**Code No. 12 / S**

# FACULTY OF ENGINEERING

**B.E. I – Semester (Supplementary) Examination, May / June 2018**

**Subject: Engineering Mechanics – I**

**Time: 3 Hours** **Max.Marks: 70**

**Note: Answer all questions from Part A & any five questions from Part B.**

## PART – A (10x2 = 20 Marks)

1 State 'Transmissibility Principle'.

2 Differentiate between moment and couple.

3 A force F is represented by $F = 5\bar{i} + 2\bar{j} + 3\bar{k}$. What is the magnitude of F.

4 What are the different conditions of equilibrium?

5 Explain cone of friction.

6 Define angle of repose and angle of friction.

7 Define centroid and centre of gravity.

8 What is product of inertia?

9 Explain deficient truss and redundant truss.

10 A hemisphere has horizontal diameter base. The height of its CG above the base is _____.

## PART – B (5x10 = 50 Marks)

11 Determine the reaction at support A and B of loaded beam shown in Fig. 1. 10

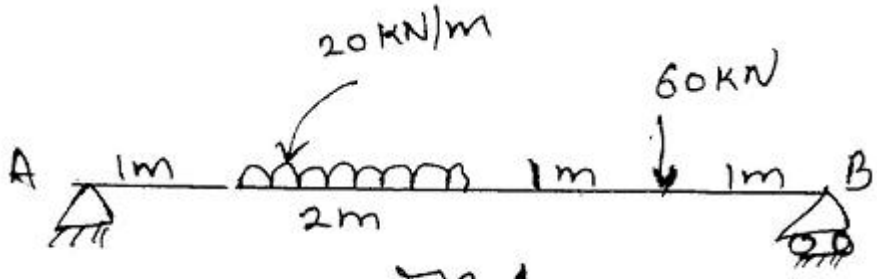


Fig. 1



..2

12 In Fig. 2 force F acting from B to E is Fm = 10 N/m. Find:

i) Component of F along a line AD

