

حل مسائل تدريبية صفحة ١٥

حل السؤال رقم ٥

$$m = \frac{B^2 r^2 q}{2V} = \frac{(7.2 \times 10^{-2} \text{ T})^2 (0.085 \text{ m})^2 (1.60 \times 10^{-19} \text{ C})}{(2)(110 \text{ V})} = 2.7 \times 10^{-26} \text{ kg}$$

حل السؤال رقم ٦

$$m = \frac{B^2 r^2 q}{2V} = \frac{(5.0 \times 10^{-2} \text{ T})^2 (0.106 \text{ m})^2 (2)(1.60 \times 10^{-19} \text{ C})}{(2)(66.0 \text{ V})} = 6.8 \times 10^{-26} \text{ kg}$$

حل السؤال رقم ٧

$$\begin{aligned} Bqv &= Eq \\ v &= \frac{E}{B} = \frac{6.0 \times 10^2 \text{ N/C}}{1.5 \times 10^{-3} \text{ T}} \\ &= 4.0 \times 10^5 \text{ m/s} \end{aligned}$$

حل السؤال رقم ٨

$$\frac{q}{m} = \frac{2V}{B^2 r^2}$$

$$\text{Thus, } r = \frac{1}{B} \sqrt{\frac{2Vm}{q}} \text{ and, } \frac{r_{22}}{r_{20}} = \frac{\frac{1}{B} \sqrt{\frac{2Vm_{22}}{q}}}{\frac{1}{B} \sqrt{\frac{2Vm_{20}}{q}}} = \sqrt{\frac{m_{22}}{m_{20}}}$$

The radius of the isotope with a mass of 22 proton masses, then, is

$$\begin{aligned} r_{22} &= r_{20} \sqrt{\frac{m_{22}}{m_{20}}} \\ &= r_{20} \sqrt{\frac{22m_p}{20m_p}} \\ &= \sqrt{\frac{22}{20}} r_{20} \\ &= \sqrt{\frac{22}{20}} (0.053 \text{ m}) \\ &= 0.056 \text{ m} \end{aligned}$$

The difference in the radii is $r_{22} - r_{20} = 0.056 \text{ m} - 0.053 \text{ m} = 0.003 \text{ m} = 3 \text{ mm}$