A.2 The Periodic Table & Trends

Practice Worksheet — name: _____ date: _____

SECTION A — MULTIPLE CHOICE

A1. Potassium reacts more violently with water than sodium because potassium:

- (A) Has more protons attracting the water
- (B) Has its outer electron further from the nucleus, so it is lost more easily
- (C) Has more outer electrons
- (D) Is denser than sodium

A2. An element is in Group 6, Period 3. Its electron arrangement is:

- (A) 2, 8, 6
- (B) 2, 6, 8
- (C) 6, 8, 2
- (D) 2, 8, 8, 6

A3. Which observation shows chlorine is more reactive than bromine?

- (A) Chlorine is a gas while bromine is a liquid
- (B) Chlorine displaces bromine from potassium bromide solution
- (C) Bromine is darker in colour
- (D) Chlorine has a lower boiling point

SECTION B — SHORT ANSWER

B1. Describe what you would observe when a small piece of sodium is added to water, and write the word equation. [4 marks]

B2. Explain why the noble gases are chemically unreactive. [2 marks]

B3. State three physical properties in which metals typically differ from non-metals. [3 marks]

ANSWER KEY

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Section A

A1: Has its outer electron further from the nucleus, so it is lost more easily — Down Group 1 each element adds a shell, placing the single outer electron further from the nuclear pull (and more shielded). It is lost more easily, so reactivity rises down the group — the reverse of the halogens.

A2: 2, 8, 6 — Period 3 means three shells; Group 6 means six outer electrons: 2, 8, 6 — sulfur. The table's address system converts directly into electron arrangements.

A3: Chlorine displaces bromine from potassium bromide solution — A more reactive halogen kicks a less reactive one out of its compounds: $Cl_2 + 2KBr \rightarrow 2KCl + Br_2$ (solution turns orange). Displacement reactions are the standard experimental test of reactivity order.

Section B

B1: The sodium floats, melts into a ball, fizzes as it darts across the surface, and may burn with a yellow-orange flame; the metal shrinks and disappears. Universal indicator in the water turns purple (alkaline). Word equation: sodium + water → sodium hydroxide + hydrogen.

B2: They have full outer electron shells (2 for helium, 8 for the others), so they have no tendency to lose, gain or share electrons — the electron rearrangements that constitute chemical reactions.

B3: Metals conduct electricity and heat well, are malleable and ductile, and are shiny solids with high melting points; non-metals are poor conductors (insulators), brittle when solid, and dull, with many existing as gases at room temperature.