

Periodic Trends

Question Paper

Level	O Level
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	The Periodic Table
Sub-Topic	Periodic Trends
Booklet	Question Paper

Time Allowed: 42 minutes

Score: /35

Percentage: /100

- 1 Which statement about the elements in the Periodic Table is correct?
- A All the elements in the same group of the Periodic Table have the same reactivity.
 - B All the elements with four electrons in their outer shells are metals.
 - C An element in Group II of the Periodic Table would form an ion with a 2– charge.
 - D Elements in the same period of the Periodic Table have the same number of shells of electrons.
- 2 What happens when a strip of silver is immersed in an aqueous solution of copper(II) sulfate?
- A Bubbles of gas will appear.
 - B No reaction occurs.
 - C Pink copper will be deposited on the silver strip.
 - D The silver strip will start to dissolve.
- 3 Which electronic configurations represent three metallic elements in the same period of the Periodic Table?

	element 1	element 2	element 3
A	2, 8, 7	2, 8, 8	2, 8, 1
B	2, 1	2, 8, 1	2, 8, 8, 1
C	2, 2	2, 3	2, 4
D	2, 8, 1	2, 8, 2	2, 8, 3

- 4 An element is in Period 3 and Group VII of the Periodic Table.
- Which statement about this element is correct?
- A The element will form 1+ ions.
 - B The element will have 3 electrons in its outer shell.
 - C The element will have 7 electrons in its outer shell.
 - D The element will have 7 shells of electrons in its atom.

- 5 The table contains information about the physical properties of the elements chlorine, copper and iron.

element	melting point /°C	boiling point /°C
chlorine	-101	W
copper	X	2582
iron	1539	Y

In the table above, what are the correct values of W, X and Y?

	W	X	Y
A	-34	1083	445
B	-34	1083	2887
C	-34	2887	445
D	445	2887	1083

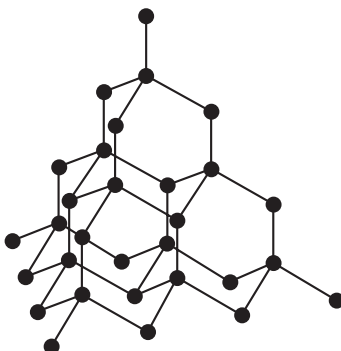
- 6 The diagram shows an outline of part of the Periodic Table.

Which statements are correct?

- Elements W, X and Y form coloured compounds.
- Elements X, Y and Z have high melting points.
- Elements X and Y act as catalysts.

- A 1 only B 2 only C 3 only D 1 and 3 only

7 The diagram shows the structure of which element in Period 3?



- A aluminium
- B magnesium
- C silicon
- D sodium

8 The diagram shows an outline of part of the Periodic Table.

												Y			Z		
W												X					

Which statement is **not** correct?

- A The melting point of *W* is lower than that of *Z*.
- B *W* and *Z* could react together and form a compound, *WZ*.
- C *X* could form an oxide, X_2O_3 .
- D *Y* could form an oxide, YO_2 .

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9 In the Periodic Table, how many periods are needed to accommodate the elements of atomic numbers 1-18?

A 2

B 3

C 4

D 8

10 An atom of which element has the same electronic configuration as the strontium ion?

A calcium

B krypton

C rubidium

D selenium

11 The boiling points of gaseous elements increase as the size of their atoms increases.

Which of these noble gases has the highest boiling point?

A argon

B helium

C krypton

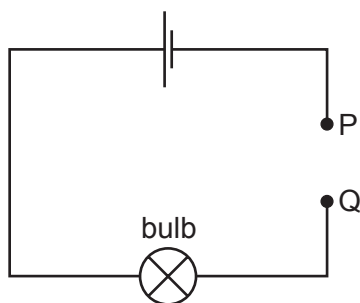
D neon

- 12 W , X and Y are elements in the same period of the Periodic Table.
- X forms compounds of formulae XCl_2 and XCl_3 .
 - Y forms a solution of pH12 when it reacts with water.
 - The reaction of W with water is similar to the reaction of Y with water but is less vigorous.

In which order are the elements in the Periodic Table?

	left to right along a period
A	$W \rightarrow Y \rightarrow X$
B	$X \rightarrow W \rightarrow Y$
C	$X \rightarrow Y \rightarrow W$
D	$Y \rightarrow W \rightarrow X$

- 13 Pieces of material are placed in turn between P and Q in the incomplete electrical circuit shown.



Which material would **not** cause the bulb to light?

