

200603130909 Physics Test on Force and Friction
Fill in the blank with the best answer. (1 point each answer)

- 1) Objects tend to remain in whatever state of motion they are currently in because of a property called _____.
- 2) What is Newton's second law as an equation? _____.
- 3-4) Name the two main types of forces. _____.
- 5) Forces are vector or scalar quantities. Which one? _____
- 6) In the SI system force is measured in _____
- 7) In the US system force is measured in _____
- 8) $6.67 \times 10^{-11} \text{ N}\cdot\text{m}/\text{kg}^2$ is called the _____
- 9) The weight of an object is calculated by multiplying its _____ by the _____
- 10) Newton's third law states that forces must exist in _____.
- 11) The _____ force is the force that is exerted perpendicular to a surface.
- 12) When an object is stationary the net force acting on it is _____
- 13) When an object is moving at a constant velocity of 4.5 m/s the net force acting on it is _____
- 14) Friction always acts in the _____ direction from the motion of the object.
- 15) The _____ is the larger of the two coefficients of friction.
- 16) Show the units of the coefficient of friction. _____
- 17) The maximum speed of an object in freefall is the _____.
- 18) How many significant digits are in 0.001120? _____
- 19) Show the equation for calculating force of friction _____
- 20) What is the mass of a 200 kilogram person on the moon where the acceleration due to gravity is $1/6$ of the value on Earth?

Problem section of test. Show work starting with a decent diagram, then equations as you use them. Show steps and circle answer. (1 point for good diagram and/or equations, 1 point for good work that leads to a correct answer (1 point)). For all problems assume that the acceleration due to gravity is 9.800 m/s^2 . Calculate all answers to 4 significant digits.

1) How much force, in newtons, is needed to accelerate a 300.0 kg object at 4.500 m/s^2 if the object is on Planet-X where $g = 1.1 \text{ m/s}^2$?

2) Find the force, in newtons, that is needed to accelerate a 200.0 N object at 3.750 m/s^2 if the object is on Earth.

3) How much mass can be accelerated at 4.000 m/s^2 by a force of $12,000 \text{ N}$? Assume that this happens in Hermitage, Pennsylvania.

4) Determine the acceleration of a 220.0 kg yellow rock by a force of 36,000.N. Assume that this happens on the moon.

5) An object will barely slide down a ramp at a constant velocity if the ramp is inclined at 11.31 degrees above the horizon. Determine the coefficient of kinetic friction between the ramp and the object.

6) How much force, in newtons, is needed to get a 1000.0 newton object to start moving on a horizontal surface if the coefficient of static friction is 0.7500. Assume we are on Earth.

7)) How much force, in newtons, is needed to keep a 400.0 kilogram object moving up a surface that is inclined at 13.00 degrees if the coefficient of kinetic friction is 0.7500. Assume this is on Earth.

8) How much force, in newtons, is needed to keep a 400.0 kilogram object moving down a surface that is inclined at 13.00 degrees if the coefficient of kinetic friction is 0.7500. Assume this is on Earth.

9) How much force, in newtons, is needed to get a 400.0 kilogram object to accelerate at 1.500 m/s^2 down a surface that is inclined at 13.00 degrees if the coefficient of kinetic friction is 0.7500. Assume this is on Earth.

10) How much force, in newtons, is needed to get a 400.0 kilogram object to accelerate at 1.500 m/s^2 up a surface that is inclined at 13.00 degrees if the coefficient of kinetic friction is 0.7500. Assume this is on Earth.