

R09

Code No: 09A1BS05

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech I Year Examinations, May/June-2013

ENGINEERING MECHANICS

(Common to CE, ME, CHEM, MCT, MMT, AE, AME, MIE, MIM, PT, CEE, MSNT, ACE)

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Explain various systems of forces with neat sketches.
b) A 300 N vertical force is applied at the end of a lever which is attached to shaft at O as shown in Figure 1 Determine

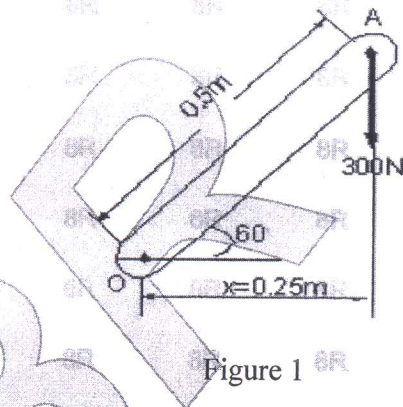


Figure 1

- i) The moment of the 300 N forces about O.
ii) The magnitude of the horizontal force applied at A which creates the same moment about O.
2. Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in Figure 2. Assuming smooth surfaces, find the reactions induced at the points of support A, B and C.

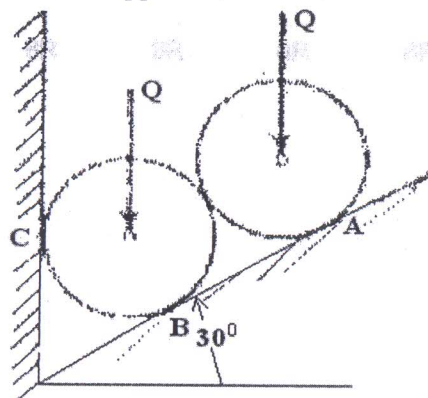


Figure 2

- 3.a) Find the centroid of the inverted T section shown in Figure 3

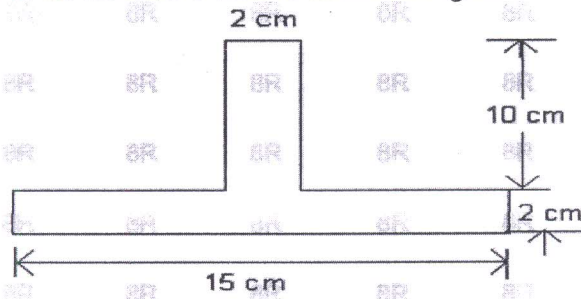


Figure 3

- b) Determine the centre of gravity of the composite body consisting of a cylinder of radius ' r ' attached to a hemisphere of radius ' r ' as shown in Figure 4

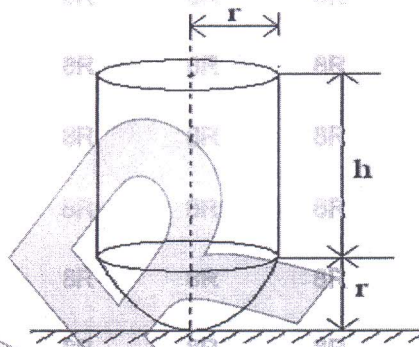


Figure 4

- 4.a) Define mass moment of inertia and explain Transfer formula for mass moment of inertia.
- b) Derive the expression for the moment of inertia of a homogeneous sphere of radius ' r ' and mass density ' w ' with reference to its diameter.
5. Determine the forces induced in the members of the pin-jointed truss shown in Figure 5. Show the values on a neat diagram of the truss. Mention clearly the nature of the forces (tension or compression) in each member.

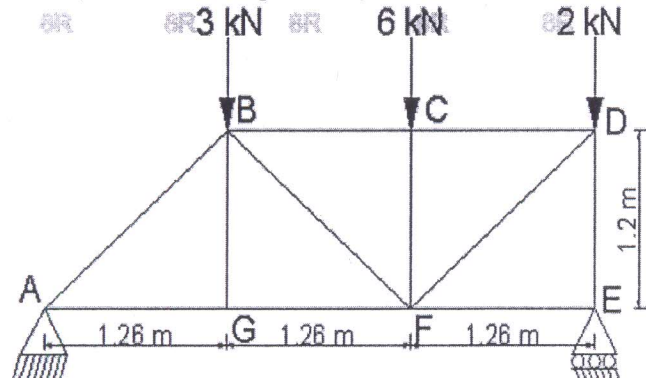


Figure 5