R20 Regulation *Subject code: 3B4BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, June 2026

ENGINEERING MECHANICS

(EEE)

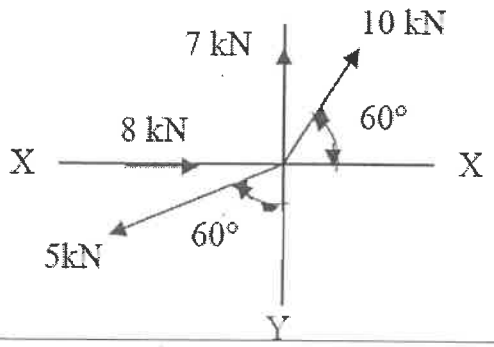
Maximum Marks: 70 Date: 08.06.2026 Duration: 3 hours

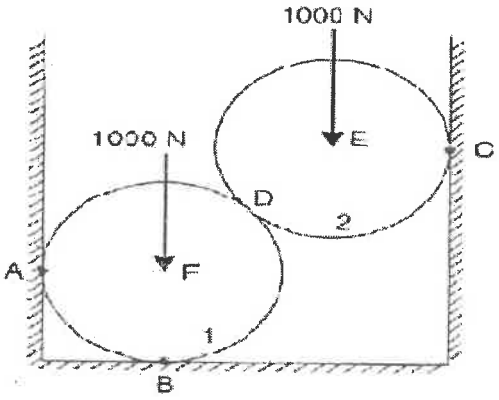
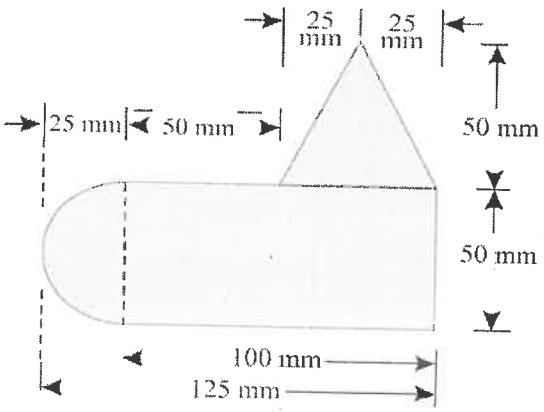
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

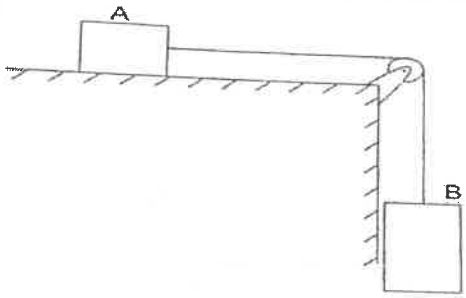
Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	State parallelogram law of forces.	2M	1	L1
2	State the necessary and sufficient conditions for equilibrium of rigid bodies in two dimensions?	2M	1	L1
3	State the Laws of friction.	2M	2	L1
4	Explain about screw friction.	2M	2	L1
5	The radius of gyration of rectangular channel is 19mm and its area is 3500mm². calculate the moment of inertia of the channel.	2M	3	L1
6	What does the second theorem of Pappu's state?	2M	3	L1
7	What is rotary motion and what are the equations of rotary motion?	2M	4	L1
8	Define "Work" and "Energy".	2M	4	L1
9	Define free vibration. What are the types of free vibration?	2M	5	L1
10	Define Time period and Amplitude.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Find resultant of a force system shown in Figure. 	10M	1	L2
	OR			

12	Two spheres, each of weight 1000 N and radius 25 cm rest in a horizontal channel of width 90 cm as shown in the Figure. Find the reactions on the points of contact A, B and C.  	10M	1	L2
13	A ladder 6 m long and with 300N weight is resting against a wall at an angle of 60^0 to the ground. A man weighing 750N climbs the ladder. At what position along 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.	10M	2	L2
	OR			
14	A uniform lamina shown in Fig. consists of a rectangle, a circle and a triangle. Determine the centre of gravity of the lamina. All dimensions are in mm.  	10M	2	L2
15	State and prove parallel axis theorem.	10M	3	L2
	OR			
16	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.	10M	3	L2
17	Derive the mass moment of inertia of a cone about its base having radius r and height h.	10M	4	L2
	OR			

18	Two blocks A and B connected with in extensible string as shown in fig.  If the system is released from rest, determine the velocity of the block A after it has moved 1.5m. Assume the coefficient of friction between block A and plane is 0.25. Masses of block A and B are 200Kg and 300Kg respectively.	10M	4	L2
19	Explain the working principle of simple pendulum.	10M	5	L2
	OR			
20	Define mechanical vibration. Explain in brief about the different types of mechanical vibrations.	10M	5	L2