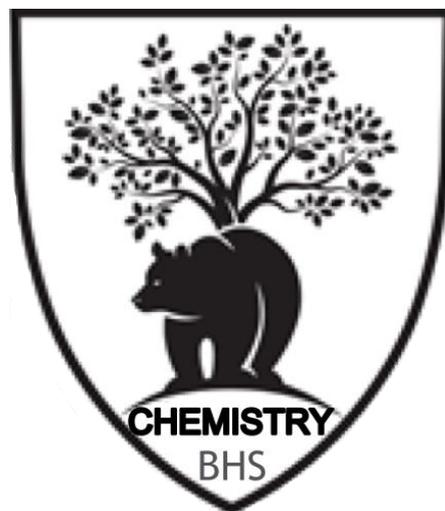


THE BERWICKSHIRE HIGH SCHOOL SCIENCES FACULTY

S1 CHEMISTRY

PERIODIC TABLE, MIXTURES AND COMPOUNDS



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PRACTICE PAPER 1

SECTION A - MULTIPLE CHOICE (5 MARKS)

Circle the correct answer for each question.

1. Which of the following substances is an **element**?
(YOU SHOULD USE PAGE 4 OF THE DATA BOOKLET TO HELP YOU.)

- A Aluminium
- B Air
- C Carbon dioxide
- D Salt water

2. Which of the following elements is a **non-metal**?
(YOU SHOULD USE PAGE 4 OF THE DATA BOOKLET TO HELP YOU.)

- A Magnesium
- B Sulphur
- C Calcium
- D Aluminium

3. Which separating technique should be used to separate a mixture of **sand and water**?

- A Chromatography
- B Filtration
- C Evaporation
- D Distillation

4. Which of the following names is a **compound** made from **two elements**?

- A Oxygen
- B Iron
- C Sodium chloride
- D Air

5. Which group contains elements that are **extremely unreactive**?

- A Alkali metals
- B Halogens
- C Noble gases
- D Transition metals

SECTION B - STRUCTURED QUESTIONS (15 MARKS)

1. ELEMENTS AND THE PERIODIC TABLE (6 MARKS)

- (a) State what is meant by an **element**. (1)
- (b) State the name given to the chart showing all of the known elements. (1)
- (c) The elements are arranged in groups (columns).

Lithium, sodium and potassium are in the same group, called the **alkali metals**.

Explain why lithium, sodium and potassium are placed in the same group. (1)

(d) State the name of **another group** in the Periodic Table. (1)

(e) Use page 4 of the data booklet to write the chemical symbol for: (2)

(i) magnesium _____

(ii) chlorine _____

2. METALS AND NON-METALS (4 MARKS)

A student tested an unknown element X. The results are shown in the table.

Appearance	Shiny
Electrical conductivity	Good
Heat conductivity	
Can it be shaped?	Yes

The student thinks element X is a metal.

(a) Complete the table to show the result you would expect for **heat conductivity**. (1)

(b) Suggest one reason why element X cannot be a **non-metal**. (1)

(c) Describe an experiment that could be done to help **identify** which metal X is. (1)

(d) Suggest a use for unknown element X and give a reason why X can be used in this way. (1)

3. MIXTURES, COMPOUNDS AND SEPARATION (3 MARKS)

(a) Is **sea water** a **mixture** or a **compound**? (1)

(b) A mixture contains **sand** and **salt water**.

State the technique you would use to separate the **sand** from the salt water. (1)

(c) Name the compound formed when **magnesium** joins with **oxygen**. (1)

4. AIR AND PERCENTAGES (2 MARKS)

Air contains many gases, as shown in the table.

Gas	Percentage
Nitrogen	78%
Oxygen	?
Other gases	1%

(a) Use the information in the table to calculate the % of **oxygen** in air. (1)

(b) Calculate the **volume of oxygen**, in litres, present in **50 litres** of air. (1)

PRACTICE PAPER 1 (ANSWERS)

SECTION A

1. A
2. B
3. B
4. C
5. C

SECTION B

1(a) Substance made from **one type of atom** / cannot be broken into a simpler substance.

