Nuclear Symbols and Conservation

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

In a nuclear equation, the sums of mass number A and atomic number Z balance separately. Use the 2025 Chemistry Reference Tables as needed.

1 Which values describe an alpha particle?

(1) A = 0, Z = −1

(2) A = 1, Z = 0

(3) A = 4, Z = 2

(4) A = 4, Z = 4

2 Carbon-14 has Z = 6. It emits a beta-minus particle with A = 0 and Z = −1. Determine the daughter’s mass and atomic numbers. Show the balances. [1]

Answer and work

3 An excited nucleus emits only a gamma photon. How do its A and Z change?

(1) Both decrease.

(2) A decreases by 4 and Z decreases by 2.

(3) A stays the same and Z increases by 1.

(4) Both stay the same.

4 A parent and daughter nucleus have the same mass number but different atomic numbers. Explain whether they represent the same element. [1]

Answer and work

Reading Decay Records

Use the information below to answer the questions.

A digital catalog shows two decay models. Each row gives the parent and daughter nuclei. Account for each change using one emitted particle with a nonzero A or Z.

Record	Parent (A, Z)	Daughter (A, Z)
R	(238, 92)	(234, 90)
S	(32, 15)	(32, 16)

5 Which particle is emitted in record R?

(1) An alpha particle

(2) A beta-minus particle

(3) A neutron

(4) A positron

6 Use the periodic table to identify the daughter element in record S.

(1) Silicon

(2) Phosphorus

(3) Sulfur

(4) Chlorine

7 Find A and Z for the particle emitted in record S. Show both number balances. [1]

Answer and work

8 How many fewer neutrons does the daughter in record R contain than its parent? Use the record to show your work. [1]

Answer and work