

P.I.C. \rightarrow \mathcal{P} is conserved

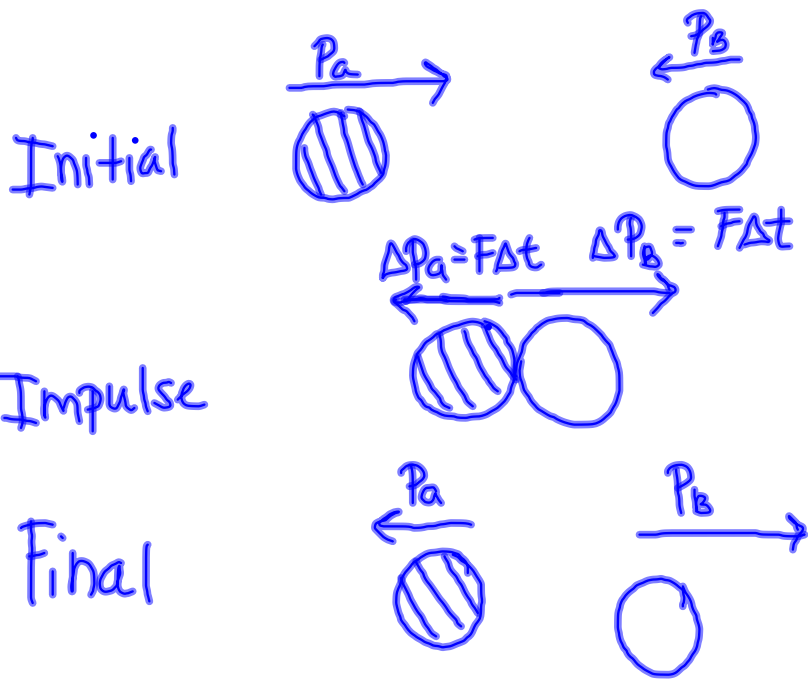


KE is NOT conserved.

Elastic Collisions

A collision in which the total momentum and total KE are both conserved.

Objects return to original
Shape after collision
 \therefore no loss of KE



Size of arrows shows magnitude

Problem 1

A 0.015 kg marble moving at 0.225 m/s right has an elastic collision with a 0.30 kg large marble moving 0.18 m/s left. After colliding, the smaller marble moves to the left at 0.315 m/s. What is the final velocity of the large marble after the collision?

$$m_1 = 0.015 \text{ Kg}$$

$$v_{1i} = +0.225 \text{ m/s}$$

$$v_{1f} = -0.315 \text{ m/s}$$

$$m_2 = 0.30 \text{ Kg}$$

$$v_{2i} = -0.18 \text{ m/s}$$

$$v_{2f} = ?$$

$$m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}$$

$$- m_1 v_{1f} \quad - m_1 v_{1f}$$

$$\frac{m_1 v_{1i} + m_2 v_{2i} - m_1 v_{1f}}{m_2} = \frac{m_2 v_{2f}}{m_2}$$

$$\frac{(0.015 \times 0.225) + (0.30 \times -0.18) - (0.015 \times -0.315)}{0.3}$$

$$v_{2f} = -0.153 \text{ m/s}$$

most collisions are simply inelastic (neither elastic nor P.I).

∴ momentum is still conserved but the 2 objects are deformed during collision so KE ↓ but move in opposite directions separately after collision.

Pg 214 Pract E #1,2

Pg 216 Pract F #1,2

Pg 219 Pract G #1,2

