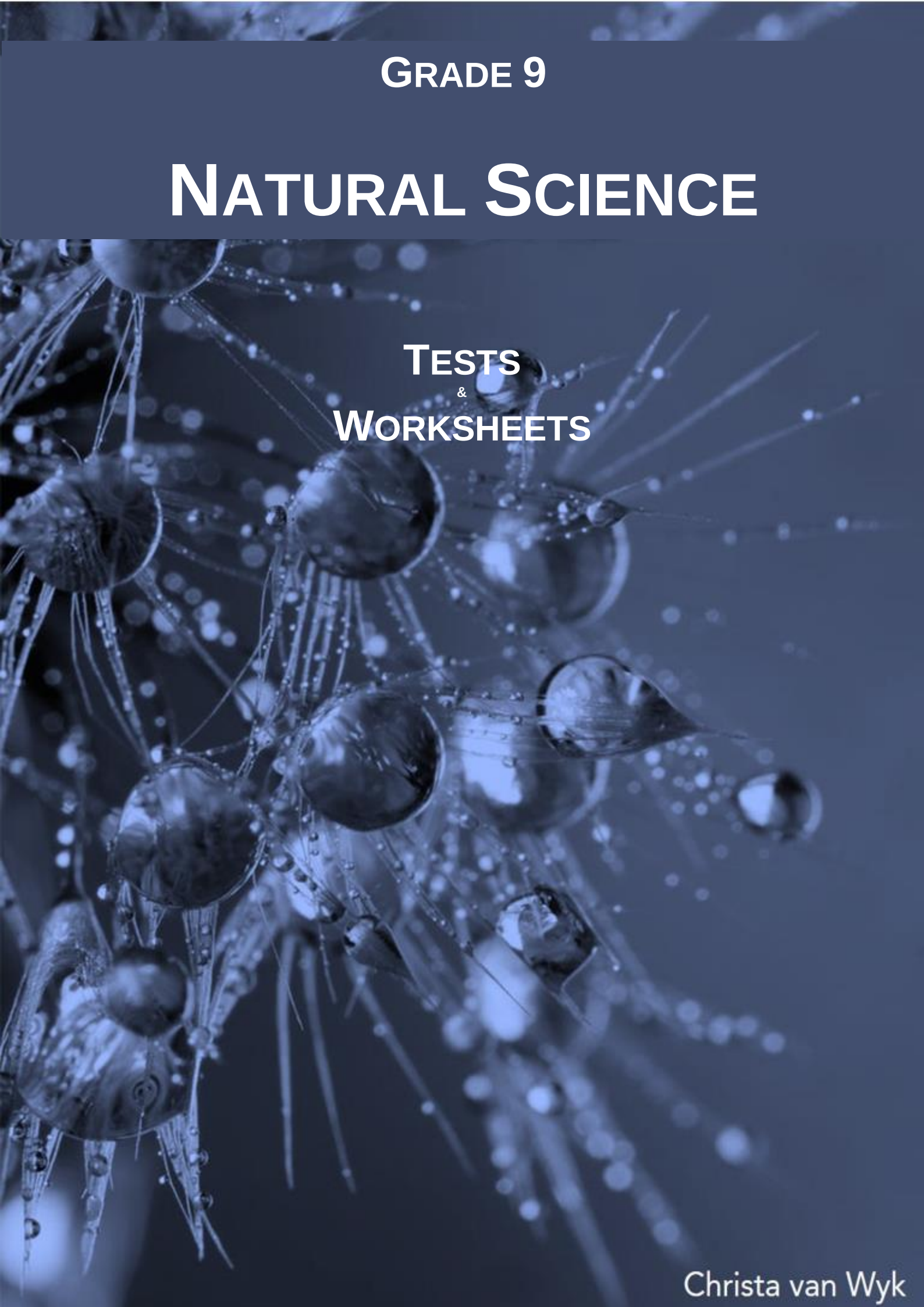
Grade 9

Natural Science

Tests & Worksheets



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Index

1 CHEMICAL REACTIONS AND CHEMICAL EQUATIONS – WORKSHEET 1:

QUESTION 1

Name the elements and the number of atoms in the following equations:

