

PHYS 1410: PHYSICAL SCIENCE (FW 2012/2013)

Additional problem for Nov. 20

Consider an elastic head-on (i.e. one-dimensional) collision that involves two objects of mass m_1 and m_2 . The latter mass is initially at rest.

1. Starting from momentum and energy conservation derive equations for the final velocities of both objects after the collision.
2. What happens if $m_1 = m_2$?
3. Calculate the final velocities for $m_1 = 2.5$ kg, $m_2 = 4.2$ kg, and $v_1 = 12$ m/s.
4. Assume now that both objects stick together after the collision. Derive a formula for the final velocity and calculate it.
5. Calculate the change in total kinetic energy ΔKE for the sticky collision.