

a) $m_{\text{parent}} \approx 228 \text{ u}$

$$m_{\text{daughter}} \approx 224 \text{ u}$$

$$m_{\alpha} \approx 4 \text{ u} \cdot \frac{1.66 \times 10^{-27} \text{ kg}}{1 \text{ u}} = 6.64 \times 10^{-27} \text{ kg}$$

From conservation of momentum:

$$p_{\text{daughter}} = 9.23 \times 10^{-20} \text{ kg}\cdot\text{m/s}$$

$$m_1 \cdot v_1 = m_2 \cdot v_2$$

$$(9.23 \times 10^{-20} \text{ kg}\cdot\text{m/s}) = (6.64 \times 10^{-27} \text{ kg}) \cdot v_{\alpha}$$

$$v_{\alpha} = 1.39 \times 10^7 \text{ m/s}$$

b) $m_{\alpha} = 6.64 \times 10^{-27} \text{ kg}$
 $v_{\alpha} = 1.39 \times 10^7 \text{ m/s}$

$$KE = \frac{1}{2} \cdot m \cdot v^2$$

$$= \frac{1}{2} (6.64 \times 10^{-27} \text{ kg}) (1.39 \times 10^7 \text{ m/s})^2$$

$$KE = 6.4 \times 10^{-13} \text{ J}$$