Question 1
An astronaut weighs 175 lb. What is his weight in newton?

A) 778 N
B) 528 N
C) 852 N
D) 634 N

Question 2
A young South African girl has a mass of 40.0 kg. (a) What is her weight in newton? (b) If she came to the United States, what would her weight be in pounds as measured on an American scale? Assume g = 9.81 N/kg.

A) (a) 453 N; (b) 88.2 lb
B) (a) 392 N; (b) 88.2 lb
C) (a) 486 N; (b) 80.5 lb
D) (a) 392 N; (b) 80.5 lb
E) (a) 453 N; (b) 101 lb

Question 3
A brick of mass 2.00 kg is "weighed under water" by hanging it from a spring scale. (a) If the spring scale reads 14.0 N, what is the upward force of water on the brick? (b) What is the reading of the pan scale on which the beaker sits? The weight of the water and the beaker together is 12.0 N.

A) (a) 5.6 N up; (b) 17.6 N
B) (a) 4.0 N up; (b) 17.6 N
C) (a) 5.6 N up; (b) 8.8 N
D) (a) 4.0 N up; (b) 35.2 N
E) (a) 4.0 N down; (b) 8.8 N

Question 4
(a) What is the magnitude of the gravitational force that the Earth exerts on the Moon? (b) What is the magnitude of the gravitational force that the Moon exerts on the Earth?

A) (a) 3.12 x 1018 N; (b) twice the force of Earth
B) (a) 1.98 x 1020 N; (b) inversely proportional to the force of Earth
C) (a) 1.98 x 1020 N; (b) the same
D) (a) 1.98 x 1020 N; (b) twice the force of Earth
E) (a) 3.12 x 1018 N; (b) inversely proportional to the force of Earth

Question 5
The coefficient of static friction between a block and a horizontal floor is 0.40, while the coefficient of kinetic friction is 0.15. The mass of the block is 5.0 kg. If a horizontal force is slowly increased until it is barely enough to make the block start moving, what is the net force on the block the instant that it starts to slide?

A) 12 N
B) 35 N
C) 49 N
D) 20 N

Question 6
A 3.0-kg block is at rest on a horizontal floor. If you push horizontally on the 3.0-kg block with a force of 12.0 N, it just starts to move. (a) What is the coefficient of static friction? (b) A 7.0-kg block is stacked on top of the 3.0-kg block. What is the magnitude F of the force, acting horizontally on the 3.0-kg block as before, that is required to make the two blocks start to move?

A) (a) 0.41 ; (b) 98 N
B) (a) 0.37; (b) 68 N
C) (a) 0.25; (b) 98 N
D) (a) 0.41 ; (b) 40 N
E) (a) 0.37; (b) 40 N

Question 7
A sailboat is tied to a mooring with a line. The wind is from the southwest. Identify all the forces acting on the sailboat.

A) 1) the force of gravity; 2) the force of the tide; 3) the force of the wind; 4) the force of the line tied to the mooring
B) 1) the force of gravity; 2) the force of water opposing gravity and the force of water currents; 3) the force of the wind; 4) the force of the line tied to the mooring
C) 1) the force of the water currents; 2) the force of the wind; 3) the force of the line tied to the mooring
D) 1) the force of gravity; 2) the force of the water currents; 3) the weight of the boat

Question 8
A mass of 10 kg is hanging from a spring scale that is in turn hanging from a hook attached to the ceiling. The scale indicates a reading of 98 N for the force. Then two people hold the spring scale horizontally and pull on opposite ends until the scale again reads 98 N. With what force must each person pull to attain this result?

A) 147 N
B) 196 N
C) 49 N
D) 98 N

Question 9
Suppose a planet exists that has a radius that is twice that of the earth and a mass that is four times as great. If the gravitational field strength on Earth's surface is g, what is the gravitational field strength on the other planet's surface?

A) g
B) 2g
C) 4g
D) 8g