# Ex 10A

$p = mv$

$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

(1) (i) $p = mv$
$= 50(10)$
$= 500$ Ns

(ii) $5000(4) = 20\,000$ Ns

(iii) $70\,000\,000(40) = 2\,800\,000\,000$ Ns

(iv) $\frac{2\times10^{-16}}{1000} \times \frac{1}{1000} = 2\times10^{-22}$ Ns

(2) (i) $p = mv$
$= 0.06(20)$
$= 1.2$ Ns

(ii) S
$u = 20$ $v = u + at$
$v = 0$ $0 = 20 - 10(t)$
$a = -10$ $t = 2$ seconds
$t = ?$

(iii) $v = 0$ so $p = 0$ as well. doh.

(3) $m_1u_1 + m_2u_2 = (m_1+m_2)v$

$50000(200) + 500000(195) = 550000v$

$v = 195\ ms^{-1}$

(3SF)

(4) (i) $20000(3) + 0 = 30000v$

$v = 2\ ms^{-1}$

(ii) $20000(3) + 0 = 20000v + 10000(3)$

$v = 1.5\ ms^{-1}$

(5) $1000(30) + 800(20) = 1400v$

$v = 25.6\ ms^{-1}$ (3SF)

(6) Treat it like a collision.

$5000(2) + 0 = (5000+1000)v$

$v = 1.67\ ms^{-1}$ (3SF)

(7) $\frac{50}{1000}(200) = \left(16 + \frac{50}{1000}\right)v$

$v = 0.624 \text{ ms}^{-1}$ (3SF)

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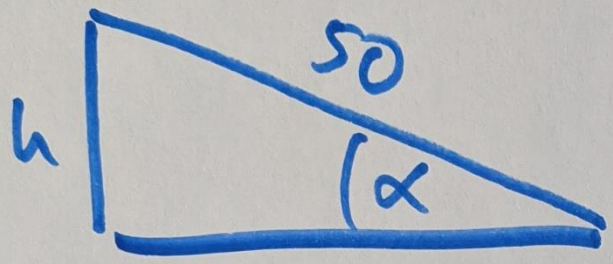
(12)




$h = 50\sin\alpha$

(i) $PE = mgh$

$= 2000(10)50\sin\alpha$

$= 50000 \text{ J}$

(ii) $KE = \frac{1}{2}mv^2$

$50000 = \frac{1}{2}(2000)v^2$

$v = 7.07 \text{ ms}^{-1}$ (3SF)

(iii) $2000(\sqrt{50}) + 0 = 3500v$

$v = 4.04 \text{ ms}^{-1}$

(iv) $KE = 28571.42857$. Loss of 43%.