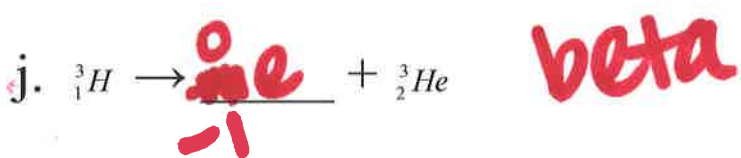
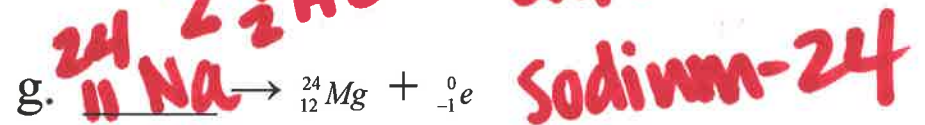
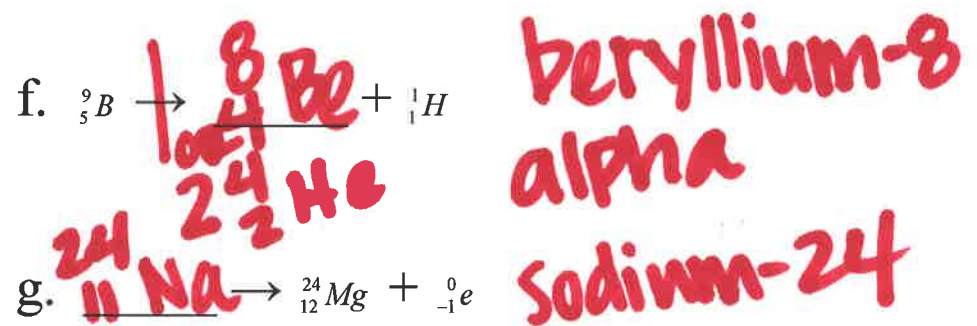
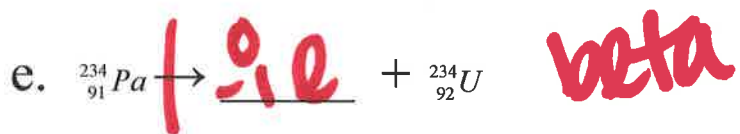
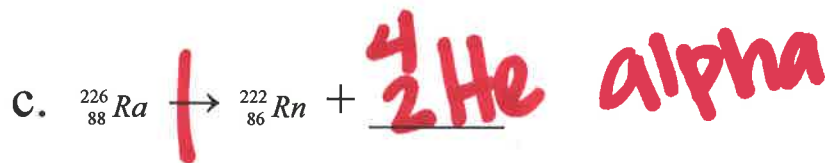


Nuclear Chemistry Exam Review

Particle Type	Symbol Used in Equations	Other symbol	Mass number <i>top #</i>	Charge <i>bottom #</i>
Beta (electron) *	${}^0_{-1}e$	β	0	-1
Positron (antimatter)	${}^0_{+1}e$	e^+	0	+1
Proton	1_1H or 1_1P	p	1	+1
Alpha Particle *	4_2He	α	4	+2
Neutron	1_0n	n	1	0
Gamma <i>Energy!</i>	${}^0_0\gamma$	γ	0	0

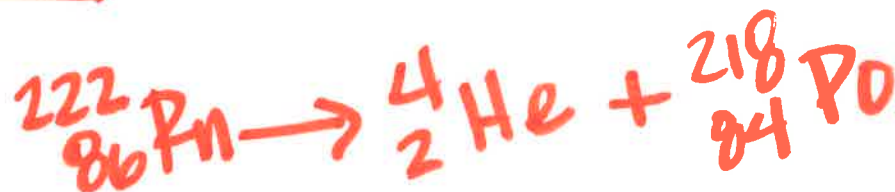
** ionizing radiation*

Complete the following transmutations of one kind of nucleus into another:



Write the following reactions.

1. The alpha emission of radon-222.



polonium-218

2. Iodine-131 decays by emission of one beta particle.



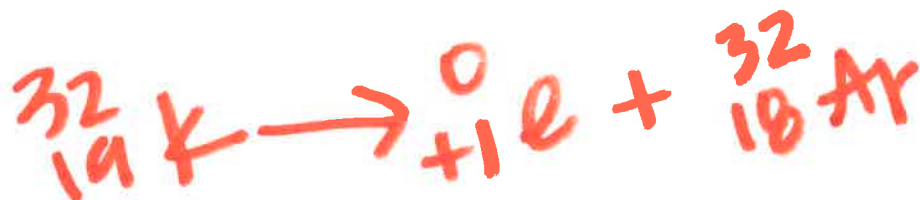
xenon-131

3. The beta decay of francium-220.



radium-220

4. Potassium-32 decays by emitting a positron.



argon-32

Half-Life Problems

8d →

5. Iodine-131 has a half-life of 8 days. If it had a starting mass of 100.0 grams, what mass will be remaining:

After 8 days? 50.0g After 16 days? 25.0g After 24 days? 12.5g

100.0g $\xrightarrow{8d}$ 50.0g $\xrightarrow{8d}$ 25.0g $\xrightarrow{8d}$ 12.5g

6. What is the half-life of uranium-239 if a 500. gram sample breaks down to 31.25 grams in 127.5 days?

total \xrightarrow{x}

500. g \xrightarrow{x} 250g \xrightarrow{x} 125g \xrightarrow{x} 62.5g \xrightarrow{x} 31.25g

$$4x = \frac{127.5d}{4}$$

31.9d

7. If $\frac{1}{4}$ of the original carbon-14 in an artifact is found, how many half-lives have passed
AND how old is it?

5730y →

$$2 \times 5730y = 11460y$$

2 $\frac{1}{2}$ lives
11460y

$$1 \rightarrow \frac{1}{2} \rightarrow \frac{1}{4}$$

$$1 \rightarrow \text{over } 0.5 \rightarrow 0.25$$

8. After 20 days, a 120 kg sample of bismuth-209 decays down to 15 kg. What is its half-life?

~~x~~ →

$$120\text{kg} \xrightarrow{x} 60\text{kg} \xrightarrow{x} 30\text{kg} \xrightarrow{x} 15\text{kg}$$

$$2x = \frac{20d}{3}$$

6.7d