11 The Periodic Table

For each question, choose the most suitable option and write the letter (**A**, **B**, **C** or **D**) in the brackets provided.

Level 1

1. Which of the following is **not** a use of a noble gas?
   - **A** To fill lightbulbs
   - **B** To fill weather balloons
   - **C** To provide an inert atmosphere in welding
   - **D** To provide an inert atmosphere to store alkali metals ( )

2. Which of the following is **false**?
   - **A** Bromine sublimes when heated.
   - **B** Chlorine is a gas while iodine is a solid at room temperature.
   - **C** Sodium and potassium are stored in oil.
   - **D** Potassium reacts more vigorously with water as compared to sodium. ( )

3. Which of the following is **not true** of Group 17 elements?
   - **A** The boiling points of the elements increases down the group.
   - **B** Group 17 elements are the most reactive non-metals in the periodic table.
   - **C** The reactivity of the elements increases down the group.
   - **D** They form copper compounds with the formula CuX_2. ( )

Level 2

4. Which of the following is **true** across Period 2 of the periodic table?
   - **A** The metallic properties of the elements increase across the period.
   - **B** The nature of the oxides goes from acidic to amphoteric to basic across the period.
   - **C** The size of the atoms generally decreases across the period.
   - **D** The valency of the elements increases from lithium to neon. ( )

5. When element **A** is added into a solution containing ions of element **B**, a reaction occurred and element **B** is produced.

   Which of the following is most likely **not true** of the reaction?

   A **A** displaced **B** in the reaction.

   B If **A** is chlorine, **B** is bromine.

   C If **B** is iodine, there are three possible elements that could be **A**.

   D If **A** is lithium, **B** is potassium. ( )

6. Which of the following pair of elements would the first element have a **higher** boiling point than the second element?

   A Argon and magnesium

   B Chlorine and fluorine

   C Oxygen and aluminium

   D Rubidium and sodium ( )

7. Which of the following is **not true** when chlorine gas is bubbled into potassium iodide solution?

   A Chlorine is more reactive than iodine and hence displaces iodine from potassium iodide solution.

   B Potassium iodide is the reducing agent.

   C The ionic equation for the reaction is $Cl_2(g) + 2I^-(aq) \longrightarrow 2Cl^-(aq) + I_2(aq)$.

   D The solution turns from brown to colourless. ( )

8. Group 16 elements have similar group trends as that of the halogens.

   Which of the following combination of Group 1 and Group 16 elements would produce the **most vigorous** reaction?

   A Oxygen and rubidium

   B Selenium and sodium

   C Sulfur and potassium

   D Tellurium and lithium ( )

9. Two reactions involving unknown elements, **X** and **Y**, and their compounds are given below.

$$\mathbf{X}OH + HCl \longrightarrow \mathbf{X}Cl + H_2O$$

$$\mathbf{Y} + \mathbf{X}Cl \longrightarrow \mathbf{Y}Cl + \mathbf{X}$$

Which of the following statements is **correct**?

A Both **Y** and **X** are elements in Group 2 of the periodic table.

B If **Y** is lithium, **X** is sodium.

C When heated in oxygen, **Y** forms **Y**O while **X** forms $\mathbf{X}_2O$.

D **Y** has a lower melting point than **X**. ( )

10. The following statements describes some characteristics of three elements, **E**, **F** and **G**, which are in the same period of the periodic table.

1 The oxide of element **E** can react with both acids and alkalis.

2 Element **F** reacts with water to form a compound with the formula **F**OH.

3 Elements **E** and **G** react to form an ionic compound with the formula $\mathbf{EG}_3$.

Arrange the elements in **increasing** order of their atomic number.

A **E, F, G**

B **F, E, G**

C **F, G, E**

D **G, E, F** ( )

Level 3

11. Suppose a new element, unine, Un, is discovered. The following shows some properties of unine.

1 Unine is a dark liquid.

2 Unine can react with magnesium to form a compound of the formula, $MgUn_2$, that is soluble in water.

Which of following reactions could unine likely undergo?

