**Force Mock Test**

**1. A 467 gram air track glider rests on a frictionless surface. A force of 2.1 N is exerted on it for a distance of 35 cm.**

a. What is the glider’s acceleration and final velocity? (4.50 m/s/s, 1.77 m/s)

b. What force would accelerate the glider from rest to 3.1 m/s in 0.12 seconds? (12.1 N)

c. If there had been a force of 0.7 N opposing the 2.1 N force, what would have been the final velocity? (1.45 m/s)

**2. A 3.4 kg object hangs on a string.**

a. What is the tension in the string if the velocity is zero? What if the velocity is a constant 1.2 m/s up? (33.32 N, 33.32 N)

b. What is the tension in the string if the mass is accelerating at 1.8 m/s/s down? (27.2 N)

c. If there is a tension of 38 N in the string, what is its acceleration? (1.38 m/s/s up)

**3. A 2.7 kg box has a kinetic and static coefficient of friction with the floor of 0.12 and 0.35.**

a. What force is needed to start it moving, and what to keep it moving at a constant speed? (3.18 N, 9.26 N)

b. What force would be necessary to accelerate the box once it is moving at 5.2 m/s/s in the direction it is moving? (17.2 N)

c. What is the acceleration of the box if it is moving to the right, and there is a force of 2.6 N to the right? (-0.213 m/s/s – it is slowing down)

**4. A 24 kg rocket takes off from the surface of the earth and reaches a height of 52 m in 1.89 seconds**

a. What is the rocket’s acceleration? (29.1 m/s/s)

b. What must be the upward force exerted by the engines? (934 N)

c. What acceleration would an upward force of 430 N cause? (8.12 m/s/s upward)