

## Worksheet 12.3 The periodic table (Group VII&VIII)

### I MCQs

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15					

1 Metal X reacts with non-metal Y to form an ionic compound with the formula  $X_2Y$ .

Which statements are correct?

- 1 X is in Group I of the Periodic Table.
- 2 X is in Group II of the Periodic Table.
- 3 Y is in Group VI of the Periodic Table.
- 4 Y is in Group VII of the Periodic Table.

**A** 1 and 3      **B** 1 and 4      **C** 2 and 3      **D** 2 and 4

2 Which statement about the halogens is correct?

- A** A sample of bromine reacts with potassium chloride solution.
- B** A sample of bromine reacts with potassium iodide solution.
- C** A sample of chlorine has a higher density than a sample of bromine.
- D** A sample of chlorine is a darker colour than a sample of bromine.

3 Which statements about Group I and Group VII elements are correct?

- 1 In Group I, lithium is more reactive than potassium.
- 2 In Group VII, chlorine is more reactive than fluorine.

	statement 1	statement 2
<b>A</b>	✓	✓
<b>B</b>	✓	x
<b>C</b>	x	✓
<b>D</b>	x	x

### ◆ Reflection

### ◆ Reflection

4 A Group I metal (lithium, sodium or potassium) is reacted with a Group VII element (chlorine, bromine or iodine).

Which compound is formed when the Group I metal of highest density reacts with the Group VII element of lowest density?

- A lithium chloride
- B potassium chloride
- C potassium iodide
- D lithium iodide

5 Which statement about Group I and Group VII elements is correct?

- A Group VII elements are monoatomic non-metals.
- B Lithium is more reactive with water than caesium.
- C The melting points of Group I metals increase down the group.
- D Potassium bromide reacts with chlorine to produce an orange solution.

6 The Periodic Table lists all the known elements.

Elements are arranged in order of ..... 1 ..... number.

The melting points of Group I elements ..... 2 ..... down the group.

The melting points of Group VII elements ..... 3 ..... down the group.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
<b>A</b>	nucleon	decrease	increase
<b>B</b>	nucleon	increase	decrease
<b>C</b>	proton	decrease	increase
<b>D</b>	proton	increase	decrease

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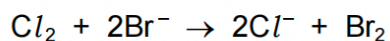
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7 The reaction between chlorine and bromide ions is a redox reaction.



What is the change in oxidation state of the reducing agent in this reaction?

- A** -2 to 0      **B** -1 to 0      **C** 0 to -1      **D** 0 to +1

8 A new element oxfordium, Ox, was discovered with the following properties.

solubility	electrical conduction	formula of element	bonding in a molecule of Ox <sub>2</sub>
insoluble in water	doesn't conduct	Ox <sub>2</sub>	Ox≡Ox

In which group of the Periodic Table should the new element be placed?

- A** Group III  
**B** Group V  
**C** Group VII  
**D** Group VIII

9 An inert gas R is used to fill weather balloons.

Which descriptions of R are correct?

	number of outer shell electrons in atoms of R	structure of gas R
<b>A</b>	2	diatomic molecules
<b>B</b>	2	single atoms
<b>C</b>	8	diatomic molecules
<b>D</b>	8	single atoms

**◆ Reflection**

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Astatine is below iodine in Group VII in the Periodic Table.

Which row describes the properties of astatine?

	state at room temperature	reactivity
<b>A</b>	gas	displaces chlorine, bromine and iodine
<b>B</b>	gas	displaces iodine but does not displace chlorine or bromine
<b>C</b>	solid	displaces iodine but does not displace chlorine or bromine
<b>D</b>	solid	does not displace chlorine, bromine or iodine

1  
1

Gas G has 10 electrons. Gas H has eight more electrons than gas G. Both gases are monoatomic.

Which statement about G and H is correct?

**A** Both gases are in the same group of the Periodic Table.  
**B** Both gases are in the same period of the Periodic Table.  
**C** Both gases are very reactive.  
**D** Gas G has a higher atomic mass than gas H.

1  
2

The electronic structures of helium, neon and argon are shown.

Which row describes these gases?

	reactivity	form of the gas	electronic structure
<b>A</b>	reactive	monoatomic	incomplete outer shell of electrons
<b>B</b>	unreactive	diatomic	complete outer shell of electrons
<b>C</b>	unreactive	diatomic	incomplete outer shell of electrons
<b>D</b>	unreactive	monoatomic	complete outer shell of electrons

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1 Which pair of elements reacts together most violently?  
3

- A chlorine and lithium
- B chlorine and potassium
- C iodine and lithium
- D iodine and potassium

1 The table shows some information about elements in Group VII of the Periodic Table.  
4

name	state at room temperature	colour
chlorine	gas	yellow-green
bromine	liquid	brown
iodine	?	?
astatine	solid	black

Which information about iodine completes the table?

	state	colour
A	liquid	black
B	liquid	green
C	solid	grey
D	solid	yellow

1 The noble gases, which are in Group 0 of the Periodic Table, are all very ..... 1..... .  
5

..... 2....., one of these gases, is used to provide an inert atmosphere in lamps.

Another, ..... 3....., is used for filling balloons because it is less dense than air.

Which words complete the sentences about noble gases?

	1	2	3
A	reactive	argon	helium
B	reactive	helium	argon
C	unreactive	argon	helium
D	unreactive	helium	argon

◆ Reflection





II Structured questions

2 The halogens are a collection of diatomic non-metals in Group VII.

(a) (i) Define the term *diatomic*.

..... [1]

(ii) What do the electron distributions of the halogens have in common?

..... [1]

(iii) How do their electron distributions differ?

..... [1]

(iv) Complete the table.

halogen	solid, liquid or gas at room temperature	colour
chlorine	.....	.....
bromine	.....	.....
iodine	.....	.....

[2]

(b) The halogens react with other non-metals to form covalent compounds.

Draw a diagram which shows the arrangement of the valency electrons in one molecule of the covalent compound arsenic trifluoride.

The electron distribution of an arsenic atom is  $2 + 8 + 18 + 5$ .

Use x to represent an electron from an arsenic atom.

Use o to represent an electron from a fluorine atom.

[3]

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II Structured questions

3 (a) Complete the table to show the electronic structure of the atoms and ions.

	electronic structure
F	2,7
Si	
Ca <sup>2+</sup>	
N <sup>3-</sup>	

[3]

(b) Predict the formula of the compound formed between Ca<sup>2+</sup> and N<sup>3-</sup>.

..... [1]

(c) Draw a dot-and-cross diagram to show the electron arrangements in the **two** ions present in lithium chloride, LiCl. Show outer shell electrons only. Include the charges on the ions.

[3]

(d) Sulfur dichloride, SCl<sub>2</sub>, is a covalent compound. It has the structure Cl–S–Cl.

Draw a dot-and-cross diagram to show the electron arrangement in a molecule of sulfur dichloride. Show outer shell electrons only.

[3]

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