R18 Regulation *Subject code:2E2AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Semester Supplementary Examinations, June 2026

ENGINEERING MECHANICS

(Common to CE & ME)

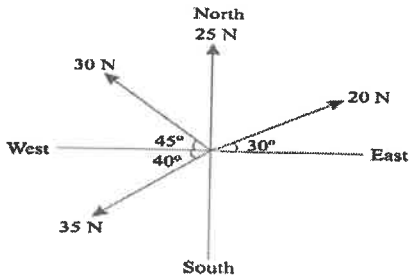
Maximum Marks: 70 Date: 24.06.2026 Duration: 3 hours

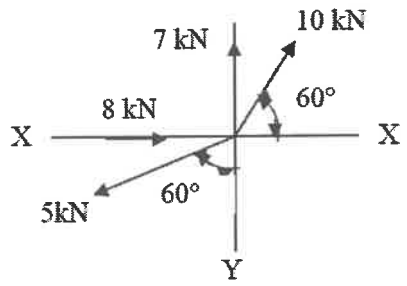
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Explain moment of force. What are the types of moment?	2M	1	L1
2	State parallelogram law of forces.	2M	1	L1
3	What is cone of friction?	2M	2	L1
4	What is a wedge?	2M	2	L1
5	What is moment of inertia?	2M	3	L1
6	State the Parallel axis theorem.	2M	3	L1
7	State work-energy principle.	2M	4	L1
8	Explain the term Dynamics.	2M	4	L1
9	What is the principle of virtual work?	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	Find resultant of a force system shown in Figure.  	10M	1	L2
13	Derive the centroid of the triangular area?	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	A hemisphere of 60 mm diameter is placed on the top of the cylinder having 60 mm diameter. Find the common centre of gravity of the body from the base of cylinder, if its height is 100 mm.	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	Calculate the moment of inertia and radius of gyration of grinding stone 90cm in diameter and 10cm thickness with respect to its axis of rotation. Stone density is 0.0026Kg/cm³.	10M	4	L2
19	State and prove equations of simple harmonic motion.	10M	5	L2
	OR			
20	Define mechanical vibration. Explain in brief about the different types of vibrations?	10M	5	L2