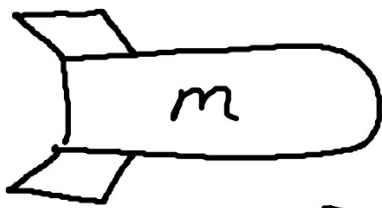


42.



$\rightarrow v$

$$\Delta K = ?$$

'silent BANG'



$\rightarrow$

$$\Sigma F_{ext} = 0$$

$$\vec{p}_0 = \vec{p}_f$$

$$(m_1 + m_2)V_0 = m_1V_{1f} + m_2V_{2f}$$

$$mV = \left(\frac{m}{4}\right)(0) + \left(\frac{3m}{4}\right)v_f$$

~~$$mv = \frac{3}{4}mv_f$$~~
$$v_f = \frac{4}{3}v$$

$$\Delta K = \frac{1}{2} \left(\frac{3m}{4} \right) \left(\frac{4}{3} v \right)^2 - \frac{1}{2} (m) (v)^2$$

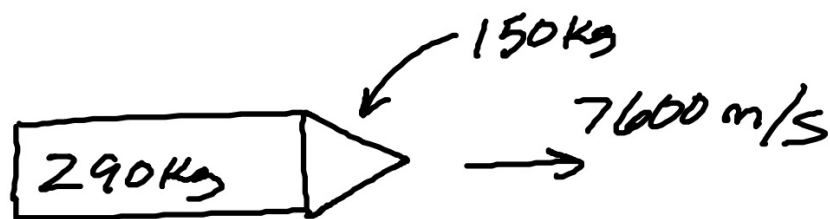
$$= \left(\frac{3m}{8} \right) \left(\frac{16}{9} v^2 \right) - \frac{m}{2} v^2$$

$$= \frac{2}{3} m v^2 - \frac{m}{2} v^2$$

$$= \frac{4}{6} m v^2 - \frac{3}{6} m v^2$$

$$\Delta K = \frac{1}{6} m v^2$$

81.



$$\Sigma F_{\text{ext}} = 0, \text{ so } \dots$$

$$\vec{P}_0 = \vec{P}_f$$

$$V_{B/A} = 910 \quad (\text{so } V_{A/B} = -910 \text{ m/s})$$

$$(440)(7600) = 290 V_{A/E} + 150 V_{B/E}$$

$$(m_A + m_B) V_0 = m_A V_{A_f} + m_B V_{B_f} \quad 3.344 \times 10^6 = 290 V_{A/E} + 150 (910 + V_{A/E})$$

$$\begin{aligned} V_{B/E} &= V_{B/A} + V_{A/E} \\ &= 910 + V_{A/E} \end{aligned}$$

$$= 290 V_{A/E} + 136500 + 150 V_{A/E}$$

$$3207500 = 440 V_{A/E}$$

$$V_{A/E} = 7290 \text{ m/s}$$

$$V_{B/E} = 910 + 7290 = 8200 \text{ m/s}$$