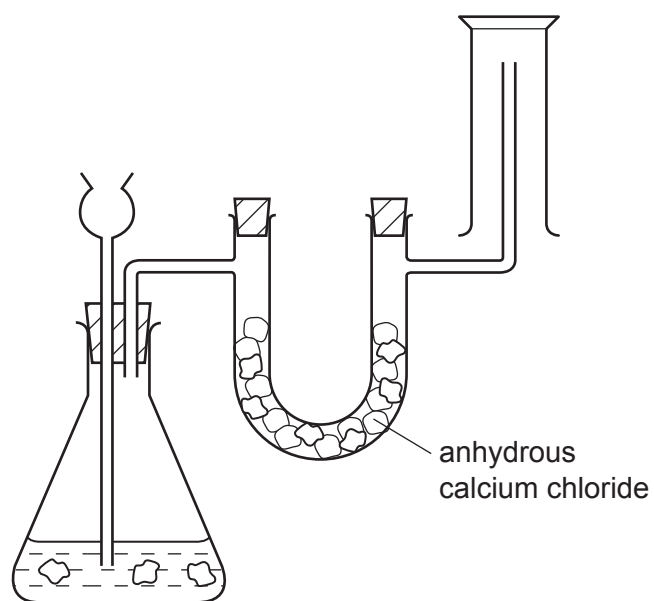
- A** aluminium
- B** diamond
- C** magnesium
- D** zinc

17 Radium (Ra) is in the same group of the Periodic Table as magnesium.

What is the charge on a radium ion?

- A** 2– **B** 1– **C** 1+ **D** 2+

18 The diagram shows a simple laboratory apparatus for the preparation and collection of a dry gas.



What is the gas?

- A** carbon dioxide
B chlorine
C hydrogen
D hydrogen chloride

19 The diagram shows part of the Periodic Table.

														P		
	Q													R	S	
	T															

Which pair of letters represents elements that are in the same period?

- A P and R B P and S C Q and T D R and S

20 Which row shows the correct number of protons and electrons in the ion of an element in Group II of the Periodic Table?

	number of protons	number of electrons
A	9	10
B	12	10
C	14	14
D	16	18

21 Which property is common to calcium, potassium and sodium?

- A Their atoms all lose two electrons when they form ions.
B They all form carbonates which are insoluble in water.
C They are all less dense than water.
D They are all metallic.

22 Which set of the electronic structures are **only** found in metals?

- A 2, 1 2, 8, 1 2, 8, 8, 1
B 2, 5 2, 6 2, 7
C 2, 7 2, 8, 7 2, 8, 18, 7
D 2, 8, 3 2, 8, 4 2, 8, 5

- 23 Elements with the code letters Q and R occupy the positions shown in the outline of the Periodic Table.

		Q																R		

What is the formula of the compound formed between them?

- A** QR_2 **B** Q_2R **C** Q_2R_3 **D** Q_3R_2
- 24 Lithium and rubidium are both in Group I of the Periodic Table.
- Which statement is correct?
- A** Lithium atoms and rubidium atoms have the same number of electrons in their outer shell.
- B** Lithium atoms are larger than rubidium ions.
- C** Lithium ions and rubidium ions have the same number of electrons in their outer shell.
- D** Rubidium ions are larger than rubidium atoms.
- 25 In the Periodic Table, how many periods include the elements of atomic numbers 1-18?
- A** 2 **B** 3 **C** 6 **D** 8
- 26 Which observation is typical of a solid non-metal element?
- A** It reacts vigorously with chlorine.
- B** It conducts electricity.
- C** It has more than one oxidation state.
- D** It forms an acidic oxide.

27 Sulphur and selenium (Se) are in the same group of the Periodic Table.

From this, we would expect selenium to form compounds having the formulae

- A SeO, Na₂Se and NaSeO₄.
- B SeO₂, Na₂Se and NaSeO₄.
- C SeO₂, Na₂Se and Na₂SeO₄.
- D SeO₃, NaSe and NaSeO₄.

28 Which statement is correct about sulphur, atomic number 16?

- A Sulphur can form the ion S²⁻.
- B Sulphur dissolves in water to form sulphuric acid.
- C Sulphur forms ionic oxides.
- D Sulphur will react with metals to produce S⁶⁺ ions.

29 Element X is a solid at room temperature.

It needs one electron per atom to gain the electronic structure of a noble gas.

It is the least reactive element in its group.

What is the element X?

- A At
- B Cs
- C F
- D Li

30 Elements X and Y are in Group VII of the Periodic Table.

X is a liquid at room temperature. Y is a solid at room temperature.

- 1 Atoms of Y have more protons than atoms of X.
- 2 Molecules of Y have more atoms than molecules of X.
- 3 Y displaces X from aqueous solutions of X⁻ ions.

Which statements are correct?

- A 1 only
- B 2 only
- C 3 only
- D 1, 2

- 31 Many properties of an element and its compounds can be predicted from the position of the element in the Periodic Table.

What property could **not** be predicted in this way?

- A the acidic or basic nature of its oxide
- B the formula of its oxide
- C the number of isotopes it has
- D its metallic or non-metallic properties

- 32 The element with a proton number 12 has similar chemical properties to the element with the proton number

- A 2. B 11. C 13. D 20.

- 33 Sodium, aluminium and sulphur are in the same period of the Periodic Table.

What trend in types of oxide occurs across this period?

	left	→	right
A	acidic		basic
B	amphoteric		acidic
C	basic		amphoteric
D	basic		acidic

- 34 Two elements are in the same group of the Periodic Table.

Which property will be the same for both elements?

- A the charge on their ions
- B their electronic structure
- C their melting point
- D their reactivity with water or acids

- 35 Which statement about the Periodic Table is correct?
- A** the melting point of the elements increases down Group I
 - B** the reactivity of the elements increases down Group VII
 - C** the reactivity of the elements decreases down Group I
 - D** the colour of the elements becomes darker down Group VII