

ANURAG Engineering College
(An Autonomous Institution)

I B.Tech II Semester Supplementary Examinations, January - 2025

ENGINEERING MECHANICS
(COMMON TO CIVIL & MECH)

Time: 3 Hours

Max. Marks: 75

Section – A (Short Answer type questions)

(25 Marks)

Answer All Questions

	Course Outcome	B.T Level	Marks
1. Differentiate between Co planor and Non Co planor System of Forces	CO1	L2	2M
2. Define a Free Body Diagram. Give two examples.	CO1	L1	3M
3. Describe Types of Friction.	CO2	L2	2M
4. Why static coefficient of friction is always greater than kinetic coefficient of friction?	CO2	L2	3M
5. Define centroid and centre of gravity, with examples.	CO3	L1	2M
6. What is the meaning of Symmetry? How can you the symmetry for determining the centre of gravity?	CO3	L2	3M
7. State perpendicular axis theorem with a neat sketch.	CO4	L1	2M
8. What is Polar moment of inertia and product of inertia?	CO4	L1	3M
9. Explain work-energy method for a plane motion.	CO5	L2	2M
10. Describe Equations for Translation.	CO5	L2	3M

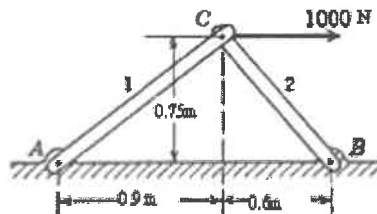
Section B (Essay Questions)

Answer all questions, each question carries equal marks.

(5 X 10M = 50M)

- 11.A) Determine the forces S1 and S2 induced in the bars AC and BC in below Figure due to the action of the horizontal applied load at C. The bars are hinged together at C and to the foundation at A and B.

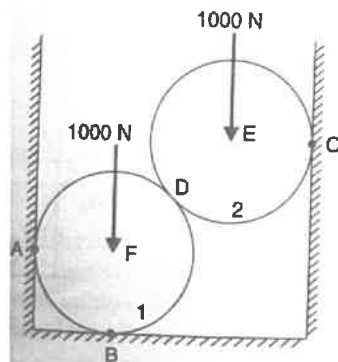
CO1 L3 10M



OR

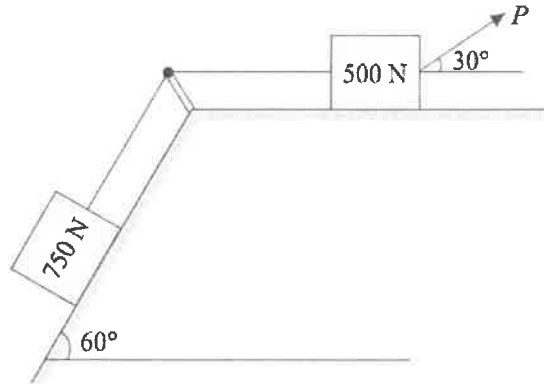
- B) Find the reaction at A, B and C. Radius of sphere each is 150mm and distance between two vertical walls is 360mm

CO1 L3 10M



12.A) What is the value of P in the system shown in figure to cause the motion to impend? Assume the pulley is smooth and coefficient of friction between the other contact surfaces is 0.2.

CO2 L3 10M



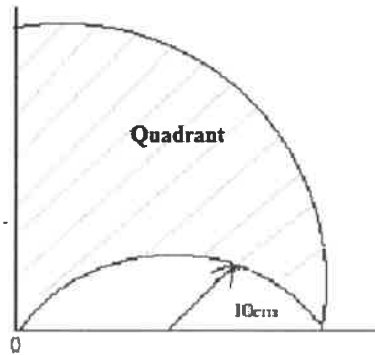
OR

B) A car travelling at a speed of $v = 60$ kmph is braked and comes to rest in 8sec after the brakes are applied. Find the minimum coefficient of friction between the wheels and the road.

CO2 L3 10M

13.A) Locate the centroid of the shaded area as shown in the Figure.

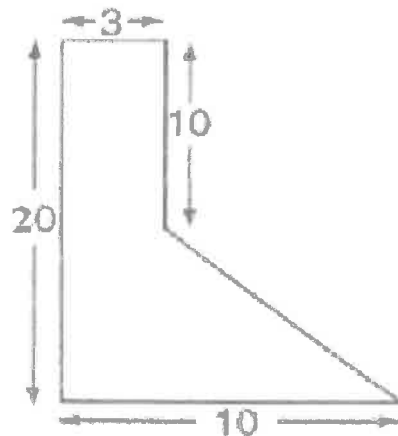
CO3 L3 10M



OR

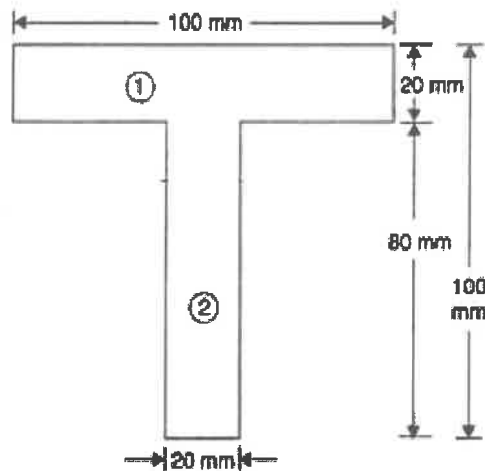
B) Locate the centroid of plane areas shown in the figure. All dimensions are in cm

CO3 L3 10M



14.A) Find the Area moment of inertia of a T-section as shown in figure.

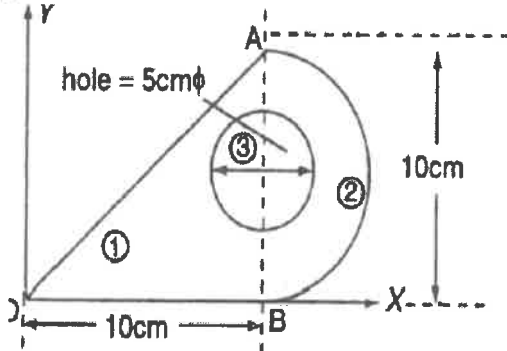
CO4 L3 10M



OR

B) Find the moment of inertia of the area in the given Figure about the axis 'AB'.

CO4 L3 10M



15.A) Determine the work done by an electric motor in winding up a uniform cable which hangs from a hoisting drum if its free length is 20m and weighs 800N. The drum is rotated by the motor.

CO5 L3 10M

OR

B) Define and derive the work-energy equation.

CO5 L3 10M

