



R20 Regulation

Subject code: 3B4BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, September 2023

Engineering Mechanics

(Electrical and Electronics Engineering)

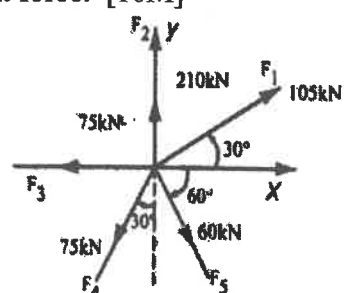
Maximum Marks: 70

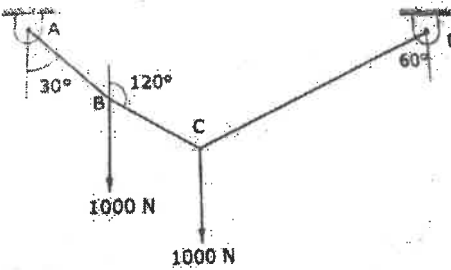
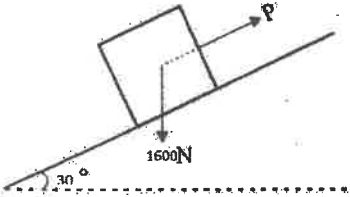
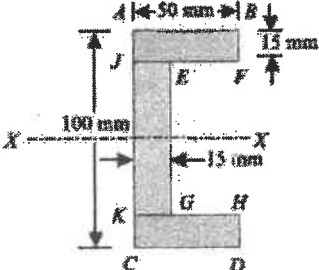
Date: 16.02.2024 Duration: 3 hours

Part-A

All the following questions carry equal marks (10x2M=20 Marks)		CO	Bloom Tx
1	State the principle of transmissibility.	CO1	L2
2	Define a couple.	CO1	L2
3	Differentiate between center of gravity and centroid.	CO2	L3
4	Define coefficient of friction.	CO2	L2
5	Write down the equation of moment of inertia about centroidal axes for a rectangle.	CO3	L2
6	What is mass moment of inertia?	CO3	L2
7	What is general plane motion? Give an example.	CO4	L3
8	Compare kinetics with kinematics.	CO4	L3
9	What is free vibration?	CO5	L2
10	Give a few applications of the concept of virtual work.	CO5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	If five forces act on a particle as shown in figure, determine the magnitude and the direction of the resultant force. [10M] 	CO1	L3
OR			
12	A string ABCD, attached to two fixed points A and D has two equal weight of 1000 N attached to it at B and C. The weight rest with the portions AB and CD inclined at angle of 30° and 60° respectively, to the vertical as in figure. Find the tensions in the portion AB, BC and CD of the string, if the inclination of the portion BC with the vertical is 120°. [10M]	CO1	L3

			
13	A block of weight 1600N is in contact with a plane inclined at 30° to the horizontal. A force 'P' parallel to the inclined plane and acting up the plane is applied to the body. The co-efficient of friction between the contact surfaces is 0.2. Find [10M] a) The value of 'P' to cause body to move up the plane. b) The value of 'P' to prevent the motion of body down the plane. 	CO2	L4
OR			
14	Find the centre of gravity of give channel section. [10M] 	CO2	L4
15	Find the moment of inertia of circular plate of radius 'R' and thickness 't' about its centroidal axes. [10M]	CO3	L3
OR			
16	Find the moment of inertia for T-section shown in figure about the centroidal axes. [10M]	CO3	L3

17	A block and pulley system is shown in figure below. The coefficient of kinetic friction between the block and the plane is 0.2. The pulley is frictionless. Find the acceleration of the blocks and the tension in the string when the system is just released. Also find the time required for 200kg block to come down by 3 m. [10M]	CO4	L3
OR			
18	Two blocks, A of weight 48 N and B of weight 80 N are on rough horizontal surface as shown in Figure. Find the minimum value of P to just move the system. If the coefficient of friction between block A and ground is 0.3 and that between block B and ground is 0.25. And also find the tension in the string. [10M]	CO4	L4
19	Find out which of the following represents simple harmonic motion. [10M] (i) $x = A \sin \omega t + B \cos \omega t$ (ii) $x = A \sin \omega t + B \cos 2\omega t$ (iii) $x = A e^{i\omega t}$ (iv) $x = A \ln \omega t$	CO5	L4
OR			
20	Derive an expression for the natural frequency of free transverse and longitudinal vibrations by equilibrium method. [10M]	CO5	L3

