

Name: _____

College Chemistry Nuclear Quiz/Test Review

1. What happens to the mass number and the atomic number of an element when it undergoes alpha decay?
2. What happens to the mass number and the atomic number of an element when it undergoes beta decay?
3. What happens to the mass number and the atomic number of an element when it captures a proton?
4. What happens to the mass number and the atomic number of an element when it captures a neutron?
5. By what process does thorium-230 decay to radium-226?
6. The alpha decay of what isotope of what element produces lead-206?
7. Radium undergoes alpha decay. The product of this reaction also undergoes alpha decay. What is the product of this second decay reaction?
8. ^{41}Ca decays by electron capture. The product of this reaction undergoes alpha decay. What is the product of this second decay reaction?
9. Bombardment of uranium-235 with a neutron generates tellurium-135, 3 neutrons, and _____.
10. The reaction shown below is responsible for creating ^{14}C in the atmosphere. What is the bombarding particle?
$${}^7_{14}\text{N} + \text{_____} \rightarrow {}^6_{14}\text{C} + {}^1_1\text{H}$$
11. How many neutrons are emitted when a californium-249 nucleus is bombarded with a carbon-12 nucleus to produce a ${}^{104}_{257}\text{Rf}$ nucleus?
12. ^{131}I has a half-life of 8.04 days. Assuming you start with a 1.53 mg sample of ^{131}I , how many mg will remain after 16.08 days?
13. All atoms of a given element have the same _____.
14. The beta decay of cesium-137 has a half-life of 30.0 years. How many years must pass to reduce a 25 mg sample of cesium 137 to 6.25 mg?
15. What isotope of what element is produced if krypton-81 undergoes beta decay?
16. Electrons do not exist in the nucleus, yet beta emission is ejection of electrons from the nucleus. How does this happen?

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1. What happens to the mass number and the atomic number of an element when it undergoes alpha decay?
MN decreases by 4, AN decreases by 2
2. What happens to the mass number and the atomic number of an element when it undergoes beta decay?
MN no change, AN increases by 1
3. What happens to the mass number and the atomic number of an element when it captures a proton?
MN increases by 1, AN increases by 1
4. What happens to the mass number and the atomic number of an element when it captures a neutron?
MN increases by 1, AN no change
5. By what process does thorium-230 decay to radium-226?

Alpha

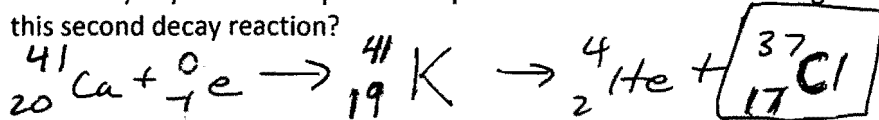
6. The alpha decay of what isotope of what element produces lead-206?

Po-210

7. Radium undergoes alpha decay. The product of this reaction also undergoes alpha decay. What is the product of this second decay reaction?

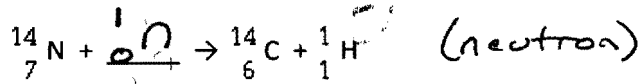
Polonium

8. ^{41}Ca decays by electron capture. The product of this reaction undergoes alpha decay. What is the product of this second decay reaction?



9. Bombardment of uranium-235 with a neutron generates tellurium-135, 3 neutrons, and $^{97}_{40}\text{Zr}$.

10. The reaction shown below is responsible for creating ^{14}C in the atmosphere. What is the bombarding particle?



11. How many neutrons are emitted when a californium-249 nucleus is bombarded with a carbon-12 nucleus to produce a $^{257}_{104}\text{Rf}$ nucleus? $^{249}_{98}\text{Cf} + {}^{12}_6\text{C} \rightarrow ^{257}_{104}\text{Rf} + \boxed{4\text{ n}}$

12. ^{131}I has a half-life of 8.04 days. Assuming you start with a 1.53 mg sample of ^{131}I , how many mg will remain after 16.08 days?

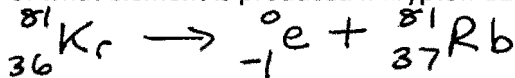
2 half lives \rightarrow 0.3825g remain

13. All atoms of a given element have the same atomic # (# of protons)

14. The beta decay of cesium-137 has a half-life of 30.0 years. How many years must pass to reduce a 25 mg sample of cesium 137 to 6.25 mg? $25 \rightarrow 6.25\text{mg}$ is 2 half lives

60 years

15. What isotope of what element is produced if krypton-81 undergoes beta decay?



16. Electrons do not exist in the nucleus, yet beta emission is ejection of electrons from the nucleus. How does this happen?

A neutron decays into a proton when it emits a beta particle.