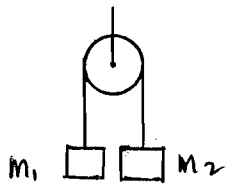
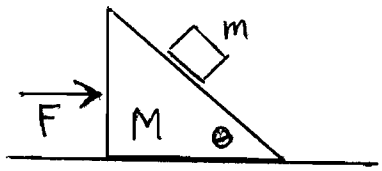
Ph201H/211H
F08

Practice Problems

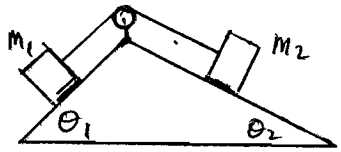
1. Find the tension in the cord holding the pulley (which is of negligible mass) after the system is released but before one of the blocks hits the ground. $m_1 = 1.2$ kg, $m_2 = 3.2$ kg.



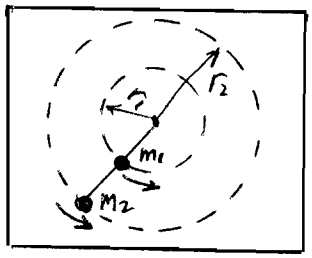
2. A small block of mass m rests on a frictionless incline of mass M, which in turn rests on a frictionless horizontal table. A horizontal force **F** is applied to the incline, which slides across the table. Determine the value of the force so that the small block remains in a fixed position on the incline.



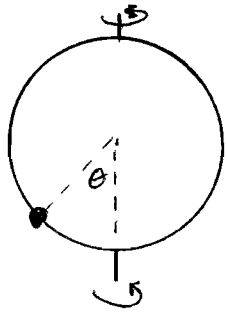
3. Determine the value of m_2 that would keep the system at rest, and also determine the tension in the cord. $m_1 = 5.0$ kg, $\theta_1 = 30°$, $\theta_2 = 20°$.



4. Two masses m_1 and m_2 are connected to each other and to a central pivot by strings. They rotate on a frictionless horizontal table with the same period of rotation t (so that the 2 strings remain in a line) at distances r_1 and r_2 from the pivot. Find the tensions in the 2 strings.



5. A small bead of mass m is free to slide on a frictionless hoop of radius r that rotates about a vertical axis with rotation period t. Determine the angle at which the bead will be in equilibrium.



6. A train traveling at constant speed rounds a curve of radius 275 m. A pendulum suspended from the ceiling hangs at an angle of 17.5° with the vertical for the entire turn. What is the speed of the train?