1.1 3 NH_4 (4)
1.2 4 $CuSO_4$ (6)

QUESTION 2

Give the chemical formulas of the following compounds:

2.1 Hydrochloric acid. (2)
2.2 Potassium carbonate. (2)
2.3 Calcium hydroxide. (2)
2.4 Table salt. (2)

QUESTION 3

A few pieces of sulphur are held over an open flame, on a burning spoon, until it burns. It is then placed in a gas cylinder, which contains oxygen.
The product is mixed with a little bit of water at the bottom of the cylinder and an indicator is used to test it.

3.1 What is the colour of the sulphur? (1)
3.2 Is sulphur a metal or a non-metal? (1)
3.3 Give two reasons for your answer in 3.2. (2)
3.4 In which phase is the product that is being formed? (1)
3.5 What is the name of the product that is formed? (1)
3.6 What is an indicator? (2)
3.7 Give an example of an indicator that could be used here and indicate the colour change you would observe. (2)

QUESTION 4

Balance the following equations:

4.1 $N_2 + O_2 \rightarrow NO$ (2)
4.2 $Mg + HCl \rightarrow H_2 + MgCl_2$ (2)
4.3 $CaCO_3 + HNO_3 \rightarrow Ca(NO_3)_2 + H_2O + CO_2$ (2)
4.4 $P_2O_5 + H_2O \rightarrow H_3PO_4$ (2)

2 CHEMICAL NAMES, FORMULAS AND EQUATIONS – WORKSHEET:

QUESTION 1:

Give the correct name for the following symbols:

1.1	C	1.6	Cl	1.11	Ag
1.2	O	1.7	P	1.12	Pb
1.3	N	1.8	Ca	1.13	Hg
1.4	Na	1.9	Cu	1.14	Sn
1.5	S	1.10	Zn	1.15	U

(15)

QUESTION 2:

Give the correct symbols of the following elements

2.1	Helium	2.5	Gold	2.9	Potassium
2.2	Magnesium	2.6	Iron	2.10	Tin
2.3	Aluminium	2.7	Bromine	2.11	Carbon
2.4	Beryllium	2.8	Lithium	2.12	Phosphorus

(12)

QUESTION 3:

Name the elements and the number of atoms of each element in the following compounds:

3.1 Three molecules of copper sulphate ($3CuSO_4$). (3)

3.2 Two molecules of nitric acid ($2HNO_3$). (3)

QUESTION 4:

Give the formula of each of the following compounds:

4.1 Ammonia. (2)

4.2 Hydrochloric acid. (2)

4.3 Calcium carbonate. (2)

4.4 Sodium hydroxide. (2)

QUESTION 5:

5.1 Balance each of the following equations:

5.1.1 $P_2O_5 + H_2O \rightarrow H_3PO_4$ (2)
5.1.2 $Mg + HCl \rightarrow H_2 + MgCl_2$ (2)
5.1.3 $CaCO_3 + HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (2)
5.1.4 $N_2 + H_2 \rightarrow NH_3$ (2)

5.2 ***Select A, B, C or D only***:

5.2.1 Consider the following reaction's equation and choose the correct answer:

$$C + O_2 \rightarrow CO_2$$

The symbols represent a reaction between

A Potassium and carbon.
B Carbon and oxygen.
C An acid and a salt.
D Calcium and oxygen. (2)

5.2.2 The number of nitrogen atoms in $3(NH_4)_2CO_3$ is:

A 2
B 3
C 5
D 6 (2)

5.2.3 The correct equation for the decomposition of mercury (II) oxide when heated is:

A $HgO \rightarrow Hg + O$
B $2HgO \rightarrow 2Hg + O_2$
C $HgO_2 \rightarrow Hg + O_2$
D $2Hg_2O \rightarrow 4Hg + O_2$ (2)

QUESTION 6:

6.1 Study the following formula:

$$CuSO_4$$

6.1.1 What is the name of this compound? (1)
6.1.2 Name all the elements and the number of atoms of each element that make up this compound. (3)

