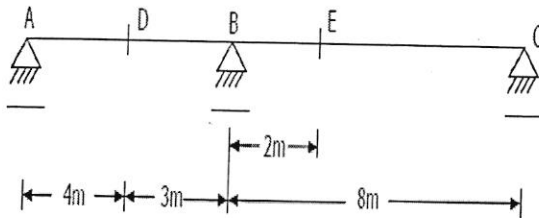
OR

18. Analyze the continuous beam as shown in figure by using moment distribution method. EI is constant. [10M]

Draw the bending moment diagram and shear force diagram.



19. A beam ABC is supported at A, B and C as shown in Fig. It has the hinge at D. [10M]
 Construct the influence lines for
 (1) reactions at A, B and C
 (2) shear to the right of B
 (3) bending moment at E



OR

20. Sketch the influence line diagram for S.F & B.M at 5m from the right end of a simply supported girder of span 15m. Hence find the maximum S.F and maximum B.M at the section if two wheel loads of 10Kn and 18Kn spaced 4m apart move from left to right. [10M]