Answer on Question #64288, Physics / Other

A 30kg object is traveling at 6m/s before colliding with a 9kg object collide, the 30 kg object has a velocity of 2 m/s, what is the velocity of the other object?

Solution:

1) Given:

$m_1 = 30$ kg,

$m_2 = 9$ kg,

$v_{1i} = 6$ m/s,

$v_{2i} = 0$,

$v_{1f} = 2$ m/s,

$v_{2f} =?$

The equation that denotes the conservation of momentum is:

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

where, m_1 = mass of object or body 1

m_2 = mass of object or body 2

v_{1i} = initial velocity of object or body 1

v_{2i}= initial velocity of object or body 2

v_{2f} = final velocity of the object 2

From above equation we have,

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

$$v_{2f} = \frac{(30\ kg)(6\ m/s) - (30\ kg)(2\ m/s)}{9\ kg} = 13.3 \text{ m/s}$$

Answer: 13.3 m/s