6.2 Give the formula for each of the following compounds:
6.2.1 Potassium permanganate. (3)
6.2.2 Sodium oxide. (3)
6.2.3 Sulfuric acid. (3)

QUESTION 7:

7.1 Balance the following equations:

7.1.1 $Na + H_2O \rightarrow NaOH + H_2$ (4)

7.1.2 $CaCO_3 + HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (4)

7.1.3 $Na + H_2O \rightarrow NaOH + H_2$ (4)

7.1.4 $Mg + HCl \rightarrow H_2MgCl_2$ (4)

7.1.5 $Mg + O_2 \rightarrow MgO$ (4)

7.1.6 $Ca + O_2 \rightarrow CaO$ (4)

7.1.7 $H_2 + I_2 \rightarrow HI$ (4)

7.2 Write down the following chemical equations and balance them:

7.2.1 $Fe + O_2 \rightarrow Fe_3O_4$ (3)

7.2.2 $H_2SO_4 + NaOH \rightarrow Na_2SO_4 + H_2O$ (4)

7.2.3 $Al_2O_3 + H_2SO_4 \rightarrow Al_2(SO_4)3 + H_2O$ (4)

7.2.4 $NaNO_3 \rightarrow NaNO_2 + O_2$ (3)

7.2.5 $KClO_3 \rightarrow KCl + O_2$ (3)

7.2.6 $Cu(NO_3)2 \rightarrow CuO + NO_2 + O_2$ (4)

7.2.7 $Al_2O_3 + H_2SO_4 \rightarrow Al_2(SO_4)\ 3 + H_2O$ (4)

QUESTION 8:

8.1 Briefly describe how you will test the presence of the following:

8.1.1 Pure oxygen. (1)

8.1.2 Carbon dioxide. (1)

8.2 Select A, B, C or D only:

8.2.1 When hydrochloric acid reacts with sodium carbonate, the products are:

A Sodium chloride and water.
B Sodium chloride, water and carbon dioxide.
C Sodium chloride and carbon dioxide.
D Sodium chloride, carbon dioxide and hydrogen. (2)

8.2.2 Which of the following substances react with each other to release carbon dioxide (CO_2) as a gas?

A Zinc and hydrochloric acid.
B Iron and sulphuric acid.
C Sodium carbonate and hydrochloric acid.
D Copper oxide and copper carbonate. (2)

8.3 Give the formula for the following compounds:

8.3.1 Hydrochloric acid.

8.3.2 Sodium hydroxide.

8.3.3 Nitric acid. (3)

8.4 Study the following formula:

Fe_2O_3

8.4.1 What is the name of this compound? (1)

8.4.2 Name all the elements that make up this compound. (3)

8.5 Balance the following equations:

8.5.1 $Cu + Cl_2 \rightarrow CuCl$ (2)

8.5.2 $Mg + HCl \rightarrow MgCl_2 + H_2$ (2)

8.5.3 $Na + H_2O \rightarrow NaOH + H_2$ (2)

QUESTION 9:

Balance each of the following equations:

9.1 $FeS + HCl \rightarrow FeCl_2 + H_2S$ (2)

9.2 $N_2 + H_2 \rightarrow NH_3$ (2)

9.3 $KClO_3 \rightarrow KCl + O_2$ (2)

9.4 $HgO \rightarrow Hg + O_2$ (2)

9.5 $Mg + HCl \rightarrow MgCl_2 + H_2$ (2)

9.6 $Li + O_2 \rightarrow Li_2O$ (2)

9.7 $H_2 + O_2 \rightarrow H_2O$ (2)

9.8 $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$ (2)

9.9 $Zn + HCl \rightarrow ZnCl_2 + H_2$ (2)

9.10 $C_3H_8 + O_2 \rightarrow O_2 + H_2O$ (2)

9.11 $Cu + Cl_2 \rightarrow CuCl$ (2)

9.12 $Na + H_2O \rightarrow NaOH + H_2$ (2)

