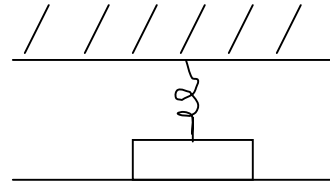


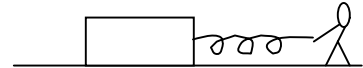
NAME _____

PSII FINAL REVIEW – Part III

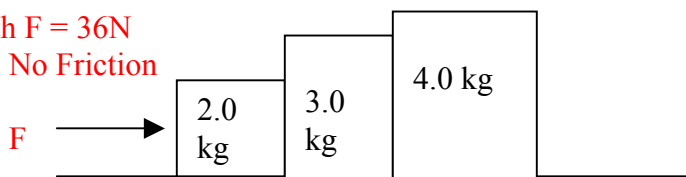
1. A compression spring is holding a 2.0 kg block down as shown. The spring constant is 85 N/m. The spring is compressed 0.13 m. What is the normal force on the block?



2. A person is dragging a 35 kg steel block across a steel floor at constant velocity. He is pulling it with a spring (don't ask me why). The spring is stretched 1.2 m. What is the spring constant? (The coefficient of friction = 0.57.)



3. With $F = 36\text{N}$
No Friction



- a) What is the (*horizontal*) acceleration of the whole system?
- b) What is the net (*horizontal*) force on each block?
- c) Draw a complete force (*free-body*) diagram for each block. Label each force and give the numerical values for both the horizontal and vertical forces.

4. A 3.00 kg pendulum rises 0.186 m when a 7.51 g bullet is fired into it. How fast was the bullet going?

5. A 160 kg elevator must be able to move at a constant speed of 1.5 m/s carrying a maximum load of ten 85 kg passengers. What power rating (*in hp*) must the motor have if the gears (*wheel & axle*) are 79% efficient and the cable/pulley set-up is 48% efficient? NOTE: 1 HP = 0.746 KW.

6. You are an accident investigator. A 2100 kg truck hit a parked 1300 kg car. Skid marks show that the combined mass went about 45 m. You measure the coefficient of friction to be about 0.4. The driver says he was going the speed limit (*45 mph*). How fast was he really going? Convert your answer to mph using $1 \text{ m/s} = 2.24 \text{ mph}$.

7. A golf ball is launched at a 28° angle above the horizontal with a speed of 47 m/s.

a) *How high is it when it is above a tree 150 m away?*

b) *At the highest point in its flight, what is "given"?*

c) *So how high is it at its highest point?*

8. For a very bouncy rubber ball dropped from a height of 10 meters – plot on an X-Y graph – the displacement of the ball with time – with vertical displacement on the vertical (Y) axis and time on the horizontal (X) axis. You need only estimate (*i.e. sketch*) the approximate curve(s) until the ball eventually stops. You may assume in this regard that the ball stops moving in five bounces after the original drop. Also assume that the ball follows the same vertical path (*with successively lessening heights*) until it stops moving.

9. What is "weight"? How is it different from mass? Why are they often confused?