P #E

Ch 29 - Worksheet

a) $m = 31.973908\ u$ (from Appendix B)

$$m = (3.0\times10^{16}\ \text{nuclei}) \cdot \frac{31.973908\ u}{1\ \text{nuclei}} = 9.59\times10^{17}\ u$$

$$m = 9.59\times10^{17}\ u \cdot \frac{(1.66\times10^{-27}\ kg)}{1\ u}$$

$$\boxed{m_o \approx 1.6\times10^{-9}\ kg}$$

b) $t_{1/2} \approx 14$ days

m after 1 half life $= \frac{1}{2}\cdot m_o$

$$= \frac{1}{2}(1.6\times10^{-9}\ kg)$$

$$\boxed{m = 8.0\times10^{-10}\ kg}$$

c) $1.6\times10^{-9}\ kg \cdot (\frac{1}{2})\cdot(\frac{1}{2})\cdot(\frac{1}{2}) \approx 2\times10^{-10}\ kg$

So $t =$ 3 half-lives

$= 3\cdot(14\ \text{days})$

$$\boxed{t \approx 42\ \text{days}}$$