9.13 $P_2O_5 + H_2O \rightarrow H_3PO_4$ (2)

9.14 $CaCO_3 + HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (2)

QUESTION 10

10.1 Give the formula for the following compounds:

10.1.1 Potassium permanganate. (1)

10.1.2 Sodium hydroxide. (1)

10.1.3 Ammonium chloride. (1)

10.2 Study the following formula:

HNO_3

10.2.1 What is the name of this compound? (1)

10.2.2 Name all the elements that make up this compound. (3)

10.2.3 How many atoms does this compound consist of? (1)

10.3 Balance the following equations:

10.3.1 $Cu + Cl_2 \rightarrow CuCl$ (2)

10.3.2 $Mg + HCl \rightarrow MgCl_2 + H_2$. (2)

10.3.3 $Na + H_2O \rightarrow NaOH + H_2$. (2)

QUESTION 11:

11.1 Which one of the following is not a formula?

A NH_3
B SO_4
C H_2O
D Cu (2)

11.2 The symbol for copper is…

A C
B K
C Ca
D Cu (2)

11.3 Which one of the following does not have a diatomic molecule?

A Nitrogen
B Oxygen
C Water
D Chlorine (2)

11.4 How many atoms do two water molecules ($2H_2O$) consist of?

A 3
B 4
C 5
D 6 (2)

QUESTION 12:

12.1 Give the symbol of the following elements:

12.1.1 Calcium (1)
12.1.2 Sodium (1)
12.1.3 Phosphorus (1)
12.1.4 Mercury (1)

12.2 Give the formulas of the following compounds:

12.2.1 Carbon dioxide. (2)
12.2.2 Potassium permanganate. (2)
12.2.3 Hydrochloric acid (2)
12.2.4 Calcium carbonate. (2)

12.3 Name the elements that are present in the following compounds:
12.3.1 Potassium nitrate. (3)
12.3.2 Copper sulphate. (3)

QUESTION 13:

13.1 What is a formula? (2)

13.2 Balance the following equations:

13.2.1 $FeS + HCl \rightarrow FeCl_2 + H_2S.$ (2)

13.2.2 $KClO_3 \rightarrow KCl + O_2.$ (2)

13.2.3 $C_3H_8 + O_2 \rightarrow CO_2 + H_2O.$ (2)

13.2.4 $Na + H_2O \rightarrow NaOH + H_2.$ (2)

3 COMPOUNDS AND CHEMICAL REACTIONS – TEST 1:

QUESTION 1:

CHOOSE ONLY A, B, C OR D:

1.1 What are the reactants in the following reaction?

$$N_2 + 3H_2 \rightarrow 2NH_3$$

A Nitrogen and Ammonium.
B Nitrogen and Hydrogen.
C Hydrogen and Ammonium.
D Only Ammonium. (2)

1.2 The reaction that correctly represents the formation of hydrogen bromide:


Reaction A


Reaction B


Reaction C

A Reaction A.
B Reaction B.
C Reaction C.
D None of the above. (2)

1.3 Consider the following response:

$$2Al + 3I_2 \rightarrow 2AlI_3$$

How many Iodide atoms are there in the product?

A 2
B 3
C 6
D None of the above. (2)

1.4 The name of the product is:

Copper + Oxygen → ?

A Copper Oxygen
B Copper Oxide
C Copper (II)Oxide
D Oxide (2)

1.5 Two reactants form a certain product. The reactants have the following properties:

- Reactant A is diatomic.
- Reactant B is monatomic.

What is a possible formula of the product?

A A_2B
B AB
C A_2B_2
D None of the above. (2)

QUESTION 2:

Consider the following reaction:

Potassium chlorate → Potassium chloride + Oxygen.

