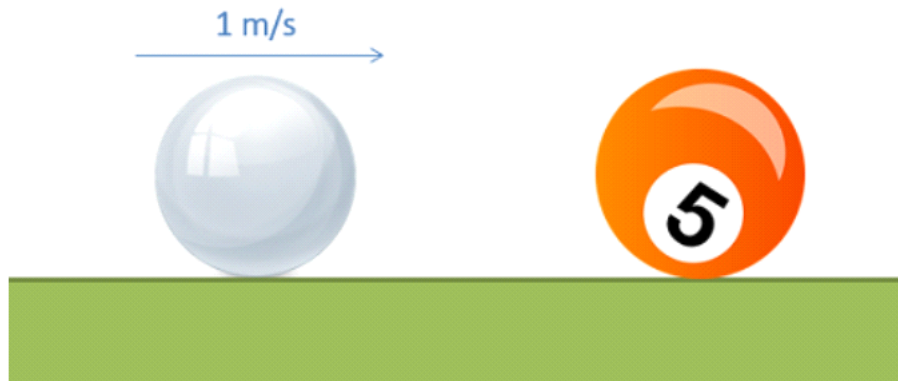


Problem 1

A cue ball weighing .17kg is traveling 1 m/s impacts a stationary billiard ball with a mass of .15kg as shown below. If the balls collide directly and the collision is elastic, what will the velocities be after the collision (ignore rotational energies)?



$$\sum m v_i = \sum m v_f$$

$$(.17 \text{ kg})(1 \text{ m/s}) = (.17 \text{ kg})(v_{CF}) + (.15 \text{ kg})(v_{PF})$$

$$KE_f = KE_i$$

$$\left(\frac{1}{2}\right)(.17 \text{ kg})(1 \text{ m/s})^2 = \frac{1}{2}(.17 \text{ kg})(v_{CF})^2 + \frac{1}{2}(.15 \text{ kg})(v_{PF})^2$$

$$.17 = .17 v_{CF} + .15 v_{PF}$$

$$v_{CF} = 1 - .882 v_{PF}$$

$$.085 = .085 (1 - .882 v_{PF})^2 + .075 v_{PF}^2$$

$$v_{PF} = 1.0625 \text{ m/s}$$

$$v_{CF} = .0629 \text{ m/s}$$