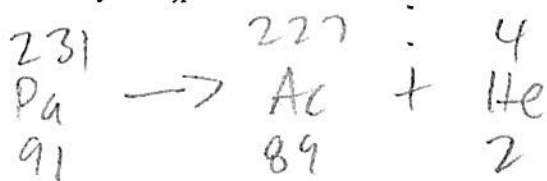


Name _____

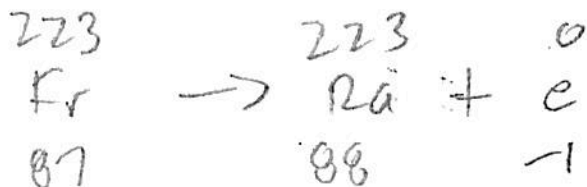
Name _____

α & β Decay Practice Problems

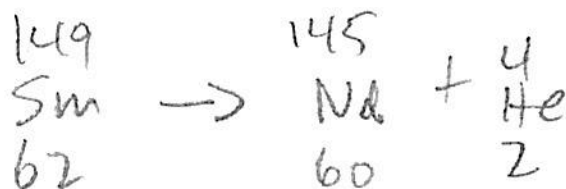
1. Write a nuclear equation for the alpha decay of $^{231}_{91}\text{Pa}$.



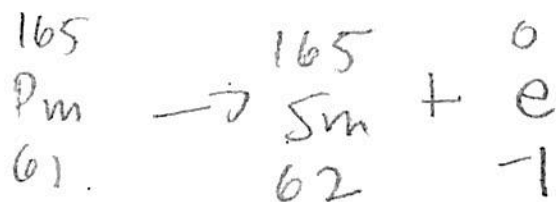
2. Write a nuclear equation for the beta decay of $^{223}_{87}\text{Fr}$.



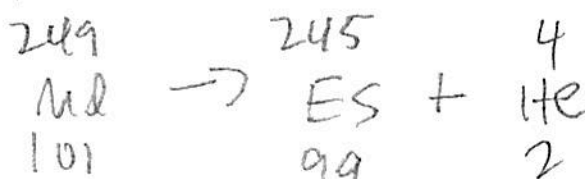
3. Write a nuclear equation for the alpha decay of $^{149}_{62}\text{Sm}$.



4. Write a nuclear equation for the beta decay of $^{165}_{61}\text{Pm}$.



5. Write a nuclear equation for the alpha decay of $^{249}_{101}\text{Md}$.



28-1 Practice Problems

Show work fully!!!

1. The half-life of cesium-137 is 30.2 years. If the initial mass of a sample of cesium-137 is 1.00 kg, how much will remain after 151 years?

$$0.0313 \text{ kg}$$

2. Given that the half-life of carbon-14 is 5730 years, consider a sample of fossilized wood that, when alive, would have contained 24 g of carbon-14. It now contains 1.5 g of carbon-14. How old is the sample?

$$23,000 \text{ yrs}$$

or 2.3×10^4 years

3. A 64-g sample of germanium-66 is left undisturbed for 12.5 hours. At the end of that period, only 2.0 g remain. What is the half-life of this material?

$$64 \rightarrow 32 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2$$

5 half-lives

$$12.5 / 5 = 2.5 \text{ hours}$$

4. With a half-life of 28.8 years, how long will it take for 1 g of strontium-90 to decay to 125 mg?

$$86.4 \text{ years}$$

5. Cobalt-60 has a half-life of 5.3 years. If a pellet that has been in storage for 26.5 years contains 14.5 g of cobalt-60, how much of this radioisotope was present when the pellet was put into storage?