A $Un_2 + 2KCl \longrightarrow 2KUn + Cl_2$

B $Un_2 + 2KCl \longrightarrow 2UnCl + 2K$

C $Un_2 + 2KI \longrightarrow 2UnI + 2K$

D $Un_2 + 2KI \longrightarrow 2KUn + I_2$ ( )

12. The reactivity of three elements, **X**, **Y** and **Z** are investigated. Two reactions involving these elements are shown below.

$$X + Y^{2+} \longrightarrow X^{2+} + Y$$

$$3X + 2Z^{3+} \longrightarrow 3X^{2+} + 2Z$$

Which other equation is required to show that the order of reactivity is **Z** < **Y** < **X**?

A $Y + Z \longrightarrow YZ$

B $3Y + 2Z^{3+} \longrightarrow 3Y^{2+} + 2Z$

C $2Z + 3X^{2+} \longrightarrow 3X + 2Z^{3+}$

D $2Z + 3Y^{2+} \longrightarrow 3Y + 2Z^{3+}$ ( )

13. Element **H** has 7 valence electrons. When element **H** reacts with potassium, the compound K**H** is formed. When element **J** is added into a solution of K**H**, a red-brown solution is formed.

What are the likely identities of **H** and **J**?

	Element H	Element J
A	Bromine	Fluorine
B	Bromine	Iodine
C	Chlorine	Fluorine
D	Fluorine	Bromine

( )

14. Group 2 elements have similar reactivity trends as Group 1 elements. A new element, **Z**, is found and thought to belong to Group 2.

Which two ionic equations would correctly allow **Z** to be placed between calcium and strontium in Group 2?

	Equation 1	Equation 2
A	$Ca + Z^{2+} \longrightarrow Ca^{2+} + Z$	$Sr + Z^{2+} \longrightarrow Sr^{2+} + Z$
B	$Ca + Z^{2+} \longrightarrow Ca^{2+} + Z$	$Sr^{2+} + Z \longrightarrow Sr + Z^{2+}$
C	$Ca^{2+} + Z \longrightarrow Ca + Z^{2+}$	$Sr + Z^{2+} \longrightarrow Sr^{2+} + Z$
D	$Ca^{2+} + Z \longrightarrow Ca + Z^{2+}$	$Sr^{2+} + Z \longrightarrow Sr + Z^{2+}$

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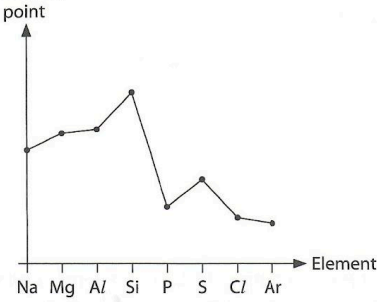
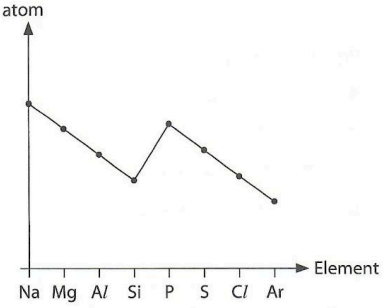
15. Which of the following graphs shows the **correct** trend of some properties of the elements across Period 3 of the periodic table?

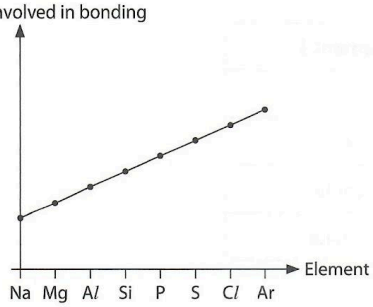
A Melting point



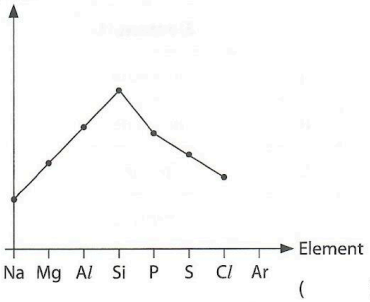
B Size of atom



C Number of electrons involved in bonding



D Size of ion formed



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