1(b) **Periodic Table**

1(c) They have **similar chemical properties** / react in similar ways.

1(d) **Halogens / Noble gases / Transition metals** (any one).

1(e) (i) **Mg** (ii) **Cl**

2(a) **Good heat conductor.**

2(b) Any one: non-metals are **poor electrical conductors** / usually **dull / brittle** / cannot be shaped.

2(c) **Flame test** (or compare flame colour) / compare properties with known metals.

2(d) Any suitable use + matching reason, e.g. **cooking pot** because it is a **good heat conductor**; **electrical wire** because it is a **good conductor**; **pan/metal tool** because it is **malleable**.

3(a) **Mixture**

3(b) **Filtration**

3(c) **Magnesium oxide**

4(a) **21%**

4(b) **21% of 50 L = 10.5 L**

PRACTICE PAPER 2

SECTION A - MULTIPLE CHOICE (5 MARKS)

Circle the correct answer for each question.

1. Which of the following is a **mixture**?

- A Water
- B Carbon dioxide
- C Air
- D Sodium chloride

2. Which element is in the **halogens** group?

(YOU SHOULD USE PAGE 4 OF THE DATA BOOKLET TO HELP YOU.)

- A Neon
- B Chlorine
- C Sodium
- D Magnesium

3. Which property is most likely for a **non-metal**?

- A Shiny
- B Good conductor of electricity
- C Malleable
- D Poor conductor of heat

4. Coloured inks are a mixture of different dyes.

Which separating technique should be used to separate the dyes?

- A Filtration
- B Chromatography
- C Evaporation
- D Magnetic separation

5. Which of the following is written with the **correct symbol**?

- A na
- B CL
- C Fe
- D mg

SECTION B - STRUCTURED QUESTIONS (15 MARKS)

1. USING THE PERIODIC TABLE (6 MARKS)

(a) Use page 4 of the data booklet to write the **name** of the element with symbol **Fe**. (1)

(b) Use page 4 of the data booklet to write the **symbol** for: (2)

(i) calcium _____

(ii) potassium _____

(c) Elements can be divided into **metals** and **non-metals**.

State whether **oxygen** is a metal or a non-metal. (1)

(d) Elements in the same group have similar chemical properties.

State two pieces of evidence you might see in a **class demonstration** that show an alkali metal is reacting with water. (2)

2. SEPARATION TECHNIQUES (4 MARKS)

A student has a mixture containing **iron filings** and **sulfur**.

(a) State the technique used to separate the iron from the sulfur. (1)

A second mixture contains **salt** mixed with **sand**.

(b) State what you would do first to start separating the salt from the sand. (1)

(c) After filtering the mixture, what is the name of the solid left on the filter paper? (1)

(d) What should be done to the salt water to obtain **dry salt**? (1)

3. ELEMENTS, COMPOUNDS AND PARTICLE DIAGRAMMS (3 MARKS)

Key: A and B are different elements.

Diagram 1: A A A A (all the same)

Diagram 2: A-B A-B A-B (pairs joined)

Diagram 3: A A-B B A-B (more than one type present)

(a) Which diagram shows an **element**? _____ (1)

(b) Which diagram shows a **compound**? _____ (1)

(c) Which diagram shows a **mixture**? _____ (1)

4. AIR AND PERCENTAGES (2 MARKS)

Air contains 78% nitrogen and 21% oxygen.

(a) Calculate the **volume of nitrogen**, in litres, present in **200 litres** of air. (1)

(b) Calculate the **volume of oxygen**, in litres, present in **200 litres** of air. (1)

END OF TEST

PRACTICE PAPER 2 (ANSWERS)

SECTION A

1. C
2. B
3. D
4. B
5. C

SECTION B

1(a) **Iron**

1(b) (i) **Ca** (ii) **K**

1(c) **Non-metal**

1(d) Any two: **bubbles/fizzing**, metal **moves** on surface, **heat** produced, **flame**/ignition of hydrogen, metal **disappears**.