$(2KClO_3 \rightarrow 2KCl + 3O_2)$

2.1 Use diagrams to represent the reaction. (3)
2.2 What are the products? (2)
2.3 Name all the elements in the reaction. (3)
2.4 What is the total number of atoms present? (1)

QUESTION 3:

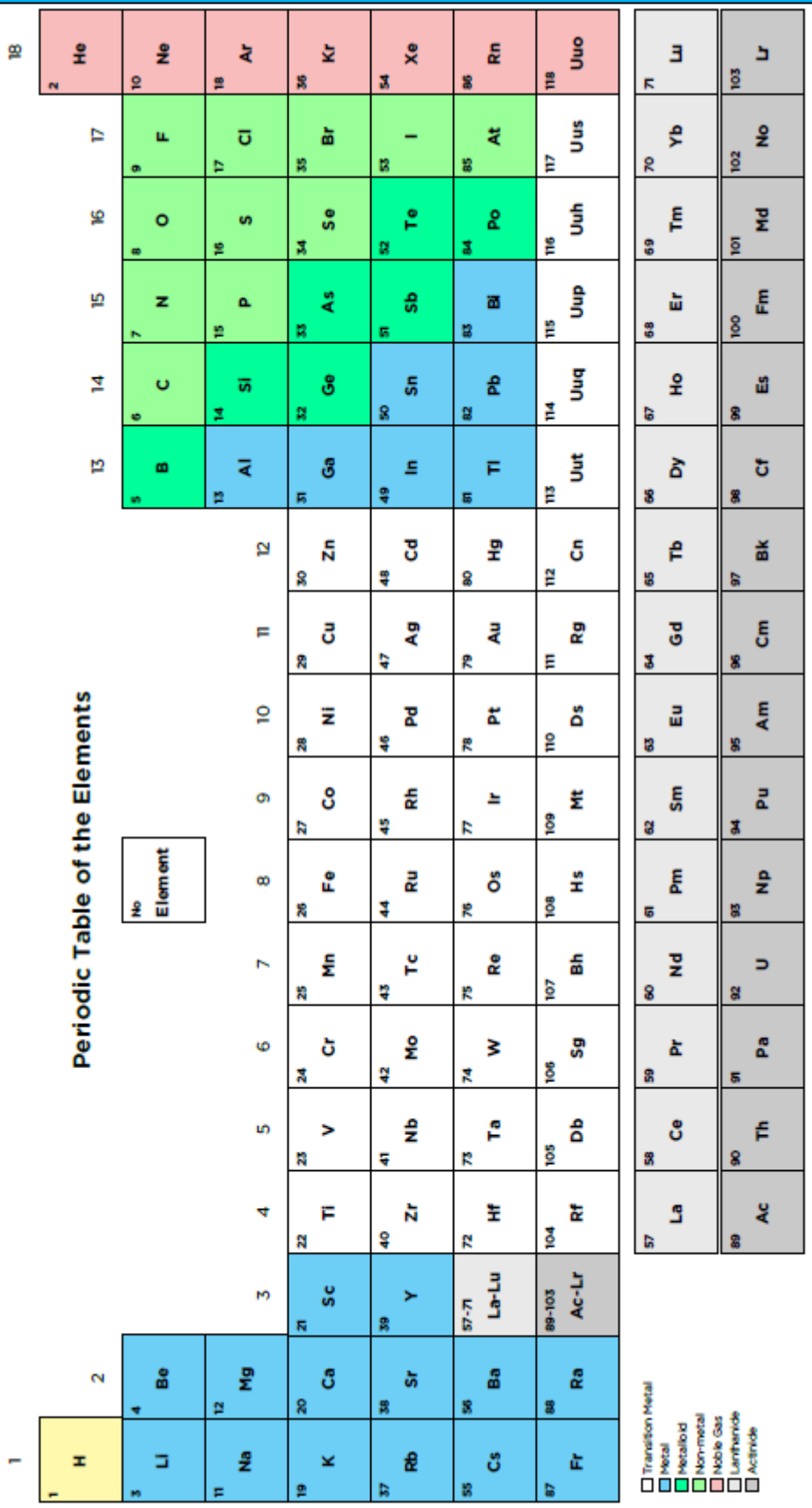
3.1 Give descriptions for the following reaction:

$H_2 + S \rightarrow H_2S$

3.1.1 3.1.2 (4)

3.2 Does hydrogen occur as atoms or molecules? Explain your answer. (2)
3.3 Is the product an element or a compound? (1)
3.4 Draw a diagram to represent the product. (4)

Periodic Table of The Elements



QUESTION 1:

CHOOSE BETWEEN A, B, C OR D:

1.1 The horizontal rows on the Periodic Tables are:

A Called Groups.
B Called Periods.
C Called Elements.
D None of the above. (2)

1.2 Element X is diatomic and reacts with element Y which is monatomic. If the product is a metal oxide that reacts with hydrochloric acid, what is the possible salt that forms?

