Regulation R20 *Subject code: 3E2AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech II Semester Supplementary Examinations, September 2023

Engineering Mechanics

(Common to CE and ME)

Maximum Marks: 70 Date:25.09.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

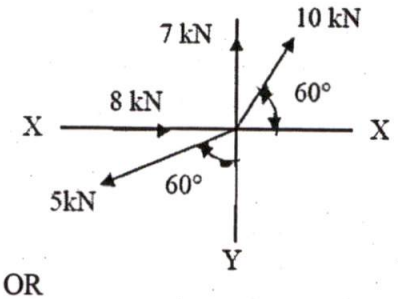
All the following questions carry equal marks (10x2M=20 Marks)

1 What is couple?
2 State triangular law of forces.
3 What are the types of friction?
4 Define angle of repose.
5 What does the second theorem of pappu's state?
6 Define polar moment of inertia.
7 Define "Work" and "Energy".
8 What are the different types of motion?
9 What are the laws of simple pendulum?
10 Explain the terms Frequency and oscillation

Part-B

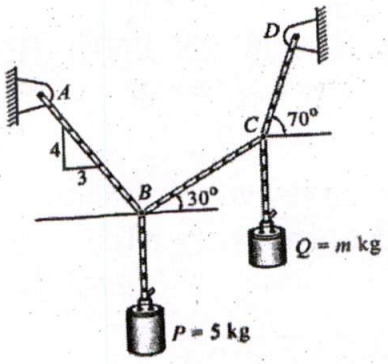
Answer All the following questions. (5 X 10M =50Marks)

11 Find resultant of a force system shown in Figure 10 M



OR

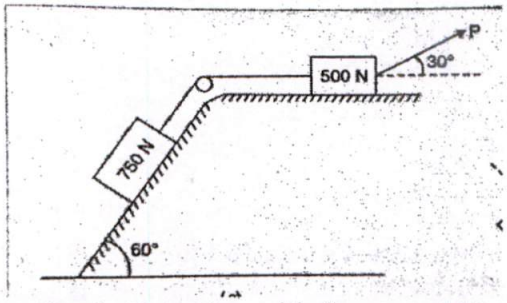
12 A block P is 5kg and block Q of mass m kg are suspended through the cord which is in the equilibrium position, as shown in below fig. determine the mass of Q? 10 M



13 A ladder 6 m long and with 300N weight is resting against a wall at an angle of 60^0 to along the ground. A man weighing 750N climbs the ladder. At what position the ladder from the bottom does he induce slipping? The coefficient of friction for both the wall and the ground with the ladder is 0.2. 10 M

OR

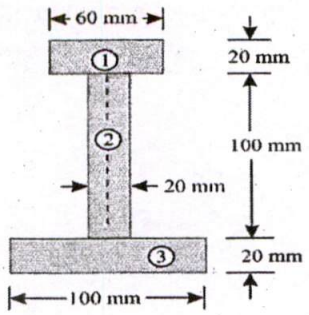
14 What is the value of P in the system as shown in figure to cause the motion of 500N block to the right side? Assume the pulley is smooth and the coefficient of friction between other contact surfaces is 0.20 10 M



15 Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the centre of gravity of the section. 10 M

OR

16 An I-section is made up of three rectangles as shown in Fig. Find the moment of inertia of the section about the horizontal axis passing through the centre of gravity of the section. 10 M



17	Two weights 785 N and 196 N are connected by a thread and move along a rough horizontal plane under the action of a force 392 N applied to the first weight 785 N. Coefficient of friction between sliding surface and plane is 0.3. Determine acceleration of weight and tension in the thread using D'Alemberts principle.	10 M
	OR	
18	A brass cone with base diameter of 400mm and height of 225mm is placed on a vertical aluminum cylinder of height 300mm and diameter 400mm. density of brass 85kN/m³ and density of aluminum is 27kN/m³. Determine the mass moment of the composite body about the vertical geometrical axis. Assume required data.	10 M
19	State and prove the simple pendulum and also mention the conditions.	10 M
	OR	
20	a. The piston of an engine moves with SHM. The crank rotates at 100rpm and its stroke is 180cm. Find the velocity and acceleration of the piston when it is at a distance 60cm from the Centre.	5 M
	b. What is principle of virtual work and mention applications of virtual work?	5 M