2(a) **Magnet** / magnetic separation

2(b) **Add water** to dissolve the salt (stir)

2(c) **Residue** (sand)

2(d) **Evaporation** / heat to remove water

3(a) **Diagram 1**

3(b) **Diagram 2**

3(c) **Diagram 3**

4(a) 78% of 200 L = **156 L**

4(b) 21% of 200 L = **42 L**

CHALLENGE PAPER 1

SECTION A - MULTIPLE CHOICE (5 MARKS)

Circle the correct answer for each question.

1. Which statement about a **compound** is correct?

- A It contains only one type of atom.
- B It can be separated by filtration.
- C It is made when elements **join together**.
- D It is always a gas.

2. Which of the following substances is a **compound**?

- A Iron
- B Oxygen
- C Water
- D Air

3. Which group contains **chlorine**?

(YOU SHOULD USE PAGE 4 OF THE DATA BOOKLET TO HELP YOU.)

- A Alkali metals
- B Halogens
- C Noble gases
- D Transition metals

4. Which technique is best for separating a mixture of **two dissolved dyes** in water?

- A Filtration
- B Chromatography
- C Magnetic separation
- D Sieving

5. A metal gives a **lilac** flame colour.
Which metal is most likely present?

- A Potassium
- B Sodium
- C Copper
- D Calcium

SECTION B - STRUCTURED QUESTIONS (15 MARKS)

1. GROUPS AND CHEMICAL PROPERTIES (6 MARKS)

- (a) State what is meant by a **group** in the Periodic Table. (1)
- (b) Explain why elements in the same group have similar chemical properties. (1)
- (c) Use page 4 of the data booklet.

(i) Name a **noble gas**. (1)

(ii) Name a **halogen**. (1)

(d) Lithium and sodium both react with water.

State two similarities you would expect when lithium reacts with water compared with sodium.

(2)

2. IDENTIFYING A SUBSTANCE USING PROPERTIES (4 MARKS)

A student is given an unknown substance Y. They test it.

Test	Result for Y
Appearance	Dull
Electrical conductivity	Poor
Can it be shaped?	No, it breaks

(a) Is Y more likely to be a **metal** or a **non-metal**? (1)

(b) Give one reason for your answer. (1)

(c) Suggest a use for Y and give a reason linked to its properties. (2)

3. COMPOUND NAMES (3 MARKS)

(a) Sodium joins with chlorine to form a compound.

Write the **name** of this compound. (1)

(b) Iron joins with sulfur to form a compound when heated.

Write the **name** of this compound. (1)

(c) Explain why the ending “**-ide**” is used in these compound names. (1)

4. AIR AND PERCENTAGES (2 MARKS)

In a sealed container there are **80 litres** of air.

(a) Calculate the **volume of oxygen** in the container. (Oxygen = 21%) (1)

(b) Calculate the **volume of nitrogen** in the container. (Nitrogen = 78%) (1)

END OF TEST

CHALLENGE PAPER 1 (ANSWERS)

SECTION A

1. C
2. C
3. B
4. B
5. A

SECTION B

1(a) A **vertical column** in the Periodic Table.

1(b) They have **similar chemical properties** / react in similar ways.

1(c) (i) Any noble gas e.g. **helium / neon / argon** (ii) Any halogen e.g. **fluorine / chlorine / bromine / iodine**.

1(d) Any two: both **bubble/fizz**, produce a **gas (hydrogen)**, produce **heat**, metal **moves** on surface, metal **gets smaller/disappears**.

2(a) **Non-metal**

2(b) Any one: dull, poor conductor, brittle/not malleable.

2(c) Any suitable use + reason linked to being an **insulator** or **brittle**, e.g. **handle coating** because it is a **poor conductor of electricity/heat**; **decorative powder** because it breaks easily. (Accept sensible S1-level suggestions.)

