

CHM 152 Summer 2009 Group Work 7 Names: _____

1. What nuclear particle has basically zero mass and a plus one charge?
a. electron **b. positron** c. alpha d. beta e. proton
2. Bismuth-208 (Bi) is the daughter of electron capture. What is the parent isotope?
a. $^{208}_{82}\text{Pb}$ b. $^{209}_{83}\text{Bi}$ **c. $^{208}_{84}\text{Po}$** d. $^{207}_{82}\text{Pb}$ e. $^{209}_{84}\text{Po}$
3. This radioactive decay process occurs when an atom is metastable.
a. alpha b. beta c. positron d. electron capture **e. gamma**
4. Radon-222 undergoes alpha emission with a half-life of 3.823 days. If 50.0 grams of radon gas were in a closed basement, how many grams would be left after 19.00 hours?
a. **43.3g** b. 1.60g c. 31.0g d. 40.7g e. 18.1g

$$k = .693 / 3.823\text{d} = 0.18127 \text{ d}^{-1}$$
$$\ln(x/50\text{g}) = -0.18127 \text{ d}^{-1} (19.00\text{h})(\text{d} / 24\text{h})$$
$$\ln x = 3.76852 \quad \text{so } x = 43.3 \text{ g}$$

5. Carbon-14 has a half-life of 5730 years. How old is a bone that has 77.2% of its carbon-14 remaining?
a. 4420y **b. 2140y** c. $3.60 \times 10^4\text{y}$ d. 1.209y e. 21.39y

$$k = .693 / 5730\text{y} = 1.20942 \times 10^{-4} \text{ y}^{-1}$$
$$\ln(77.2 / 100) = -1.20942 \times 10^{-4} \text{ y}^{-1} (t)$$
$$t = 2140 \text{ y}$$