R17 Regulation *Subject Code:1E1AE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous & Accredited by NAAC with 'A' Grade)

B.Tech. I Year I Semester Supplementary Examinations, April 2022

Engineering Mechanics

(Common to CE,EEE,ME,ECE,CSE & IT)

Maximum Marks:70 Date:09.05.2022 Duration: 3hours

Part-A

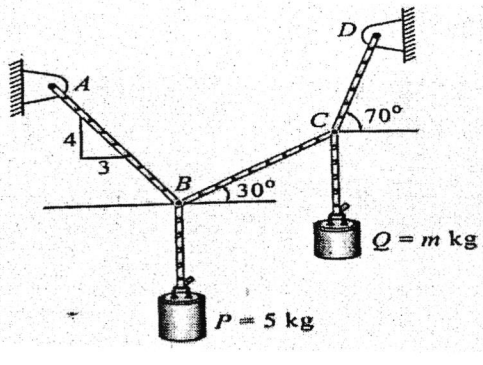
Answer all the following questions 10x2M=20 Marks

1. Define the term law of transmissibility with neat diagram
2. State the parallelogram law of forces
3. Define the term velocity ratio and Mechanical advantage.
4. Prove the angle of friction is equal to angle of repose.
5. Write an equation for centroid of a semi circle
6. Define the term polar moment of inertia and radius of gyration,
7. What are the applications of virtual work
8. Write the equation of the Trajectory of a Projectile.
9. Write the Work energy equation for Translation motion.
10. Write the Impulse moment equation and Mention Applications.

Part-B

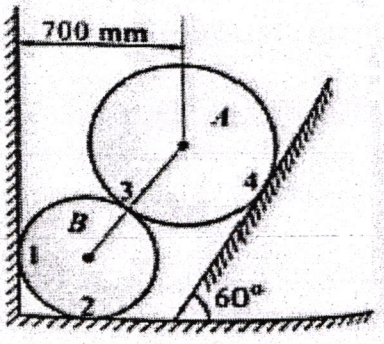
Answer all the following questions 10M X 5=50M

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? [10]

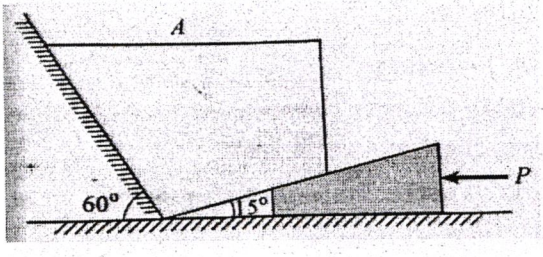


OR

12. Two spheres A and B of weight 1000N and 750N, respectively are kept as shown in below Fig. Determine the reactions at all contact points 1, 2, 3 and 4. Radius of A = 400mm and Radius of B = 300mm. [10]



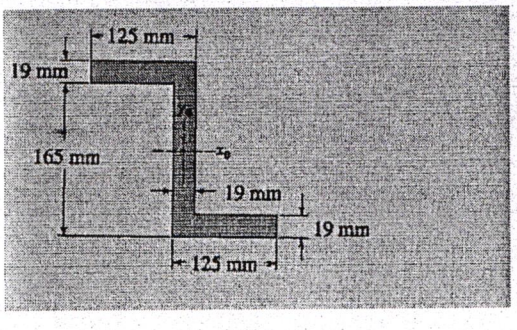
13. Determine the force P required to move the block A of weight 5000N up the inclined plane. Coefficient of friction between all contact surfaces is 0.25. Neglect the weight of the wedge and the wedge angle is 15 degrees as shown in below Fig. [10]



OR

14. A screw jack has square threads with a mean radius 38mm, and pitch of 15mm. Consider μ=0.06. If the lever is of length 0.4m. Find the force that has to be applied at the end of the lever to lift up load of 8KN. Is the screw jack self locking/ If not find the force required at the end of the lever to prevent the load from descending. [10]

15. Find the Centroid of the below fig. [10]



OR

16. Derive Moment of inertia for the Circle about its Diametrical Axis. [10]

17. Explain the transfer formula for mass Moment of Inertia [10]

OR

18. Derive the Mass Moment of Inertia of thin rod about its centroidal axis [10]

19. Explain the work energy principle and mention its applications. [10]

OR

20. A load with a mass of 200g will stretch a spring 10.0 cm. The spring is then stretched an additional5.00 cm and released. Find:

i. the spring constant
ii. the period of vibration and frequency
iii. the maximum acceleration
iv. The velocity through equilibrium positions. [10]