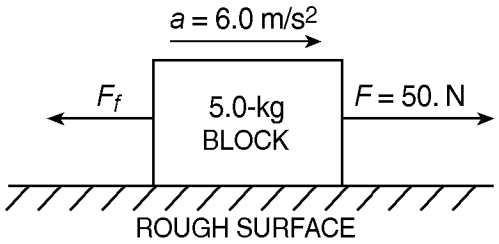
Name: _____

Physics: Exploring the Coefficient of Friction

___ 1) A wooden block is at rest on a horizontal steel surface. If a 10.-newton force applied parallel to the surface is required to set the block in motion, how much force is required to keep the block moving at constant velocity?

A) less than 10. N B) 10. N C) greater than 10. N

___ 2) The diagram below shows a 5.0-kilogram block accelerating at 6.0 meters per second^2 along a rough horizontal surface by the application of a horizontal force, F, of 50. newtons.



What is the magnitude in newtons of the force of friction, F_f, acting on the block?

___ 3) A 10.-kilogram rubber block is pulled horizontally at constant velocity across a sheet of ice. Calculate the magnitude of the force of friction acting on the block. [*Show all work, including the equation and substitution with units.*]

___ 4) Explain how to find the coefficient of kinetic friction between a wooden block of unknown mass and a tabletop in the laboratory. Include the following in your explanation:

- Measurements required
- Equipment needed
- Procedure
- Equation(s) needed to calculate the coefficient of friction

___ 5) The coefficient of kinetic friction between a 780.-newton crate and a level warehouse floor is 0.200. Calculate the magnitude of the horizontal force required to move the crate across the floor at constant speed. [*Show all work, including the equation and substitution with units.*]

___ 6) A box is pushed toward the right across a classroom floor. The force of friction on the box is directed toward the

A) floor B) right C) left D) ceiling

___ 7) The table below lists the coefficients of kinetic friction for four materials sliding over steel.

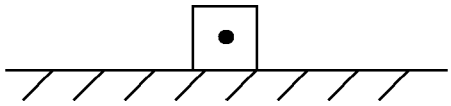
Material	Coefficient of Kinetic Friction
aluminum	0.47
brass	0.44
copper	0.36
steel	0.57

A 10.-kilogram block of each of these materials is pulled horizontally across a steel floor at constant velocity. Which block requires the *smallest* applied force to keep it moving at constant velocity?

A) steel B) aluminum C) copper D) brass

Questions 8 and 9 refer to the following:

A force of 10. newtons toward the right is exerted on a wooden crate initially moving to the right on a horizontal wooden floor. The crate weighs 25 newtons.



___ 8) (a) On the diagram provided, draw and label *all* vertical forces acting on the crate.

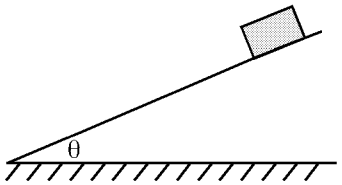
(b) On the same diagram, draw and label *all* horizontal forces acting on the crate.

___ 9) (a) Calculate the magnitude of the force of friction between the crate and the floor in the given diagram. [*Show all work, including the equation and substitution with units.*]

(b) What is the magnitude of the net force acting on the crate?

(c) Is the crate accelerating? [*Explain your answer.*]

___ 10) The diagram below shows a block sliding down a plane inclined at angle θ with the horizontal.

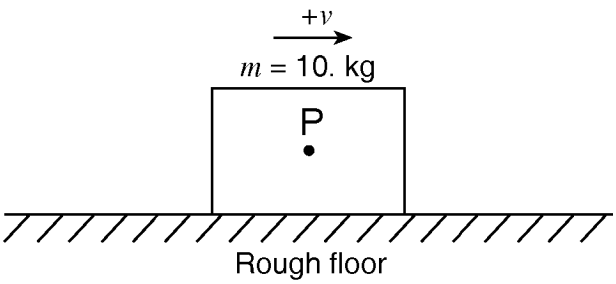


As angle θ is increased, the coefficient of kinetic friction between the bottom surface of the block and the surface of the incline will

A) remain the same B) increase C) decrease

___ 11) A skier on waxed skis is pulled at constant speed across level snow by a horizontal force of 39 newtons. Calculate the normal force exerted on the skier. [*Show all work, including the equation and substitution with units.*]

___ 12) A 10.-kilogram box, sliding to the right across a rough horizontal floor, accelerates at -2.0 meters per second^2 due to the force of friction.

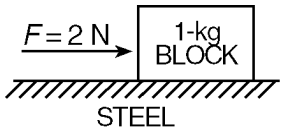


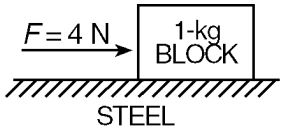
(a) Calculate the magnitude of the net force acting on the box. [*Show all work, including the equation and substitution with units.*]

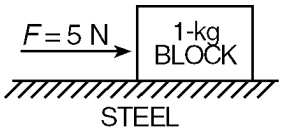
(b) On the diagram shown, draw a vector representing the net force acting on the box. Begin the vector at point *P* and use a scale of 1.0 centimeter = 5.0 newtons.

(c) Calculate the coefficient of kinetic friction between the box and the floor. [*Show all work, including the equation and substitution with units.*]

___ 13) A different force is applied to each of four 1-kilogram blocks to slide them across a uniform steel surface at constant speed as shown below. In which diagram is the coefficient of friction between the block and steel *smallest*?

A) 

B) 

C) 

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