

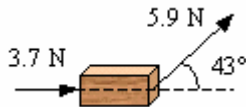
TYPICAL NUMERIC QUESTIONS FOR PHYSICS I REGULAR

QUESTIONS TAKEN FROM CUTNELL AND JOHNSON

CONTENT STANDARD IC, ID

FORCES

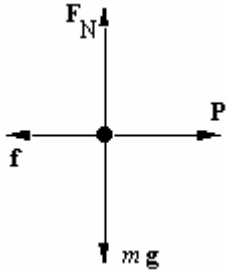
1. When the net force that acts on a hockey puck is 10 N, the puck accelerates at a rate of 50 m/s^2 . Determine the mass of the puck.
A) 0.2 kg B) 1.0 kg C) 5 kg D) 10 kg E) 50 kg
2. A 15-N net force is applied for 6.0 s to a 12-kg box initially at rest. What is the speed of the box at the end of the 6.0-s interval?
A) 1.8 m/s B) 15 m/s C) 3.0 m/s D) 30 m/s E) 7.5 m/s
3. A 810-kg car accelerates from rest to 27 m/s in a distance of 120 m. What is the magnitude of the average net force acting on the car?
A) 740 N B) 2500 N C) 91 N D) 1300 N E) 7900 N
4. Two forces act on a 4.5-kg block resting on a frictionless surface as shown. What is the magnitude of the horizontal acceleration of the block?



- A) 1.8 m/s^2 B) 1.2 m/s^2 C) 0.82 m/s^2 D) 3.2 m/s^2 E) 8.9 m/s^2

Use the following to answer question 8:

A block is pulled along a rough level surface at constant speed by the force \mathbf{P} . The figure shows the free-body diagram for the block.



F_N represents the normal force on the block; and \mathbf{f} represents the force of kinetic friction.

8. If the coefficient of kinetic friction, μ_k between the block and the surface is 0.30 and the magnitude of the frictional force is 80.0 N, what is the weight of the block?
A) 1.6 N B) 4.0 N C) 160 N D) 270 N E) 410 N

Use the following to answer questions 9-10:

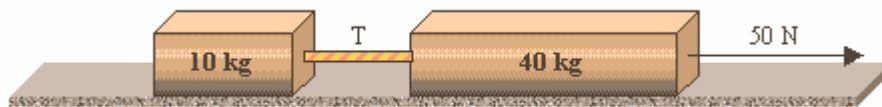
A 2.0-N force acts horizontally on a 10-N block that is initially at rest on a horizontal surface. The coefficient of static friction between the block and the surface is 0.50.

9. What is the magnitude of the frictional force that acts on the block?
A) 0 N B) 2 N C) 5 N D) 8 N E) 10 N
10. Suppose that the block now moves across the surface with constant speed under the action of a horizontal 3.0-N force. Which statement concerning this situation is *not* true?
A) The block is not accelerated.
B) The net force on the block is zero newtons.
C) The frictional force on the block has magnitude 3.0 N.
D) The coefficient of kinetic friction between the block and the surface is 0.30.
E) The direction of the total force that the surface exerts on the block is vertically upward.

11. A small plane climbs with a constant velocity of 250 m/s at an angle of 28° with respect to the horizontal. Which statement is true concerning the magnitude of the *net force* on the plane?
- It is equal to zero newtons.
 - It is equal to the weight of the plane.
 - It is equal to the magnitude of the force of air resistance.
 - It is less than the weight of the plane but greater than zero newtons.
 - It is equal to the component of the weight of the plane in the direction of motion.
12. A woman stands on a bathroom scale in an elevator that is not moving. The scale reads 500 N. The elevator then moves downward at a constant velocity of 5 m/s. What does the scale read while the elevator descends with constant velocity?
- 100 N
 - 250 N
 - 450 N
 - 500 N
 - 750 N
13. A rope connects boat A to boat B. Boat A starts from rest and accelerates to a speed of 9.5 m/s in a time $t = 47$ s. The mass of boat B is 540 kg. Assuming a constant frictional force of 230 N acts on boat B, what is the magnitude of the tension in the rope that connects the boats during the time that boat A is accelerating?
- 160 N
 - 1270 N
 - 230 N
 - 860 N
 - 340 N

Use the following to answer question 14:

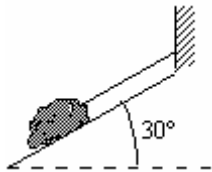
A 10-kg block is connected to a 40-kg block as shown in the figure. The surface on which the blocks slide is frictionless. A force of 50 N pulls the blocks to the right.



14. What is the magnitude of the acceleration of the 40-kg block?
- 0.5 m/s^2
 - 1 m/s^2
 - 2 m/s^2
 - 4 m/s^2
 - 5 m/s^2

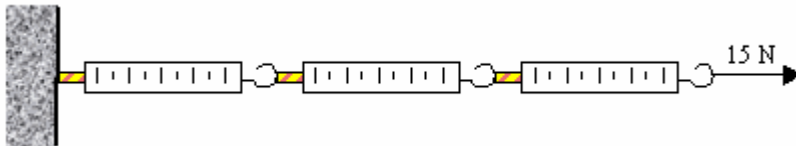
Use the following to answer questions 15-16:

A rope holds a 10-kg rock at rest on a *frictionless* inclined plane as shown.



15. Determine the tension in the rope.
A) 9.8 N B) 20 N C) 49 N D) 85 N E) 98 N
16. Which one of the following statements concerning the force exerted *on* the plane *by* the rock is true?
A) It is 0 N.
B) It is 98 N.
C) It is greater than 98 N.
D) It is less than 98 N, but greater than zero newtons.
E) It *increases* as the angle of inclination is *increased*.

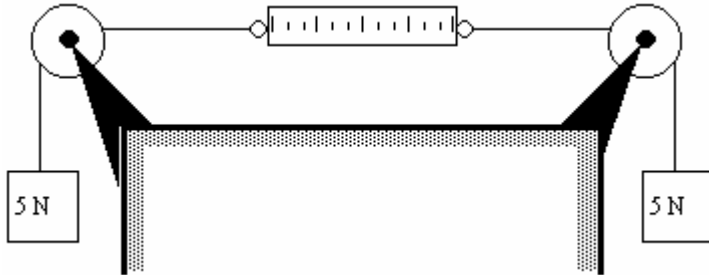
17. Three spring scales are attached along a straight line as shown. The scale on the left is attached to a wall. A force of 15 N is applied to the scale at the right.



- What is the reading on the middle scale?
A) 0 N B) 45 N C) 10 N D) 5 N E) 15 N

Use the following to answer questions 18-19:

Two 5-N boxes are attached to opposite ends of a spring scale and suspended from pulleys as shown.



18. What is the reading on the scale?
A) 0 N B) 2.5 N C) 5 N D) 10 N E) 25 N
19. Suppose that the system were placed in an elevator that accelerated downward at 2 m/s^2 .
What would the scale read?
A) 0 N B) 4 N C) 6 N D) 8 N E) 10 N