

Nuclear Chemistry & Half-Life

STUDENT PRACTICE WORKSHEET

Name: _____ Date: _____

Directions: Circle the best answer for 1-6. Show your full reasoning and units for 7-8. Compare with the separate key after completing the page.

Part A — Concept checks

1. After two half-lives, the remaining fraction is...

- A. $1/2$ B. $1/4$ C. $1/8$ D. $3/4$

2. An alpha particle is essentially a...

- A. electron B. helium-4 nucleus C. photon D. neutron

3. Beta-minus decay increases atomic number by...

- A. -2 B. -1 C. $+1$ D. $+2$

4. Gamma emission changes mass number by...

- A. -4 B. -1 C. 0 D. $+1$

5. After one half-life, 24.0 g of a sample becomes...

- A. 6.0 g B. 12.0 g C. 18.0 g D. 48.0 g

6. Does ordinary heating greatly alter a nuclide's half-life?

- A. yes, doubles it B. yes, halves it C. no, generally not D. always makes it zero

Part B — Application and explanation

7. A radioactive sample starts at 80.0 mg. How much remains after three half-lives?

8. Explain why this guideline matters, with an example of what could go wrong if you ignore it: Half-life is the time to lose half of what remains, not the same fixed number of grams in every interval.

REFERENCE RELATIONSHIP

$$N = N_0(1/2)^{(t/t_{1/2})}$$