Kinetic Energy

$\frac{1}{2}mv^2$ (consider each particle separately)

Loss in KE = Initial KE - Final KE

If e = 1, loss in KE = 0
If e = 0, loss in KE = initial KE

Example 8

Two spheres A and B have masses 3 kg and 5 kg respectively. A and B move towards each other in opposite directions along the same straight line on a smooth horizontal surface with speeds 3 m s^{-1} and 2 m s^{-1} respectively.

a Given the coefficient of restitution is $\frac{3}{5}$, find the velocities of the spheres after the collision.

b Find the loss of kinetic energy due to the impact.

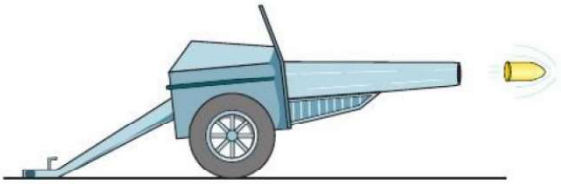
Example 9

A gun of mass 600 kg fires a shell of mass 12 kg horizontally with speed 200 m s^{-1}.

a Find the velocity of the gun after the shell has been fired.

b Find the total kinetic energy generated on firing.

c Show that the ratio of the energy of the gun to the energy of the shell is equal to the ratio of the speed of the gun to the speed of the shell after firing.



Example 10

Two particles A and B, of masses 200 g and 300 g respectively, are connected by a light inextensible string. The particles are side by side at rest on a smooth floor and A is projected with speed 6 m s^{-1} directly away from B. When the string becomes taut, particle B is jerked into motion and A and B then move with a common speed in the direction of projection of A. Find:

a the common speed of the particles after the string becomes taut

b the loss of total kinetic energy due to the jerk.

Ex 4C even questions