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 2024

Engineering Mechanics

(Common to CE & ME)

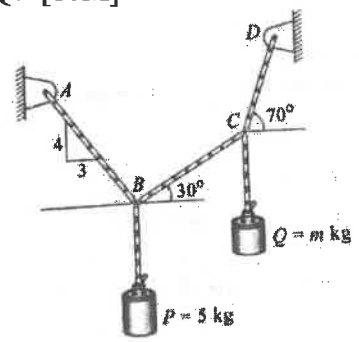
Maximum Marks: 70 Date:04.07.2024 Duration: 3 hours

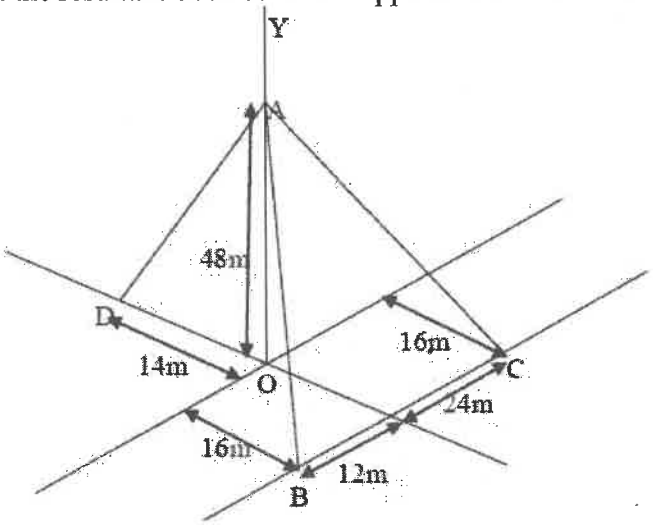
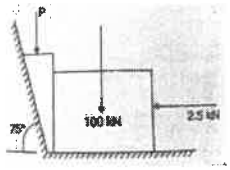
Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

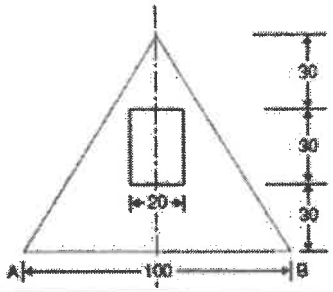
Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Define the term law of transmissibility with neat diagram	1	L1
2	Define couple.	1	L1
3	Define the limiting friction.	2	L1
4	Compare centroid and centre of gravity.	2	L1
5	State the Numerical formula of Polar Moment of Inertia.	3	L1
6	Define motion.	3	L1
7	Write the transfer formula for mass moment of inertia.	4	L1
8	Write the work energy equation for linear motion and rotating?	4	L1
9	Define virtual work and virtual displacement.	5	L1
10	Write the applications of virtual work	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	A block P is 5kg and block Q of mass m kg are suspended through the cord which is in the equilibrium position, as shown in below fig. determine the mass of Q? [10M] 	1	L3
	OR		

12	A post is held vertical in position by three cables AB, AC, AD as shown in below Fig. If tension in cable AB is 40N, calculate the required tension in AC and AD so that the resultant of three forces applied at A is vertical. [10M] 	1	L3
13	Determine the force P required to start the wedge as shown in Fig. The angle of friction for all surfaces of contact is 15°. [10M] 	2	L3
	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	L3
15	Find the mass moment of inertia of a solid cylinder of radius r, height h and mass m about centroidal x and y axes. [10M]	3	L3
	OR		
16	Determine the moment of inertia an area of a triangle with a rectangular cut as shown in the following figure, about the base *A-B* and the centroidal axis parallel to *AB*. (All dimensions are in Centimeters). [10M]	3	L3

			
17	Derive work energy equation for translation. [10M]	4	L3
	OR		
18	A block of 25 kg mass at rest on an inclined plane is pulled up by a force of 175 N magnitude acting parallel to the inclined plane as shown in Fig 3 a. Determine the acceleration of the block, if the coefficient of kinetic friction between the block and the plane is 0.3. [10M] 	4	L3
19	The amplitude of a particle in simple harmonic motion is 0.75m and the period is 1.2sec. Determine: (a)maximum velocity (b) maximum acceleration. (c) displacement (d) frequency [10M]	5	L3
	OR		
20	A body moving with simple harmonic motion has amplitude of 1 m and a period of oscillation of 2 seconds. What will be its velocity and acceleration 0.4 seconds after passing an extreme position? [10M]	5	L3