$$5 \text{ half-lives!}$$

$$14.5 \times 2 = 29 \times 2 = 58 \times 2 = 116$$

$$116 \times 2 = 232$$

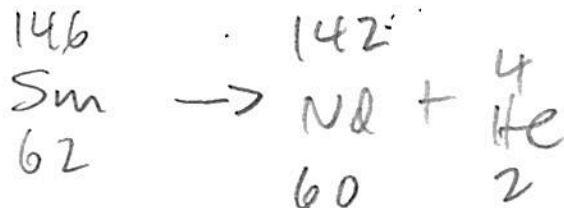
$$232 \times 2 = 464$$

28-1 Practice Problem

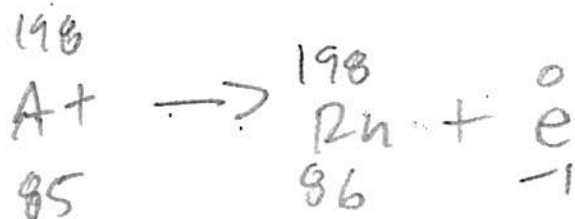
Show work fully!!!

$$100.1 / 14.3 = 7 \frac{1}{2} \text{ lives}$$

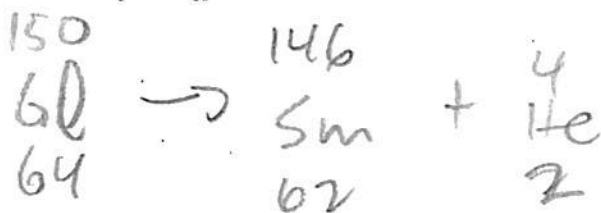
6. Write a nuclear equation for the alpha decay of $^{146}_{62}\text{Sm}$.



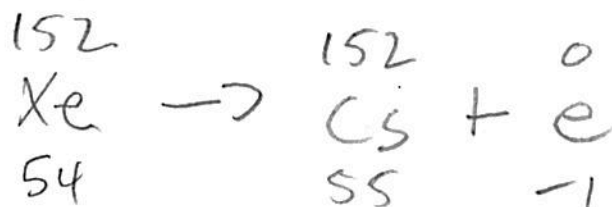
7. Write a nuclear equation for the beta decay of $^{198}_{85}\text{At}$.



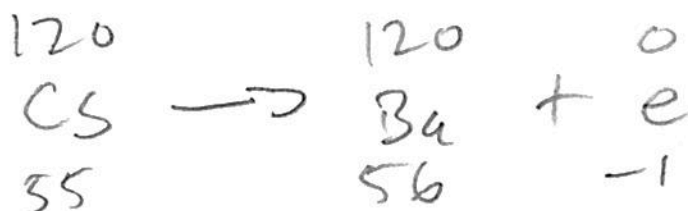
8. Write a nuclear equation for the alpha decay of $^{150}_{64}\text{Gd}$.



9. Write a nuclear equation for the beta decay of $^{152}_{54}\text{Xe}$.



10. Write a nuclear equation for the beta decay of $^{120}_{55}\text{Cs}$.



6. A 1.000-kg block of phosphorus-32, which has a half-life of 14.3 days, is stored for 100.1 days. At the end of this period, how much phosphorus-32 remains?

$$\frac{1000 \text{ g}}{2^7} = 7.8 \text{ grams}$$

OR: 0.0078 kg

7. A sample of air from a basement is collected to test for the presence of radon-222, which has a half-life of 3.8 days. However, delays prevent the sample from being tested until 7.6 days have passed. Measurements indicate the presence of 6.5 μg of radon-222. How much radon-222 was present in the sample when it was initially collected?

$$26 \mu\text{g}$$

8. A 0.500 M solution of iodine-131, which has a half-life of 8.0 days, is prepared. After 40. days, how much iodine will remain in 1.0 L of solution? Express the result in moles.

$$0.016 \frac{\text{mol}}{\text{L}}$$

9. The half-life of sodium-25 is 1.0 minute. Starting with 1 kg of this isotope, how much will remain after half an hour?

30 half-lives

$$\frac{1000 \text{ g}}{2^{30}} = 9.3 \times 10^{-7} \text{ g}$$

OR: $9.3 \times 10^{-10} \text{ kg}$

10. What is the half-life of polonium-214 if, after 820. seconds, a 1.0-g sample decays to 31.25 mg?

$$164 \text{ seconds}$$