R20 Regulation *Subject code: 3B4BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2024

ENGINEERING MECHANICS

(Electrical & Electronics Engineering)

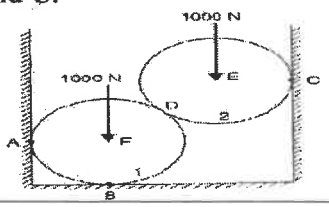
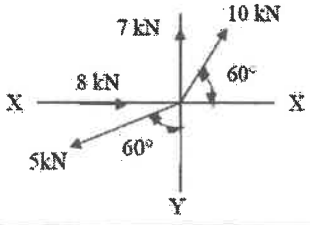
Maximum Marks: 70 Date:03.12.2024 Duration: 3 hours

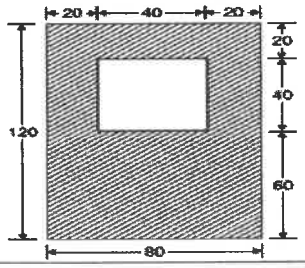
Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	State the Lami's theorem.	1	L1
2	What is couple?	1	L1
3	Define angle of repose.	2	L1
4	What is a wedge?	2	L1
5	What is Radius of gyration?	3	L1
6	Explain Pappu's theorems.	3	L1
7	What is rotary motion and write the equations of rotary motion?	4	L1
8	Write about mass moment of inertia.	4	L1
9	What is the principle of virtual work?	5	L1
10	State simple harmonic motion.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	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
	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 5 m long rests on a horizontal ground and leans against a smooth vertical wall at an angle of 70^0 with the horizontal. The weight of the ladder is 300 N. The ladder is on the verge of sliding when a man weighing 750 N stands on a rung 1.5 m along the ladder. Calculate the coefficient of friction between the ladder and the floor. [10M]	2	L2
15	For the shaded area as shown in the following figure, determine the Moment of Inertia of an area of plane figure about their centroidal axes. All units are in centimeters. [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 85kg/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