A XCl_2
B XCl
C YCl
D XY (2)

1.3 Butane burns in an excess of oxygen and forms carbon dioxide and water.

$C4H_{10} + O_2 \rightarrow CO_2 + H_2O$

The reaction is balanced and thus the following will happen:

A 8 Carbon Dioxide molecules form.
B Water molecules form.
C A and B.
D None of the Above. (2)

1.4 The common name for Magnesium Sulphate is:

A Baking soda.
B Hydrochloric acid.
C Marble.
D English salt. (2)

1.5 Consider the following picture that represents the reaction. The particles to the right of the arrow are called the products. What are the particles to the left of the arrow called?

A Substances.
B Product.
C Reactants.
D None of the above. (2)

QUESTION 2:

2 Complete the following:

2.1 Define the term diatomic element and give an example of a diatomic element. (2)
2.2 Write down the formula for rust. (1)
2.3 Write and balance the reaction for the formation of rust. (3)
2.4 Use diagrams to represent the following reaction: (3)

$$SO_2 + O_2 \rightarrow SO_3$$

QUESTION 3:

3 Consider the forming of HBr (hydrogen bromide)

$$H_2 + Br_2 \rightarrow 2HBr$$

3.1 How many reactants are there? (1)
3.2 How many hydrogen bromide atoms are formed? (1)
3.3 Name each reactant. (2)
3.4 How many bromine atoms are present in front of the arrow. (1)

5 ELEMENTS, IONS AND CHEMICAL SUBSTANCES – WORKSHEET:

QUESTION 1:

1 Give the correct symbol for the following elements:

1.1 Helium
1.2 Aluminium
1.3 Gold
1.4 Bromine
1.5 Potassium
1.6 Magnesium
1.7 Beryllium
1.8 Iron
1.9 Lithium
1.10 Tin (10)

