F.E. (All Branches) – Engineering Mechanics
Internal Assessment Test - 1

Date: September 13, 2017 **Time: 10.30 am – 11.30 am** **Max Marks: 20**

Note the following:
1. All questions are compulsory.
2. Draw neat diagrams wherever necessary.
3. Write everything in **ink only (Don't use pencil).**

Q.1. Solve any **five.** **5x2M**

(a) A ring is pulled by three forces as shown in Figure 1. Find the resultant force in magnitude and direction.

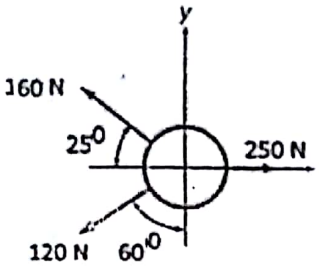

Figure 1

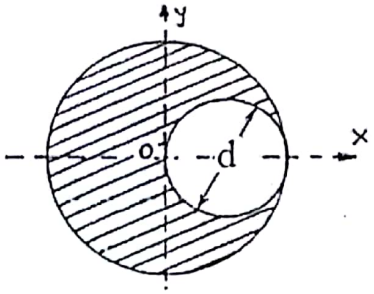

Figure 2

(b) For the shaded lamina shown in Figure 2, find the coordinates of the centroid. Take diameter of smaller circle, d, equal to 10 cm.

(c) A cylinder C of weight 1000 N is resting on an inclined plane with the help of cable AC as shown in Figure 3. Find the tension developed in the cable.

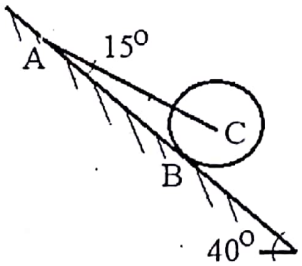

Figure 3

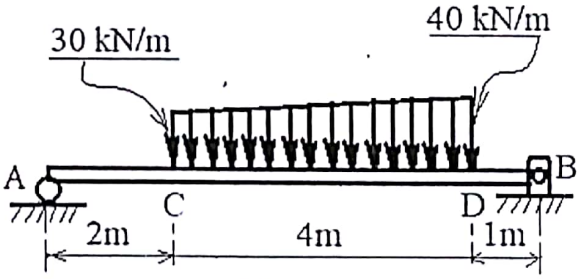

Figure 4

(d) For the beam shown in Figure 4, find the reaction at support A.

(e) State the assumptions made during the analysis of plane trusses.

(f) A bar is subjected to a system of parallel forces as shown in Figure 5. Reduce this system to a single force.

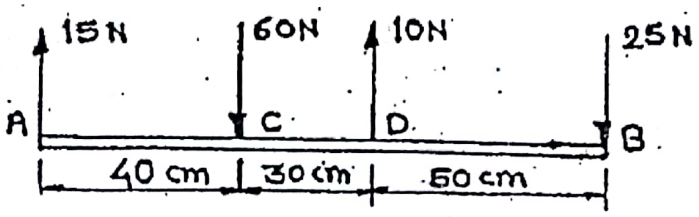

Figure 5

60 cm

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Q.2. Solve any **one.** 5 M

(a) Find the support reactions for the beam shown in Figure 6.

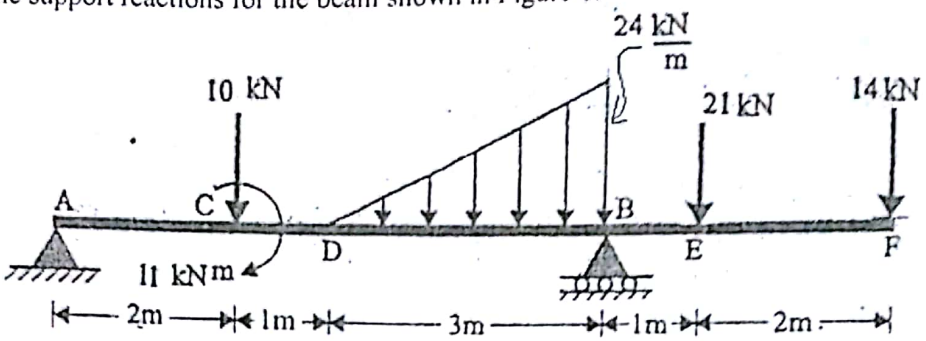

Figure 6

(b) For the stacking arrangement shown in Figure 5, find all the support reactions. Take the radius of roller A as 300mm and that of roller B as 400mm. Weights of roller A and B are 500N and 800N respectively. Assume all the contacts to be smooth.

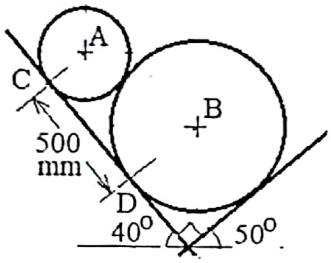

Figure 7

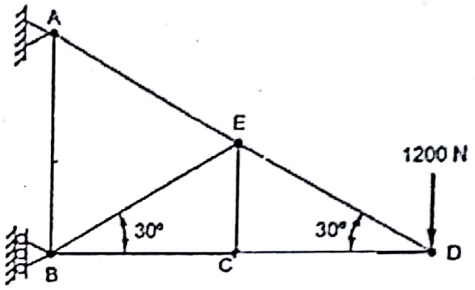

Figure 8

Q.3. Solve any **one.** 5 M

(a) For the truss shown in Figure 8, find the support reactions. Also, using method of joints, find the forces in any four members of the truss.

(b) Locate the centroid of the composite lamina shown in Figure 9.

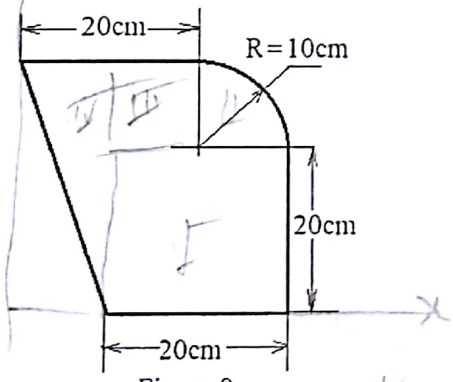

Figure 9