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 2024

Structural Analysis - I

(Civil Engineering)

Maximum Marks: 70 Date:25.07.2024 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 10 questions. Answer any 5 questions which carries 10M.
4. Each question carries 12marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10X2M = 20 Marks)**

1. Name different types of indeterminacies?
2. Draw different types of supports and name them
3. What are different types of frames?
4. Give one difference between propped cantilever beam & fixed beam
5. Define Strain energy.
6. State Castagliano's theorem
7. Explain continuous beam with neat diagram
8. Define distribution factor
9. Define moving load and give one example.
10. Define influence line

Part-B

Answer all the 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 6m carries point loads of 20Kn and 15Kn at distance 2m and 4m from the left end A. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams. [10M]
13. For truss shown in fig.[i] Determine reactions at two supports A and B. Find forces in members 4,5 & 7. [10M]

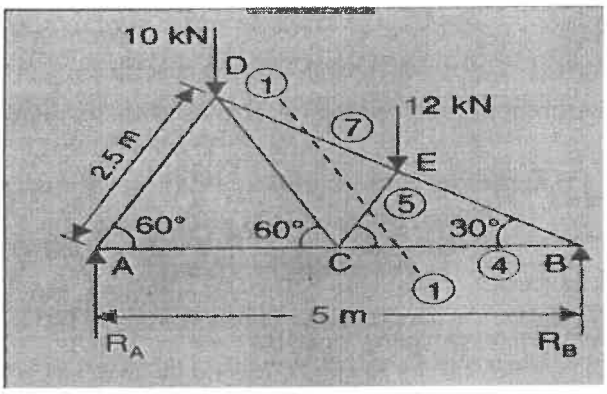

Fig.[i]

OR

14. Determine the forces in the truss shown in fig.[ii] which carries a horizontal load of 12Kn and a vertical load of 18Kn. [10M]

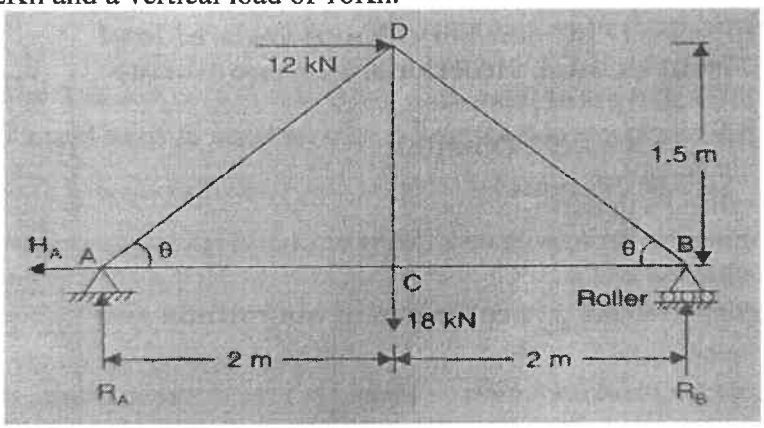

Fig.[ii]

15. A beam AB of 4m span is simply supported as shown in fig.[iii] Determine (a) Deflection at C, (b) Maximum deflection [10M]

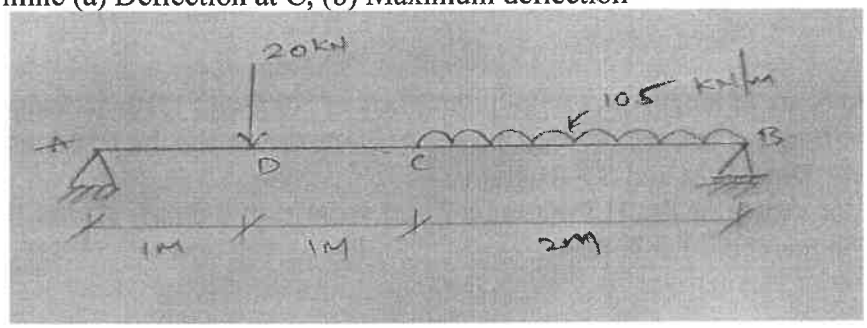

Fig.[iii]

OR

16. A three hinged arch parabolic arch ABC has a span 20m and central rise of 4m. The arch has hinges at the ends and at the center. Train of two point loads of 20Kn and 10Kn,5m apart, crosses this arch from left to right, with 20Kn load leading. Calculate maximum thrust induced at the support. [10M]

17. Using slope deflection method obtain the support moments for the two span continuous beam shown in fig.[iv] below. Sketch BMD. [10M]

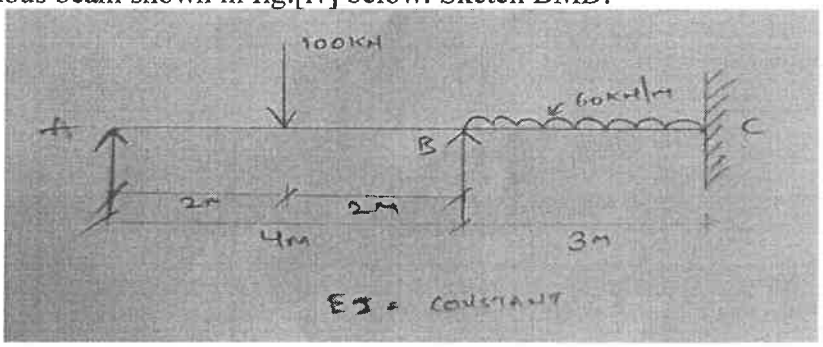

Fig.[iv]

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 there is a load of 8Kn at 2.5m from C. Sketch the BMD. [10M]

19. Draw the influence line diagram for the forces in the members P,Q & R of the truss shown in fig.[v]. [10M]

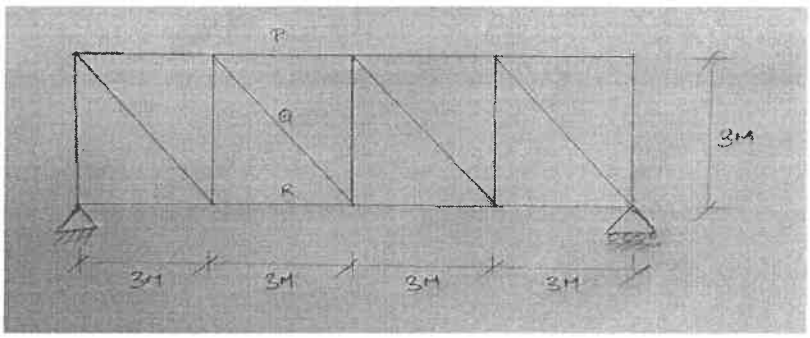

Fig.[v]

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]