**Quiz 11**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Calculate the binding energy per mole of nucleons for calcium-40. Masses needed for this calculation are (in g/mol) $$ = 1.00783, $$ = 1.00867, and $$ = 39.96259 (8 points).

$$\frac{∆E}{nucleon}=\frac{∆mc^{2}}{40 \frac{mol nucleons}{mol}}$$

$=\frac{\left[20\left(1.00783\frac{g}{mol}\right)+20\left(1.00867\frac{g}{mol}\right)-39.96259\frac{g}{mol}\right](2.99792458×10^{8}\frac{m}{s})^{2}}{40 \frac{mol nucleons}{mol}}×\frac{1 kg}{1000 g}$

$$=\frac{(0.36741\frac{g}{mol})(2.99792458×10^{8}\frac{m}{s})^{2}}{40 \frac{mol nucleons}{mol}}×\frac{1 kg}{1000 g}×\frac{1 kJ}{1000 J}=8.256×10^{8}\frac{kJ}{mol nucleons}$$

1. A 1.00 mL solution containing 0.240 μCi of tritium is injected into a dog’s bloodstream. After a period of time to allow the isotope to be dispersed, a 1.00 mL sample of blood is drawn. The radioactivity of this sample is found to be 4.3 × 10-4 μCi. What is the total volume of blood in the dog (5 points)?

$$M\_{1}V\_{1}=M\_{2}V\_{2}⇒V\_{2}=\frac{M\_{1}V\_{1}}{M\_{2}}=\frac{(0.240 μCi)(1.00 mL)}{(4.3×10^{-4} μCi)}=560 mL or 5.6×10^{2} mL$$

1. What was your favorite experiment in chemistry 142 (1 point)?
2. What was your favorite topic covered in chemistry 142 (1 point)?