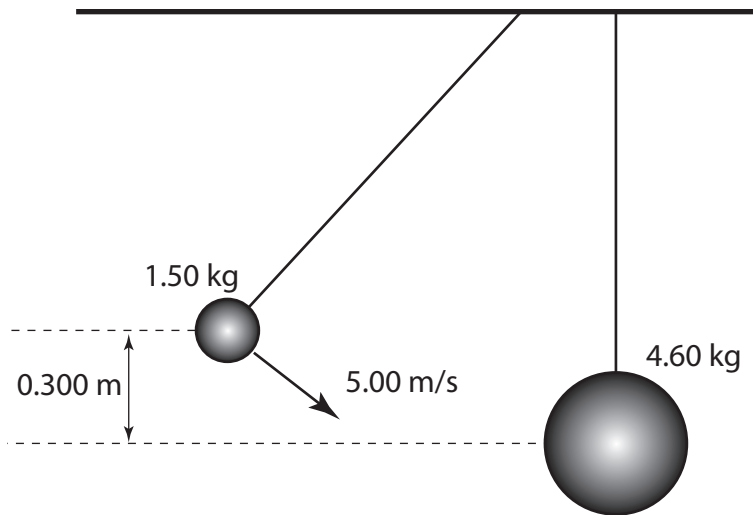


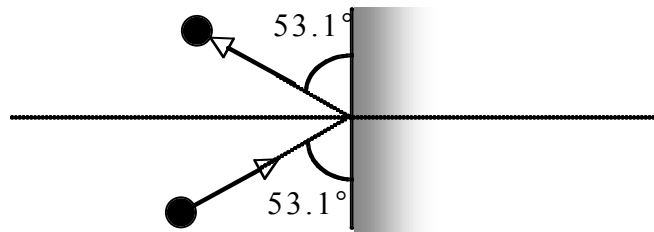
Problem Session

Linear Momentum and Collisions

1. Starting with an initial speed of 5.00 m/s at a height of 0.300 m, a 1.50-kg ball swings downward and strikes a 4.60-kg ball that is at rest, as the drawing shows.
- Find the speed of the 1.50-kg ball just before impact.
 - Assuming that the collision is elastic, find the velocities (magnitude and direction) of both balls just after the collision.
 - How high does each ball swing after the collision, ignoring air resistance?



2. A 1.00 kg steel ball strikes a vertical wall with a speed 10.0 m/s at an angle of 53.1° with the surface. It bounces off with the same speed and angle, as shown below. The ball is in contact with the wall for 20.0 ms. Let F_{WB} be the magnitude of the average force of the **wall on the ball** and F_{BW} be the magnitude of the average force of the **ball on the wall**. Which of the following statements is true?



- | | |
|------------------------|---------------------------------------|
| A. $F_{WB} < F_{BW}$. | C. $F_{BW} < F_{WB}$. |
| B. $F_{BW} = F_{WB}$. | D. Insufficient information is given. |

Which of the following vectors best describes the change in momentum of the steel ball?

Answers

1.
 - a) 5.56 m/s
 - b) -2.83 m/s (1.50-kg ball), +2.73 m/s (4.60-kg ball)
 - c) 0.409 m (1.50-kg ball), 0.380 m (4.60-kg ball)
2. b), b)
3. b)
4. $v_1 = 6 \text{ m/s}$, $v_2 = 8 \text{ m/s}$, $\theta = 37^\circ$
5. $v_f = 100 \text{ m/s}$