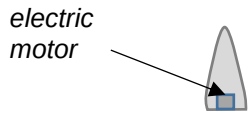
Assignment No. 5 ***Chapter 5***

Problem 1)

A 125-kg (including all the content) rocket has an engine that produces a constant vertical force (the thrust) of 1720 N. Inside this rocket, a 15.5-N electrical power supply rests on the floor.

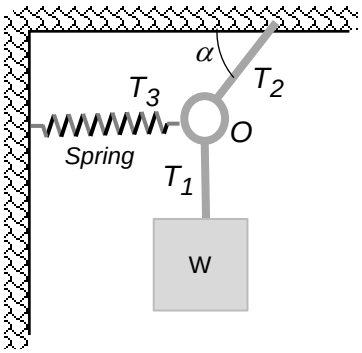
a) Find the acceleration of the rocket.

b) When it has reached an altitude of 120 m, how hard does the floor push on the ower supply?



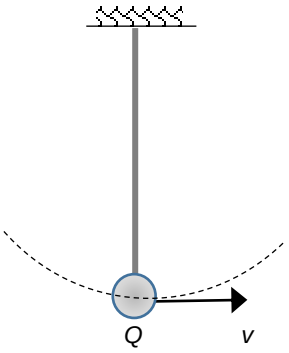
Problem 2)

A block of weight W is suspended from a chain linked at O to two other chains. Draw the free-body-diagrams of the block, and ring.



Problem 3)

A pendulum of length *L* with a bob of mass *m* swings back and forth. At the low point of its motion (point Q), the tension in the string is 3*m* g. Calculate the speed of the bob at this point.

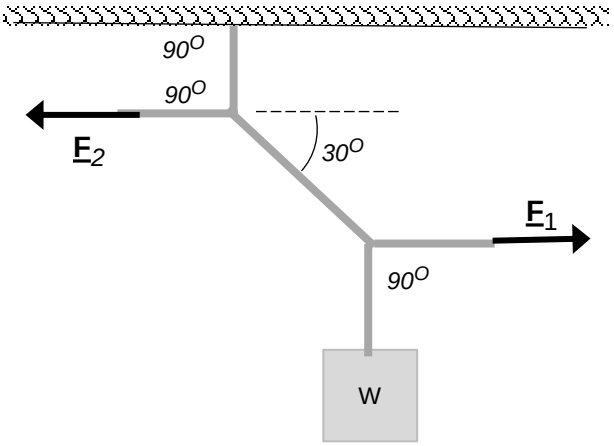


Problem 4)

A block with mass 50.0 kg is suspended as showm.

a) What is the tension in the diagonal string AB?

b) Find the magnititudes of the forces $\underline{\mathbf{F}}_1$ and $\underline{\mathbf{F}}_2$ that must be applied to hold the system in the position shown.

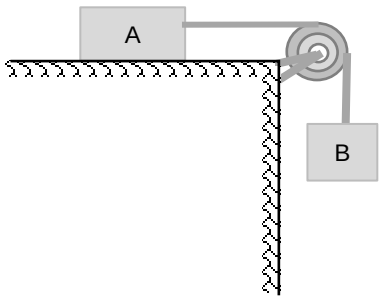


Problem 5)

Block A weighs 45.0 N, and block B weighs 25.0 N. Once block B is set into downward motion, it descends at a constant speed.

a) Calculate the coefficient of kinetic friction between block A and the tabletop.

b) A cat, also of weight 45.0 N, falls asleep on top of block B. if block B is now set into downward motion, what is its acceleration (magnititude and direction)?



Problem 6)

Block B with a mass of 30 kg is connected to block A with mass m by an inextendable cable which goes around a frictionless pulley. The coefficents of static frictions between slope and blocks A and B are 0.40 and 0.25, and coefficients of kinetic friction are 0.3, and 0.20, respetively. Detrmine

a) the minimum mass m of the block A for equilibrium

b) the maximum mass m of the block A for equilibrium

c) The range of mass of block A so that the system remains in static equilibrium