VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Repeat Mid Semester (even) Examination, May 2024

COURSE NAME:B. Tech | SEMESTER:2nd

BRANCH NAME: (/Section: D,E,F, H, I, J)

SUBJECT NAME: Engineering Mechanics

FULL MARKS: 30 | TIME: 90 Minutes

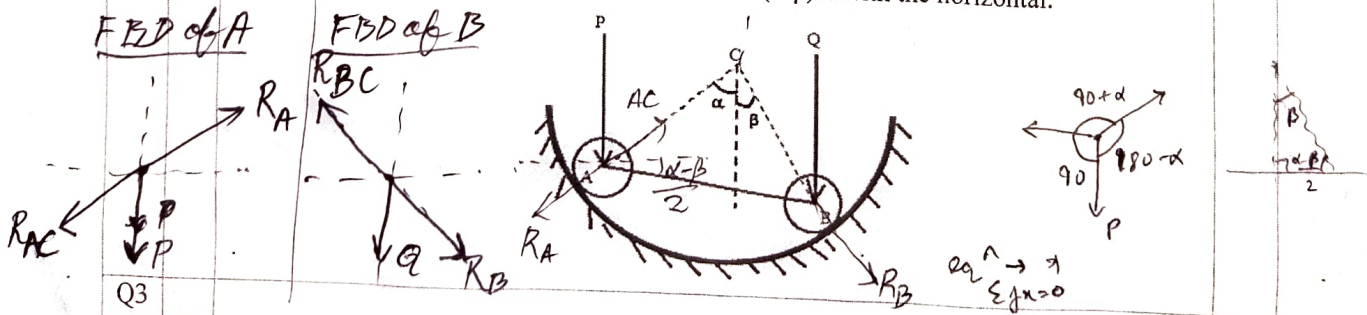
Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

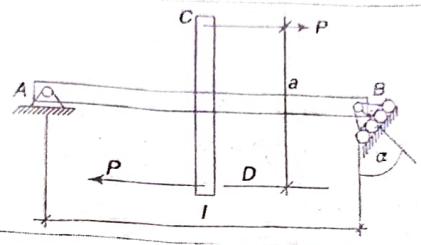
Q1		Answer all Questions.	2 × 3
	a)	Explain Pappus theorem.	
	b)	Under which condition the truss will be an indeterminate one	
	c)	What is the location of centroid of a cone height 'h' and radius 'r'?	
Q2			
		A cylindrical roller of weight 600 N is resting on a smooth inclined plane having incline of 30°. The roller is held by a rope as shown in Figure. Find the tension in the rope and reaction at the point of contact between roller and plane.	8

OR

		Two roller of weights "P" = 222.5N and "Q" = 445N are connected by a rigid bar at its ends & supported inside a circular ring in a vertical plane as shown in figure. The length of the bar "AB" is such that radii "AC" and "BC" form right-angle at center of the circular ring "C". Neglecting friction and weight of the bar, find the compressive force in the bar "AB". Assuming that the bar, AB makes (α-β)/2 with the horizontal.	8

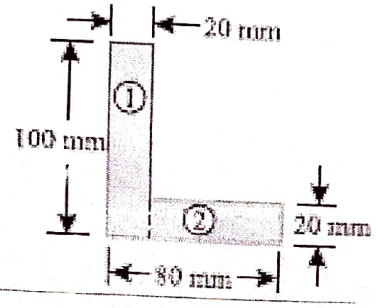


Q3			
		A beam AB of length l is supported as shown in Fig. 6 and subjected to equal but opposite horizontal forces P at points C and D. Find the reactions at the support A and B.	8



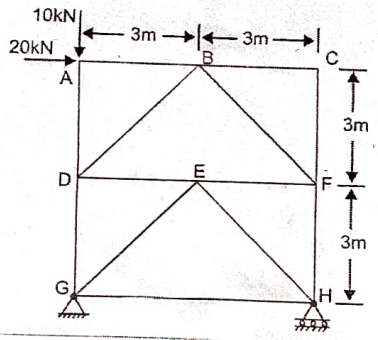
OR

Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown in figure. 8



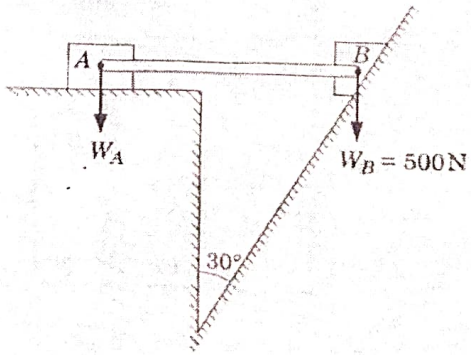
Q4

Determine the force in each member of the truss shown in Figure. 8



OR

Two blocks are connected by a horizontal link AB and rest on two planes as shown in the Figure. What is the smallest weight W_A of the block A for which equilibrium can exist? Assume the coefficient friction for the block A and the horizontal surface to be 0.4 and the angle of friction for the block B on the inclined plane is 20°. 8



Φ

when an object is rotated along its COM, it covers equal curve distance from the point of rotation.