REVIEW QUESTIONS
Chapter 18

1. For each element below, use the information given to determine the number of protons, neutrons and electrons in its nucleus.

   a) $^{84}_{36}Kr$ $p^+ =$ _____ $n^0 =$ _____

   b) $^{137}_{56}Ba$ $p^+ =$ _____ $n^0 =$ _____

   c) $^{243}_{95}Am$ $p^+ =$ _____ $n^0 =$ _____

2. Complete each equation below, and classify the type of decay:

   a) $^{8}_{5}B \longrightarrow$ _____ $+ \ ^{0}_{-1}e$ Type:_____

   b) $^{210}_{84}Po \longrightarrow$ _____ $+ \ ^{4}_{2}He$ Type:_____

   c) $^{60}_{27}Co \longrightarrow \ ^{60}_{28}Ni +$ _____ Type:_____

3. Half-life of a radionuclide is 5 days. How many days will it require for a 160-g sample of this radionuclide to decay to 5 grams?

4. A sample of a particular radionuclide starts with a mass of 32 g. Twelve hours later, 0.5 g of this isotope remains. What is the half-life of this radionuclide?

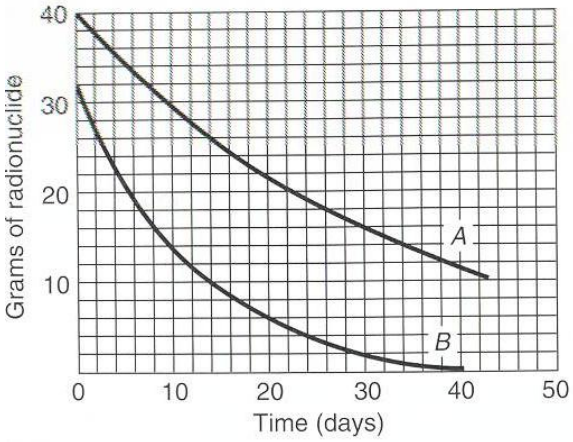
5. For each pair of nuclides given, determine which is radioactive, and give a reason for your choice:

   a) $^{17}_{9}F$ and $^{32}_{16}S$ Reason:_____

   b) $^{56}_{26}Fe$ and $^{226}_{88}Ra$ Reason:_____

   c) $^{23}_{11}Na$ and $^{20}_{9}F$ Reason:_____

6. Use the graph provided below to find the half-life of radionuclides A and B.



7. Write equations for the following decays:

   a) Beta decay of $^{56}_{26}Fe$

   b) Alpha decay of $^{227}_{89}Ac$

8. Determine the type of radiation given off in the following decay:

$$^{234}_{90}\mathbf{Th} \longrightarrow {}^{230}_{88}\mathbf{Ra} + \underline{\quad\quad} \longrightarrow {}^{230}_{89}\mathbf{Ac} + \underline{\quad\quad}$$

9. Complete the following equations:

a) $^{14}\mathrm{N} + \mathrm{n} \longrightarrow \underline{\quad\quad} + \mathrm{H}$

b) $^{10}\mathrm{B} + \mathrm{n} \longrightarrow \underline{\quad\quad} + \alpha$

c) $^{56}\mathrm{Fe} + \underline{\quad\quad} \longrightarrow {}^{57}\mathrm{Co} + \beta$

d) $^{45}_{21}\mathrm{Sc} + \mathrm{n} \longrightarrow \underline{\quad\quad} + {}^{2}_{1}\mathrm{H}$

10. Calculate the nuclear binding energy of $^{56}_{26}\mathrm{Fe}$ (in J/mol) from the following mass data:

$^{56}_{26}\mathrm{Fe} = 55.9349$ g/mol

$\mathrm{n}^0 = 1.0087$ g/mol

$\mathrm{p}^+ = 1.0073$ g/mol

$\mathrm{e}^- = 0.00055$ g/mol