Practice Problem

The largest flowers in the world are the Rafflesia arnoldii, found in Malaysia. A single flower is almost a meter across and has a mass up to 11.0 kg. Suppose you cut off a single flower and drag it along the flat ground.The coefficient of kinetic friction between the flower and the ground is 0.39.

    a. Draw a free body diagram

    b. What is the force of gravity of the flower?

    c. What is the normal force?

    d. What is the force of friction?

Practice Problems

1) Robert Galstyan, from Armenia, pulled two coupled railway wagons a distance of 7 m using his teeth. The total mass of the wagons was about 2.20×10^5 kg. Of course, his job was made easier by the fact that the wheels were free to roll. Suppose the wheels are blocked and the coefficient of static friction between the rails and the sliding wheels is 0.220. What would be the magnitude of the minimum force needed to move the wagons?

    a. Draw a free body diagram

    b. What is the force of gravity?

    c. What is the normal force?

    d. What is the force of friction?

2) A 24 kg crate initially at rest on a horizontal floor requires 75 N horizontal force to set it in motion. Find the coefficient of static friction between the crate and the floor.

    a. Draw a free body diagram

    b. What is the force of gravity?

    c. What is the normal force?

    d. What is the force of friction?

3) Once the crate in the above problem is in motion, a horizontal force of 53 N keeps the crate moving with a constant velocity. Find μ_k , the coefficient of kinetic friction, between the crate and the floor.

    a. Draw a free body diagram

    b. What is the force of gravity?

    c. What is the normal force?

    d. What is the force of friction?

    e. What is the μ_k?

4) A 25 kg chair initially at rest on a horizontal floor requires a 165 N horizontal force to set it in motion. Once the chair is in motion, a 127 N horizontal force keeps it moving at a constant velocity.

    a. Draw a free body diagram

    b. What is the force of gravity?

    c. What is the normal force?

    d. What is the force of friction when it is moving?

    e. what is the force of friction when it is not moving?

    f.   Find the coefficient of static friction between the chair and the floor.

    g. Find the coefficient of kinetic friction between the chair and the floor.

5) The coefficients of static and kinetic friction between wood and concrete are 0.60 and 0.45.

a) How much force would be needed to start a 45 kg wooden crate moving across a concrete floor?

b) How much force would be needed to keep it moving at constant velocity?