

Question

1 2 3 4 5 6 7 8 9

Description

Chapter 6, #'s 12, 16, 18, 22, 30, 38, 40, 50, 54

1. Question Details

SerCP9 6.P.012. [1588656]

A tennis player receives a shot with the ball (0.0600 kg) traveling horizontally at 54.0 m/s and returns the shot with the ball traveling horizontally at 38.0 m/s in the opposite direction.

(a) What is the impulse delivered to the ball by the racket?

N · s

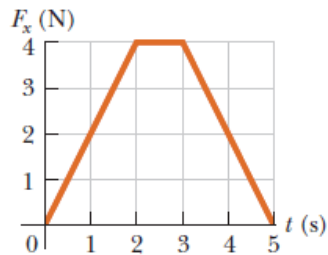
(b) What work does the racket do on the ball?

J

2. Question Details

SerCP9 6.P.016. [1594412]

A force of magnitude F_x acting in the x -direction on a 2.70-kg particle varies in time as shown in the figure below.



(a) Find the impulse of the force.

kg · m/s

(b) Find the final velocity of the particle if it is initially at rest.

m/s

(c) Find the final velocity of the particle if it is initially moving along the x -axis with a velocity of -2.70 m/s.

m/s

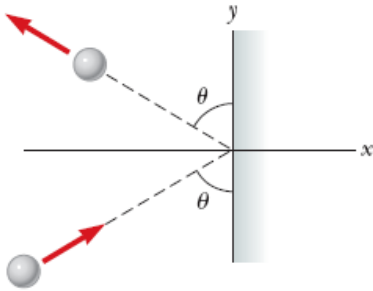
3. Question Details

SerCP9 6.P.018.WI. [1635702]

A **2.70**-kg steel ball strikes a massive wall at **10.0** m/s at an angle of $\theta = 60.0^\circ$ with the plane of the wall. It bounces off the wall with the same speed and angle (see the figure below). If the ball is in contact with the wall for **0.224** s, what is the average force exerted by the wall on the ball? (Take to the right as the $+x$ -direction and up as the $+y$ -direction.)

magnitude N

direction $^\circ$ counterclockwise from the $+x$ -axis



4. Question Details

SerCP9 6.P.022. [1588552]

A rifle with a weight of **40** N fires a **4.0**-g bullet with a speed of **220** m/s.

(a) Find the recoil speed of the rifle.

m/s

(b) If a **775**-N man holds the rifle firmly against his shoulder, find the recoil speed of the man and rifle.

m/s

5. Question Details

SerCP9 6.P.030. [1589072]

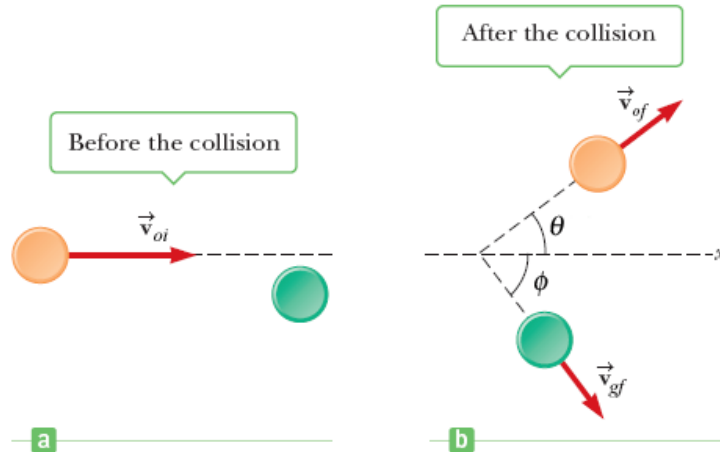
An archer shoots an arrow toward a **300**-g target that is sliding in her direction at a speed of **2.40** m/s on a smooth, slippery surface. The **22.5**-g arrow is shot with a speed of **40.0** m/s and passes through the target, which is stopped by the impact. What is the speed of the arrow after passing through the target?

m/s

Two shuffleboard disks of equal mass, one orange and the other green, are involved in a perfectly elastic glancing collision. The green disk is initially at rest and is struck by the orange disk moving initially to the right at $\vec{v}_{oi} = 3.90$ m/s as in Figure (a) shown below. After the collision, the orange disk moves in a direction that makes an angle of $\theta = 35.0^\circ$ with the horizontal axis while the green disk makes an angle of $\phi = 55.0^\circ$ with this axis as in figure (b). Determine the speed of each disk after the collision.

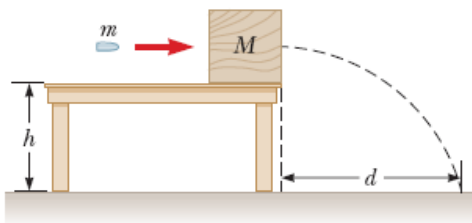
$$v_{of} = \boxed{} \text{ m/s}$$

$$v_{gf} = \boxed{} \text{ m/s}$$



A bullet of mass $m = 8.00$ g is fired into a block of mass $M = 240$ g that is initially at rest at the edge of a table of height $h = 1.00$ m (see figure below). The bullet remains in the block, and after the impact the block lands $d = 1.60$ m from the bottom of the table. Determine the initial speed of the bullet.

$$\boxed{} \text{ m/s}$$



Two automobiles of equal mass approach an intersection. One vehicle is traveling with velocity 11.7 m/s toward the east, and the other is traveling north with velocity v_{2i} . Neither driver sees the other. The vehicles collide in the intersection and stick together, leaving parallel skid marks at an angle of 49.0° north of east. The speed limit for both roads is 35 mi/h, and the driver of the northward-moving vehicle claims he was within the limit when the collision occurred. Is he telling the truth?

Yes

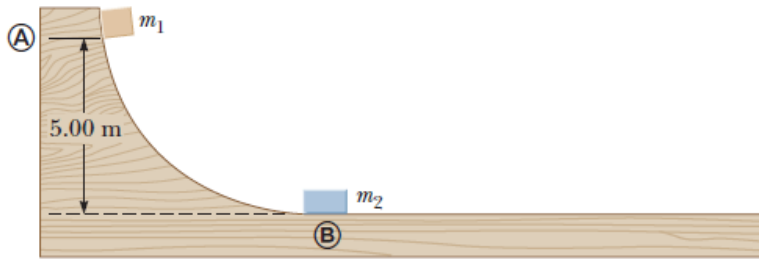
No

What was the initial speed of the northward-moving vehicle?

$$\boxed{} \text{ mi/h}$$

Consider a frictionless track as shown in the figure below. A block of mass $m_1 = 4.00$ kg is released from (A). It makes a head-on elastic collision at (B) with a block of mass $m_2 = 12.0$ kg that is initially at rest. Calculate the maximum height to which m_1 rises after the collision.

m



Assignment Details

Name (AID): HW #6 -- Due Oct. 12, 2012 (2875553)

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