School of Mechanical Engineering
Mechanical Engineering
ETE - Jun 2023

Time : 3 Hours   Marks : 100

Sem II - G3UB201T - Engineering Mechanics
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

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1.	Define friction and its application	K2 CO1 (5)
2.	A T-section beam consists of a rectangular section with dimensions 10 cm by 20 cm and a smaller rectangular section attached to it. The smaller section has dimensions 5 cm by 15 cm. The entire beam has a mass of 10 kg. Find the centroid of the T-section beam.	K2 CO2 (5)
3.	A car with a mass of 1000 kg is traveling at a speed of 20 m/s. If the brakes are applied, and the car comes to a stop in a distance of 50 m, calculate the work done by the brakes.	K2 CO3 (5)
4.	Explain the methods of analysis of truss in detail .	K3 CO4 (10)

OR

	Analyse the truss shown below and report forces in 1,2and 3 member . t	K3 CO4 (10)
5.	A 50 kg box is placed on a horizontal surface. The coefficient of kinetic friction between the box and the surface is 0.3. A force of 200 N is applied to the box horizontally. Determine the acceleration of the box.	K2 CO1 (10)
6.	A passenger elevator of mass 1000 kg is moving upwards with an acceleration of 2 m/s². The tension in the cable supporting the elevator is measured to be 12000 N. Calculate the force exerted by the elevator floor on a passenger with a mass of 70 kg.	K3 CO3 (10)
7.	Extract an expression of moment of inertia for a triangular section .	K3 CO2 (10)
8.	Draw shear force and bending moment diagram for a cantilever beam AB of 4 m long having its fixed end at A and loaded with uniformly distributed load of 2 kN/m over entire span and point load of 3 kN acting upward at the free end of cantilever. Find point of contra-flexure if any.	K4 CO5 (15)

OR

Draw Shear force and Bending moment diagram for loading shown below.   K4 CO5 (15)
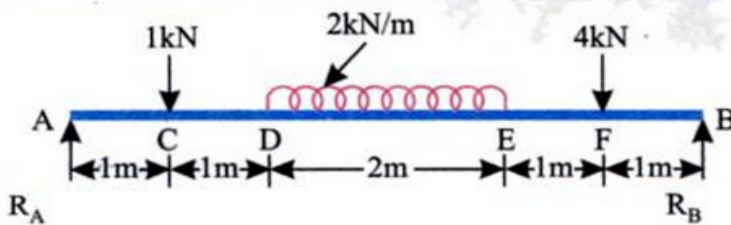
9.	A force F is applied to a beam at an angle of 60 degrees from the horizontal direction. The beam is in equilibrium, and the force is balanced by two other forces acting on the beam. One force acts at an angle of 30 degrees above the horizontal, while the other force acts at an angle of 45 degrees below the horizontal. If the magnitude of the force F is 100 N, calculate the magnitudes of the other two forces.	K3 CO1 (15)
10.	Analyse the truss shown below .	K4 CO4 (15)