

QP Code:1010A23C101

Reg No: Name:

TKM COLLEGE OF ENGINEERING, KOLLAM

(Government Aided and Autonomous)

First Semester B. Arch. Degree Examination, February 2023

22ARC101 - Theory of Structures – I

(2022 Scheme)

Duration:3 Hours

Maximum Marks:60

PART - A

(Answer **all** questions. Each question carries 4 marks)

Marks

- | | |
|---|---|
| 1. Explain the classification of force system | 4 |
| 2. Classify beams according to the types of support provided. | 4 |
| 3. Locate the centroid of the following shapes with figures 1. Semi Circular area 2. Quarter Circular area 3. Semi Circular arc 4. Quarter Circular arc | 4 |
| 4. State and explain parallel axis theorem | 4 |
| 5. What are the various methods available for the analysis of trusses? Discuss | 4 |

PART - B

(Answer **one** full question from each module. Each full question carries 8 marks)

Module 1

- | | |
|--|---|
| 6. Determine the magnitude and direction of resultant of forces acting on the ring as shown in Figure 1. | 8 |
|--|---|

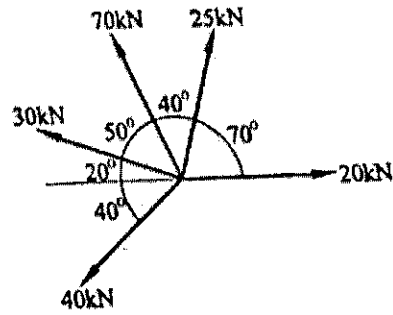


Figure 1

7. Two spheres each of weight 50 N and of radius 10 cm rest in a horizontal channel of width 36 cm as shown in figure. Find the reactions at the points of contact A, B and C. 8

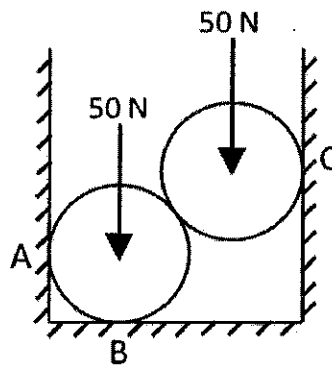


Figure 2

Module 2

8. What are different types of supports? Explain their properties with neat sketches. 8
9. Determine the reactions at the supports of the beam shown in Figure 3. 8
 (Where, $W_1 = 18 \text{ KN}$, $W_2 = 56 \text{ KN}$ and $W_3 = 32 \text{ KN}$)

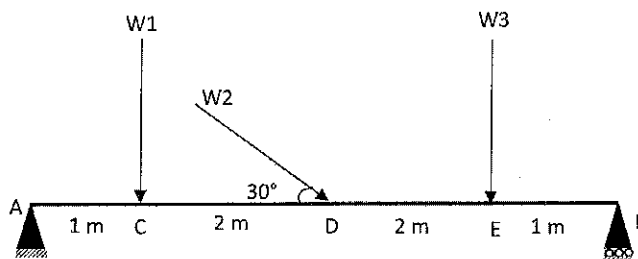


Figure 3

Module 3

10. Locate the centroid of the given Figure 4

8

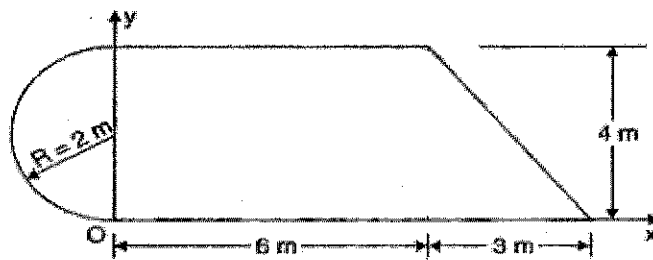


Figure 4

11. Locate the centroid of the shaded area shown in Figure 5

8

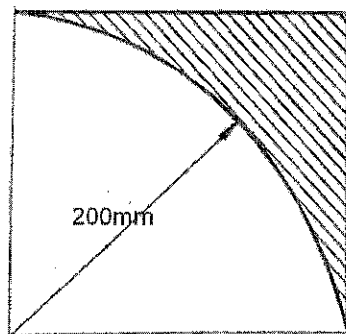


Figure 5

Module 4

12. a. Define Moment of Inertia and Polar Moment of Inertia (4)

8

b. State and prove perpendicular axis theorem (4)

13. Determine the moment of inertia of Channel section shown in Figure 6 about the Centroidal XX and YY axes. All dimensions are in cm

8

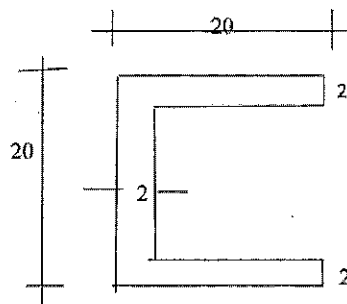


Figure 6

Module 5

14. Analyse the truss shown in Figure 7 by method of joints

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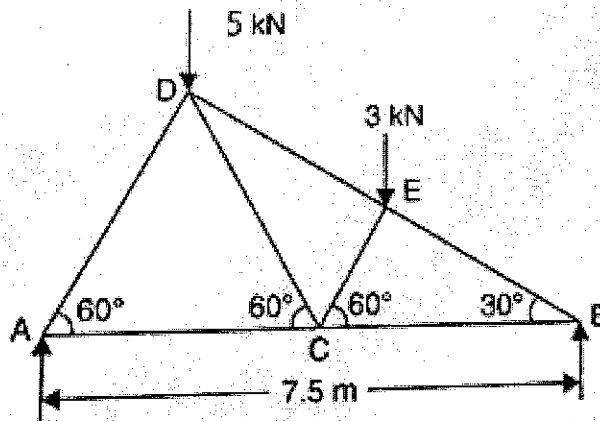


Figure 7

15. Find the member forces of the given truss (Figure 8) by graphical method

8

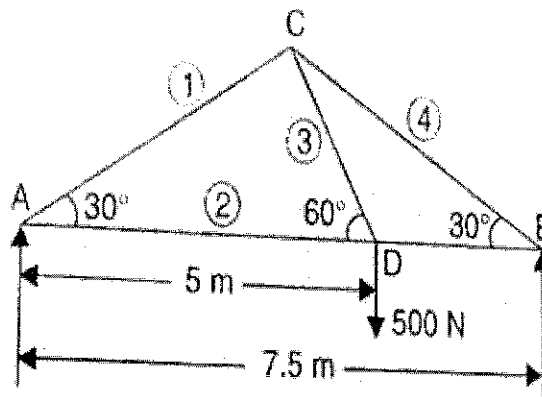


Figure 8