3(a) **Sodium chloride**

3(b) **Iron sulfide**

3(c) “-ide” is used when a compound is made from **two elements**.

4(a) 21% of 80 L = **16.8 L**

4(b) 78% of 80 L = **62.4 L**

CHALLENGE PAPER 2

SECTION A - MULTIPLE CHOICE (5 MARKS)

Circle the correct answer for each question.

1. Which statement about a **mixture** is correct?

- A The substances are chemically joined.
- B The substances can often be separated by physical methods.
- C The mixture has a fixed chemical formula.
- D A mixture is always made from two elements only.

2. Which separating technique is best for separating **salt** from **salt water**?

- A Filtration
- B Evaporation
- C Magnetic separation
- D Chromatography

3. Which element is most likely to be a **metal**?

(YOU SHOULD USE PAGE 4 OF THE DATA BOOKLET TO HELP YOU.)

- A Oxygen
- B Chlorine
- C Aluminium
- D Neon

4. Which of the following is written correctly?

- A co
- B CO
- C Co
- D cO

5. Which particle diagram represents a **mixture of an element and a compound**?

- A A-B A-B A-B
- B A A A A
- C A A-B A A-B
- D A-A A-A A-A

SECTION B - STRUCTURED QUESTIONS (15 MARKS)

1. USING THE DATA BOOKLET (6 MARKS)

Use page 4 of the data booklet.

(a) Write the **symbol** for: (2)

(i) oxygen _____

(ii) sodium _____

(b) Write the **name** of the element with symbol **Cu**. (1)

(c) State whether **Cu** is a **metal** or a **non-metal**. (1)

(d) Copper is used for electrical wiring.

State one property of copper that makes it suitable for this use. (1)

(e) Name one non-metal and a use linked to a property (S1 level). (1)

2. PLANNING A SEPARATION (4 MARKS)

A student spills a mixture of **sand**, **iron filings** and **salt** into a beaker of water.

(a) State the first technique the student should use to remove the iron filings. (1)

(b) After removing the iron filings, the student wants to separate the sand from the salt water. State the technique they should use. (1)

(c) What is the name of the liquid that passes through the filter paper? (1)

(d) State what the student should do to obtain **dry salt** from the salt water. (1)

3. MIXTURES VS COMPOUNDS (3 MARKS)

Iron and sulfur can be mixed together.

(a) State one way you could separate an iron and sulfur **mixture**. (1)

When heated strongly, iron and sulfur react to form **iron sulfide**.

(b) State why a magnet will not separate iron from sulfur after the reaction. (1)

(c) State one way the **properties** of a compound can be different from the elements that make it. (1)

4. PERCENTAGES IN AIR (2 MARKS)

A classroom is filled with **1000 litres** of air.

(a) Calculate the volume of **oxygen** in the room. (Oxygen = 21%) (1)

(b) Calculate the volume of **other gases** in the room. (Other gases = 1%) (1)

END OF TEST

CHALLENGE PAPER 2 (ANSWERS)

SECTION A

1. **B**
2. **B**
3. **C**
4. **C**
5. **C**

SECTION B

1(a) (i) **O** (ii) **Na**

1(b) **Copper**

1(c) **Metal**

1(d) **Good electrical conductor**

1(e) Example: **Carbon** used in **pencils** because it is **brittle** (flakes off) / **Sulfur** used in **fungicides** (accept other sensible S1 answers linked to a property).

2(a) **Magnet** / magnetic separation

2(b) **Filtration**

2(c) **Filtrate**

2(d) **Evaporation** / heat to remove the water

3(a) **Magnet**

3(b) The iron and sulfur have **joined/chemically reacted** to form a **compound** (iron sulfide) so the iron is no longer separate.

3(c) Compounds often have **different properties** from their elements (e.g. colour, reactivity, conductivity).

4(a) 21% of 1000 L = **210 L**

4(b) 1% of 1000 L = **10 L**