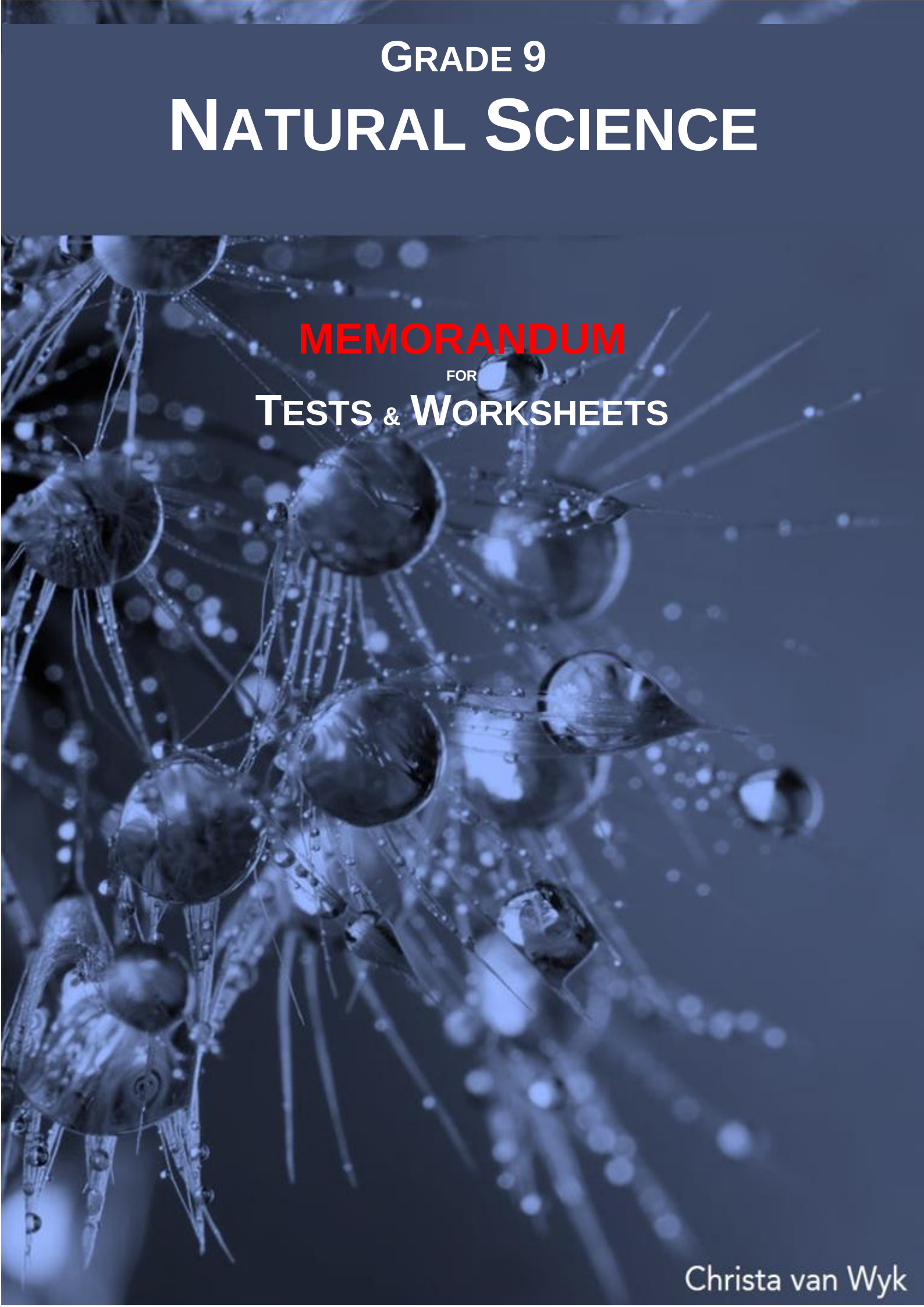
QUESTION 2:

1.11 Give the correct name for the symbol of the following elements:
1.12 *N*
1.13 *S*
1.14 *P*
1.15 *Cu*
1.16 *Ag*
1.17 *Hg*
1.18 *U*
1.19 *O*
1.20 *Na*
1.21 *Cl*
1.22 *Ca*
1.23 *Zn*
1.24 *Sn*
1.25 *Pb* (15)

QUESTION 3:

2 Define the following terms:
2.1 Ion (1)
2.2 Cation (1)

GRADE 9
NATURAL SCIENCE



MEMORANDUM
FOR
TESTS & WORKSHEETS

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1 CHEMICAL REACTIONS AND CHEMICAL EQUATIONS – WORKSHEET 1 MEMORANDUM:

QUESTION 1:

Name the elements and the number of atoms in the following equations:

1.1. 2 Elements - Nitrogen and Hydrogen. (✓✓)
3 N (nitrogen) atoms, 12 H (hydrogen) atoms. (✓✓) (4)

1.2. 4 $CuSO_4$ 3 Elements – Carbon (Cu), Sulphur (S) and Oxygen (O), (✓✓✓)
3 Copper atoms (Cu), 4 Sulphur atoms (S), 16 Oxygen atoms (O). (✓✓✓) (6)

QUESTION 2:

Give the chemical formula for the following compounds:

2.1 $HC\ell$ (✓✓) (2)

2.2 $K(CO_3)_2$ (✓✓) (2)

2.3 $Ca(OH)_2$ (✓✓) (2)

2.4 $NaC\ell$ (✓✓) (2)

QUESTION 3:

3.1 Yellow. (✓) (1)
3.2 Non-metal. (✓) (1)
3.3 Is in group 6 on the right side of the periodic table, does not have a gloss. (✓✓) (2)
3.4 Liquid. (✓) (1)
3.5 Sulphur oxide. (✓) (1)

(Explanation: When sulphur burns in pure oxygen, it forms sulphur dioxide, SO_2. Sulphur dioxide produces sulfuric acid, H_2SO_3 when it dissolves in water. The balanced chemical equation for this reaction is: SO_2 (g) + H_2O (l) → H_2SO_3 (liquid). unstable H_2SO_3 will react further and change to H_2SO_4).