ii) Shortest distance from point B to line AD. 10

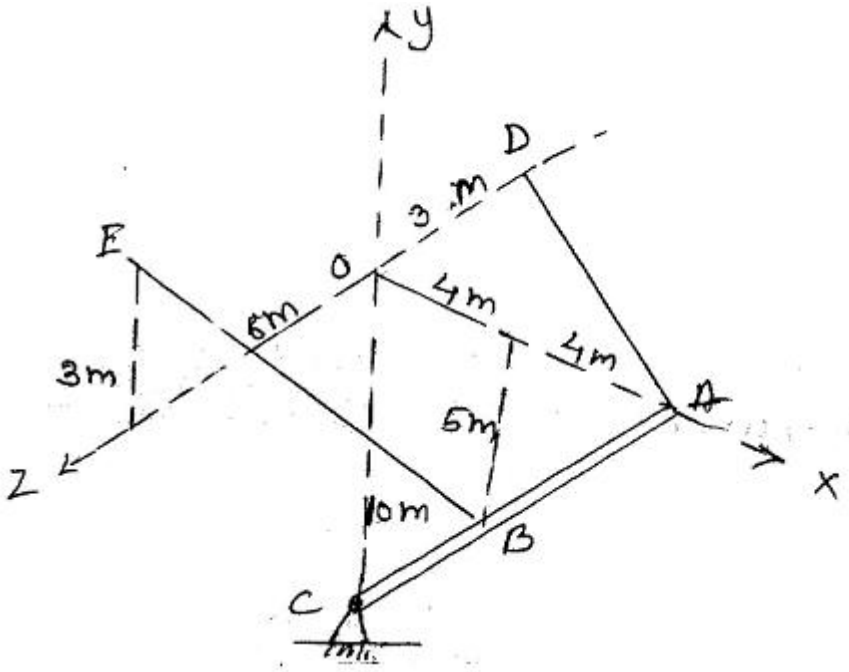


Fig. 2

13 Find the magnitude and nature of the forces in all members of the truss with the loading as shown in Fig. 3. 10

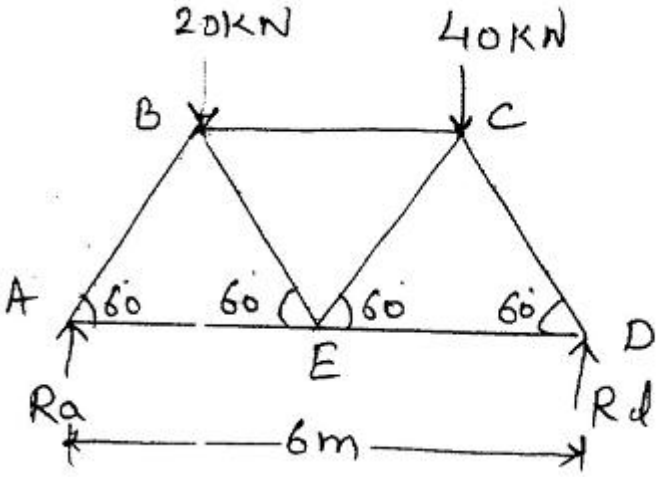


Fig. 3

14 Locate the centroid of shaded area as shown in Fig. 4. 10

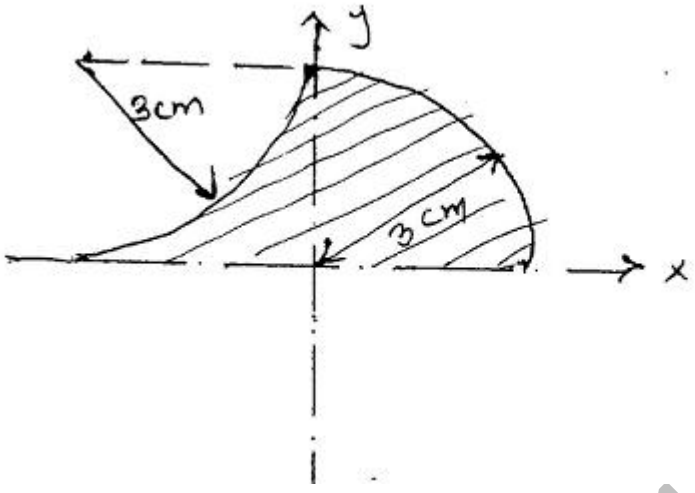


Fig. 4

15 Find the moment of inertia of plane area as shown in Fig. 5 about AB. 10

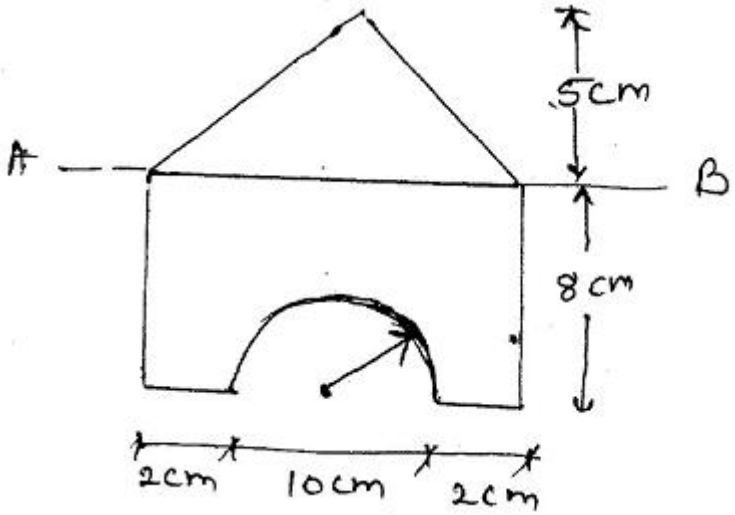


Fig. 5

16 Determine the minimum force 'P' required to start block D as shown in Fig. 6 if block C is restrained by cable AB. Take μ = 0.3 for all contact surfaces. 10

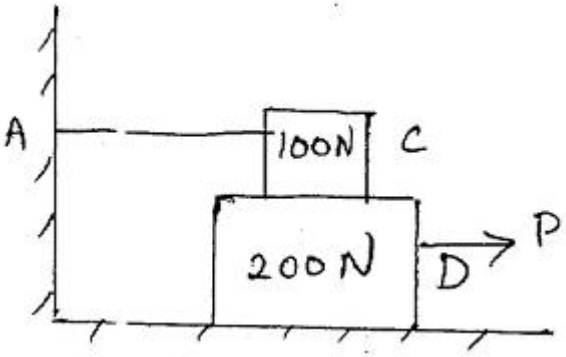


Fig. 6

17 a) State Pappus 1st and 2nd theorem. 3

b) Find centroid of triangle by method of integration. 3

c) The shaded section shown in Fig. 7 has an area of 10 $cm^2$ and moment of inertia of 50 $cm^4$ about axis AA. Find the moment of inertia about axis CC. 4

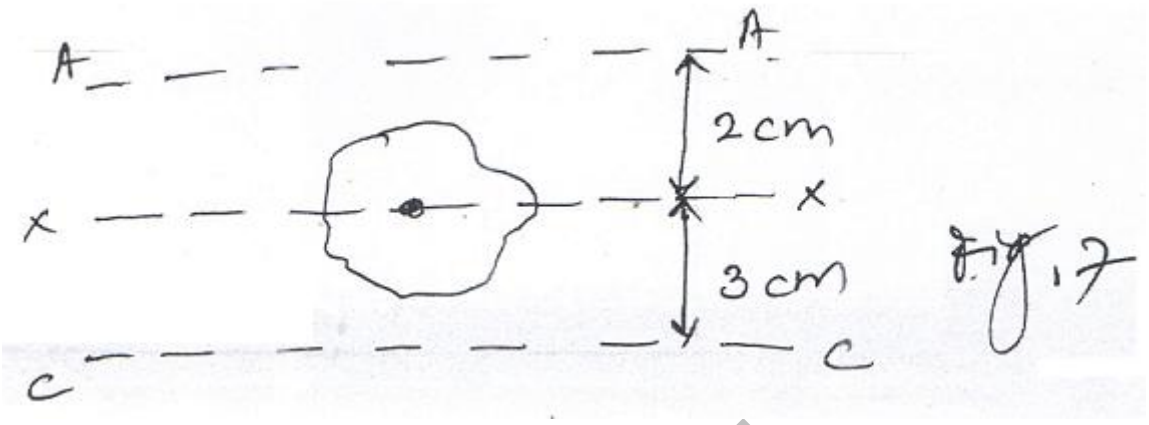


Fig. 7

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