ATOMIC ENERGY CENTRAL SCHOOL,ANUPURAM

CH-6 Work Power and Energy(Handout 6/6)

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PGT PHYSICS,AECS ANUPURAM

Elastic Collision in 1-D

If the initial velocities and final velocities of both the bodies are along the same straight line, then it is called a one-dimensional collision, or head-on collision.

Elastic collision:

(A ball of mass m_1 with initial velocity v_1 strikes a ball of mass m_2 initially at rest and after collision ball 1 moves with velocity v'_1 and ball 2 moves with velocity v'_2 , in the same direction)

Momentum conservation: $m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2'$

KE conservation: $m_1 v_1^2 + m_2 v_2^2 = m_1 v'^2_1 + m_2 v'^2_2$

Where m_1,m_2 are the masses of the two blocks

v_1 is initial velocity of block 1, v_2=0 here

v'_1 is final velocity of block 1

After solving these two equations we get,

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$$v_1' = \frac{m_1 - m_2}{m_1 + m_2} v_1$$

$$v_2' = \frac{2\, m_1}{m_1 + m_2} v_1$$