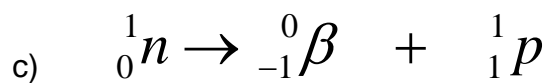
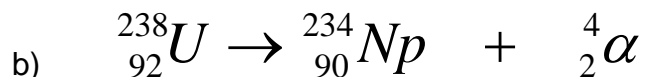
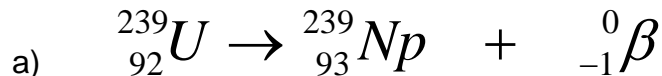


Name _____ KEY _____ Section _____ chm152 Quiz 10

1) (9 pts) For each of the following nuclear reactions, identify the emitted particle; be sure to **include the values of A and Z as well as the symbol**.



2) (3 pts) Which of the following rules is NOT used to predict nuclear stability?

(E) The number of electrons in an isotopes valence shell

3) (6 pts) Radioactive Iodine-131 ($t_{1/2} = 8.04$ days) is used to treat hyperthyroidism in patients. If a patient is given an 8.8×10^{-6} g dose during treatment, what mass remains after 32.2 days? $t_{1/2} = 0.693/k$ $\ln[A]_t = -kt + \ln[A]_0$

There are TWO ways to solve this problem!!!!

Method 1: $k = (0.693)/(8.04 \text{ days}) = 8.62 \times 10^{-2} \text{ days}^{-1}$

$$\ln[A]_t = -(8.62 \times 10^{-2} \text{ days}^{-1})(32.2 \text{ days}) + \ln(8.8 \times 10^{-6}) = -14.41$$

$$[A]_t = e^{(-14.41)} = \mathbf{5.5 \times 10^{-7} \text{ g}}$$

Method 2: $(32.2 \text{ days})/(8.04 \text{ days}) = 4$ half lives

4 half lives = 6.25% of initial amount remains

$$(0.0625)(8.8 \times 10^{-6} \text{ g}) = \mathbf{5.5 \times 10^{-7} \text{ g}}$$

4) (2 pts) Given equal amounts of each, which of the following isotopes will have the highest concentration after 10.7 years?

(A) ${}^{210}\text{Pb}$, $t_{1/2} = 20.4 \text{ yr}$