Code No: 153AW

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, October - 2020
ENGINEERING MECHANICS
(Electrical and Electronics Engineering)

Time: 2 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. A circular log of weight 1200N and radius 18 cm is supported by a pair of bracket, one of which is shown in figure 1. Bar PN hinged at P and held by a string MN is 57 cm long. To induce minimum tension at MN, determine the value of 2θ, as shown, for equilibrium. Consider all contact surfaces smooth. Also find the value of minimum tension. [15]

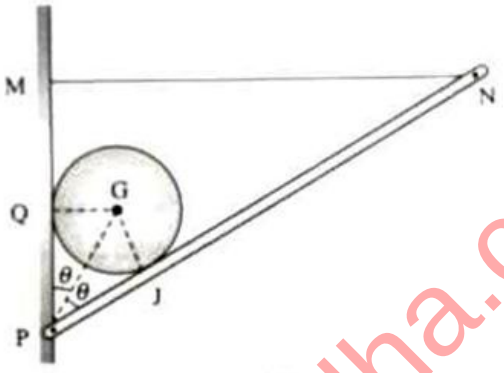

Figure 1

2. Determine x,y,z, components of 750 N and 900 N and also the angles θ that the force forms with coordinate axes shown in figure 2. [15]

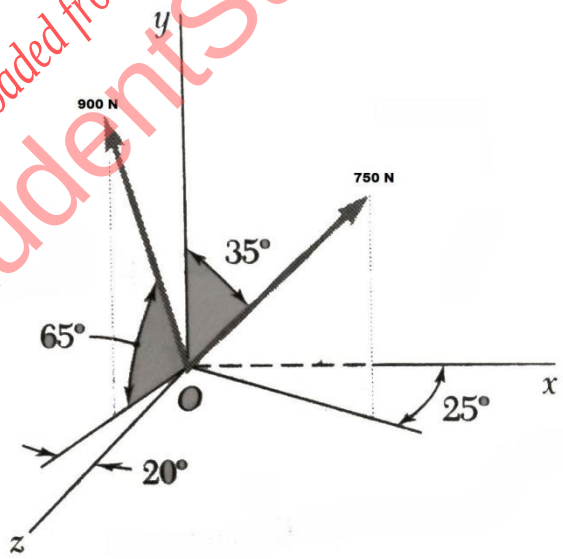

Figure: 2

3. Referring to figure 3 determine the least weight of the top block necessary to prevent downward motion of the 1100 N block. Assume the coefficient of friction for drum 0.25 and for other contact surfaces 0.30. [15]

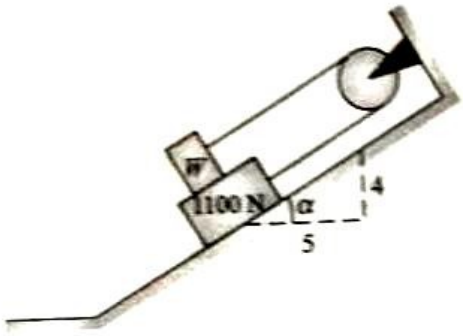

Figure 3

4. A Screw jack has square threads of mean diameter 6cm of helix angle of 10^0 and coefficient of friction 0.25. Determine the force that must be applied to the end of 50 cm lever to a) rise b) lower a weight of 2500 N. [15]

5. Discuss about the expression for finding mass moment of inertia of a cylinder of radius **R** and height **h** about its base. [15]

6. Find the moment of inertia about Y axis of the shaded area under the second degree curve as shown in Figure 4. [15]

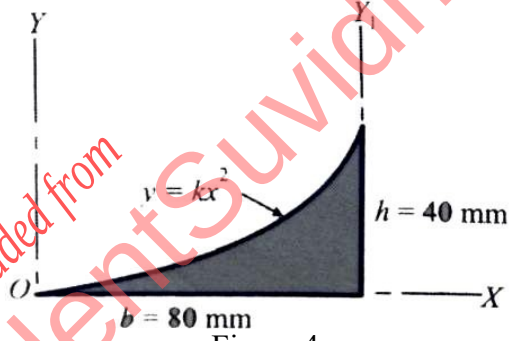

Figure 4

7. Two bodies A and B of mass 80 kg and 20 kg are connected by a thread and move along a rough horizontal plane under the action of a force 400 N applied to the first body of mass 80 kg as shown in Figure 5. The coefficient of friction between the sliding surfaces of the bodies and the plane is 0.3. Determine the acceleration of the two bodies and the tension in the thread, using D' Alembert's principle. [15]

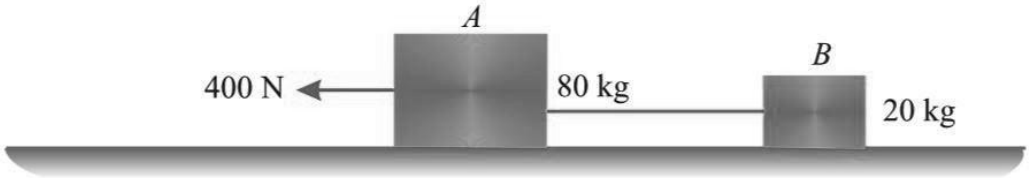

Figure 5

8. A body moves along a straight line and its acceleration "a" which varies with time "t" is given by a =6-4t. Five seconds after the start of observation, the velocity is 18 m/s. The distance moved by the body 8 sec after the start of observation of motion from origin is 75 m. Determine:
a) The acceleration, velocity and distance from the origin at the start of observation.
b) The time after the start of observation at which the velocity becomes zero and the distance travelled from the origin. [15]

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