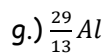
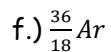
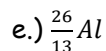
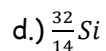
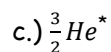
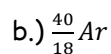
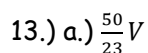
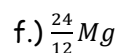
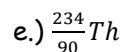
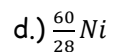
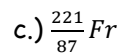
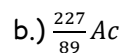
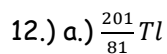


## Radioactivity Review

- 1.) Radiation is the process of a nucleus breaking down by releasing particles or energy.
- 2.) a.) Three kinds of radioactive decay are alpha, beta, and gamma decay.
  - b.) Alpha decay produces a helium nucleus, beta decay produces an electron, and gamma decay produces high energy rays.
  - c.) The electric charge of these three decays is alpha = positive, beta = negative and gamma equals neither (neutral).
- 3.) Alpha particles can be represented by the Greek letter alpha ( $\alpha$ ) or  ${}^4_2\text{He}$ .
- 4.) a.) The atoms of *magnesium – 24* and *magnesium – 26* are similar in that they both have 12 protons and electrons.
  - b.) *Magnesium – 24* and *magnesium – 26* differ in the number of neutrons. *magnesium – 24* has 24 and *magnesium – 26* has 26.
- 5.) Protons are the subatomic particle that determines the identity of the element.
- 6.) In an alpha particle both protons and neutrons are present.
- 7.) Beta particles have a negative charge as they are an electron ejected from the nucleus and electrons are negatively charged.
- 8.) The release of an alpha particle changes the element by reducing the protons and neutrons by 2 each.
- 9.) a.) 128 g undergoing two half-lives would have 32 g remaining.  $128 * \frac{1}{2} * \frac{1}{2} = 32 \text{ g}$ 
  - b.) 128 g undergoing four half-lives would have 8 g remaining.  $128 * \frac{1}{2} * \frac{1}{2} * \frac{1}{2} * \frac{1}{2} = 8 \text{ g}$
- 10.) A nuclear reaction differs from a chemical reaction in
  - (a.) the amount of energy released (lots in nuclear little in regular reactions).
  - (b.) in regular reactions electrons are involved in the bonding but in nuclear it could be protons, neutrons, or electrons involved and they are not bonding but coming from the nucleus.
  - (c.) in regular reactions new products are formed when elements rearrange but in nuclear new elements are formed from the breakdown of the nucleus.

11.) Nuclear reactions can be induced by striking a nucleus with neutrons causing the nucleus to split.



14.) a.)  $50 \mu g$  (5730 is one half-life of *carbon* – 14).

b.)  $25 \mu g$  (two half-life).

c.)  $12.5 \mu g$  (three half-life).

15.) a.) Decide whether each example is fission, fusion, or both.

a.) Electrical energy = fission

b.) Atomic weapons = both, but mainly fusion (since 1952)

c.) Radioactive daughter products = fission

d.) Happens at core of sun = fusion