

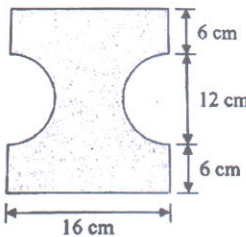
**PRAGATI ENGINEERING COLLEGE: SURAMPALEM**  
**(AUTONOMOUS)**  
**I B.Tech I Semester Supplementary Examinations, July – 2024**  
**ENGINEERING MECHANICS**  
**(CE)**

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit  
 All Questions Carry Equal Marks

Q. No.	Questions	BTL	CO	Marks
<b>UNIT – I</b>				
1.	a) State and prove Lami's Theorem. b) Find the resultant of coplanar forces system given in the figure and the same on AB with due consideration to the applied moment.	K3	CO1	7M
		K3	CO1	7M
<b>OR</b>				
2.	a) Two forces are acting on a body and the body is in equilibrium. What conditions should be fulfilled by these two forces? b) What do you understand by the term "Couple"? Discuss the characteristics of a couple.	K1	CO1	7M
		K1	CO1	7M
<b>UNIT – II</b>				
3.	a) Write all Assumptions and Equilibrium analysis of plane trusses by using method of joints. b) In the Figure, the two blocks (A=30 N and B=50 N) are placed on rough horizontal plane. Coefficient of friction between the block A and the plane is 0.3 and that between B and plane is 0.2. Find the minimum value of the force P to just move the system. Also find the tension in the string	K2	CO2	4M
		K3	CO2	10M
<b>OR</b>				
4.	a) State the Coulomb's laws of dry friction? Explain the significance of cone of friction. b) Explain the phenomenon of friction by taking an example of a block placed on a rough surface.	K3	CO2	7M
		K2	CO2	7M
<b>UNIT – III</b>				
5.	a) State and prove Pappus theorems of area and volume. b) Find out the mass moment of inertia of a right circular cone of base radius R and mass M about the axis of the cone.	K3	CO3	7M
		K3	CO3	7M
<b>OR</b>				
6.	a) With the help of example derive the Mass Moment of Inertia of	K2	CO3	7M

		Simple bodies.			
	b)	Find the moments of inertia of the cut section shown about the centroidal axes. Two semicircular portions are cut from a rectangular plate.			
			K3	CO3	7M
UNIT – IV					
7.	a)	Derive the relationship between the linear motion of geometric centre and angular motion of a wheel rolling without slipping.	K3	CO4	7M
	b)	Explain the mechanism of kinetics of rolling bodies with diagram.	K2	CO4	7M
OR					
8.		The angular acceleration of a flywheel is given by $\alpha = 12 - t$ , where, $\alpha$ is in $\text{rad/sec}^2$ and $t$ is in seconds. If the angular velocity of the flywheel is 60 $\text{rad/sec}$ at the end of 4 seconds, determine the angular velocity at the end of 6 seconds. How many revolutions take place in these 6 seconds?	K3	CO4	14M
UNIT – V					
9.	a)	Explain the Motion of Connected Bodies Fixed Axis Rotation and Plane Motion with diagram.	K2	CO5	14M
OR					
10.	a)	Write the work-energy equation in case of fixed axis rotation.	K2	CO5	6M
	b)	A body of weight 2000N moves on a level horizontal rough road for a distance of 200m. The resistance of the road is 10N per 1000N weight of the body. Find the work done by the resistance on the body.	K3	CO5	8M