R18 Regulation *Subject code:2E2AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, January 2026

ENGINEERING MECHANICS

(CE) & (ME)

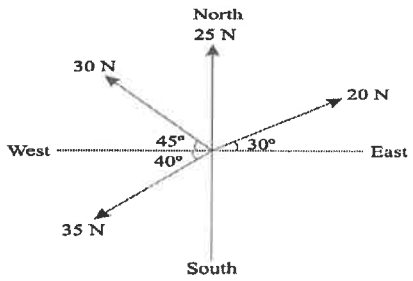
Maximum Marks: 70 Date:27.01.2026 Duration: 3 hours

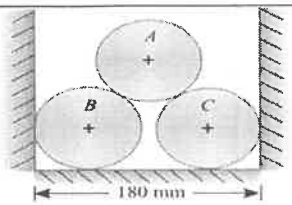
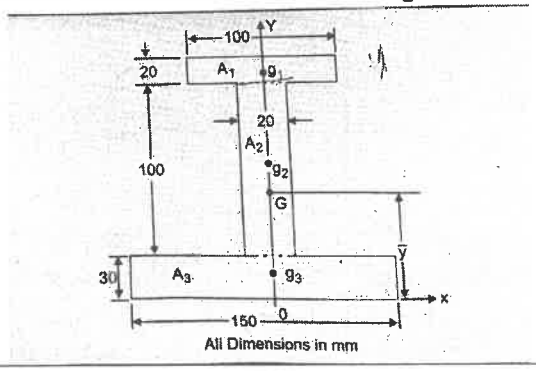
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

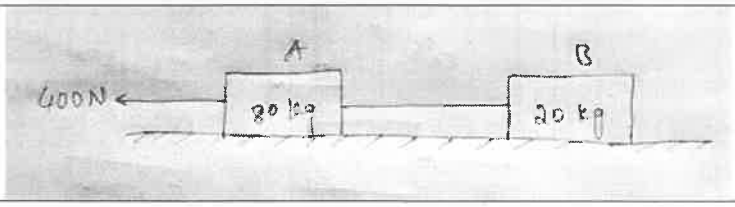
Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	State the Lami's theorem.	2M	1	L1
2	What is couple?	2M	1	L1
3	Define angle of repose.	2M	2	L1
4	Define centroid.	2M	2	L1
5	What is Radius of gyration?	2M	3	L1
6	Explain Pappu's theorems.	2M	3	L1
7	Explain the transfer formula for mass bodies.	2M	4	L1
8	Define Work.	2M	4	L1
9	Define free vibration.	2M	5	L1
10	State simple harmonic motion.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	The following forces act at a point: (i) 20 N inclined at 30° towards North of East, (ii) 25 N towards North, (iii) 30 N towards North West, and (iv) 35 N inclined at 40° towards South of West. Find the magnitude and direction of the resultant force. 	10M	1	L2
	OR			
12	Three cylinders weighting 100 N each and of 80 mm diameter are placed in a channel of 180 mm width as shown in Fig.	10M	1	L2

	 Determine the pressure exerted by (i) the cylinder A on B at the point of contact (ii) the cylinder B on the base and (iii) the cylinder B on the wall.			
13	Locate the centroid of the I-section as show in figure. 	10M	2	L2
	OR			
14	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
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.	10M	3	L2
	OR			
16	Find the moment of inertia of a hollow rectangular section about its centre of gravity, if the external dimensions are 40 mm deep and 30 mm wide and internal dimensions are 25 mm deep and 15 mm wide.	10M	3	L2
17	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. Determine the mass moment of the composite body about the vertical geometrical axis.	10M	4	L2
	OR			
18	Two bodies A and B of mass 80Kg and 20Kg are connected by a thread and move along a rough horizontal plane under the action of a force 400N applied to the first body of mass 80Kg as shown in fig. The coefficient of friction between the sliding surfaces of the bodies and the plane is 0.3. Determine the acceleration of bodies and the tension in the thread using D'Alembert's Principle.	10M	4	L2

				
19	State and prove equations of simple harmonic motion.	10M	5	L2
	OR			
20	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.	10M	5	L2