3.6 An indicator is a chemical substance that changes colour when it comes into contact with an acid or an alkali. (✓✓) (2)

3.7 Any one of the following:

• Universal indicator	Red/orange/yellow in acid	**or**: Blue/purple/violet in alkali	
• Red or blue litmus paper	Red in acid	**or**: Blue in alkali.	
• Bromothymol blue	Yellow in acid	**or**: Blue in alkali.	
• Phenolphthalein	Colourless in acid	**or**: Pink in base. (✓✓)	(2)

QUESTION 4:

4.1 $N_2 + O_2 \rightarrow 2NO$ (✓✓) (2)

4.2 $Mg + 2HCl \rightarrow H_2 + MgCl_2$ (✓✓) (2)

4.3 $CaCO_3 + 2\ HNO_3 \rightarrow Ca(NO_3)_2 + H_2O + CO_2$ (✓✓) (2)

4.4 $P_2O_5 + 3H_2O \rightarrow 2H_3PO_4$ (✓✓) (2)

2 CHEMICAL NAMES, FORMULAS AND EQUATIONS – WORKSHEET MEMORANDUM:

QUESTION 1:

1.1 Carbon (✓)
1.2 Oxygen (✓)
1.3 Nitrogen (✓)
1.4 Sodium (✓)
1.5 Sulphur (✓)
1.6 Chlorine (✓)
1.7 Phosphorus (✓)
1.8 Calcium (✓)
1.9 Copper (✓)
1.10 Zinc (✓)
1.11 Silver (✓)
1.12 Lead (✓)
1.13 Mercury (✓)
1.14 Tin (✓)
1.15 Uranium (✓) (15)

QUESTION 2:

2.1 He (✓)
2.2 Mg (✓)
2.3 Al (✓)
2.4 Be (✓)
2.5 Au (✓)
2.6 Fe (✓)
2.7 Br (✓)
2.8 Li (✓)
2.9 K (✓)
2.10 Sn (✓)
2.11 C (✓)
2.12 P (✓) (12)

QUESTION 3:

1.1 3 Copper, 3 Sulphur, 12 Oxygen. (✓✓✓) (3)
1.2 2 Hydrogen, 2 Nitrogen, 6 Oxygen. (✓✓✓) (3)

QUESTION 4:

4.1 NH_3 (✓✓) (2)
4.2 HCl (✓✓) (2)
4.3 $CaCO_3$ (✓✓) (2)
4.4 $NaOH$ (✓✓) (2)

QUESTION 5:

5.1.1 $P_2O_5 + 3H_2O \rightarrow 2H_3PO_4$ (✓✓) (2)
5.1.2 $Mg + 2HCl \rightarrow H_2 + MgCl_2$ (✓✓) (2)
5.1.3 $CaCO_3 + 2HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (✓✓) (2)
5.1.4 $N_2 + 3H_2 \rightarrow 2NH_3$ (✓✓) (2)

5.2.1 B (✓✓) (2)
5.2.2 D (✓✓) (2)

5.2.3 B (✓✓) (2)

QUESTION 6:

6.1.1 Copper sulphate. (✓) (1)
6.1.2 Copper + Sulphur + Oxygen. (✓✓✓) (3)

6.2.1 Potassium permanganate. MnO_4 (✓✓✓) (3)
6.2.2 Sodium oxide. Na_2O (✓✓✓) (3)
6.2.3 Sulfuric acid. H_2SO_4 (✓✓✓) (3)

QUESTION 7:

7.1.1 $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (✓✓✓✓) (4)

7.1.2 $CaCO_3 + 2HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (✓✓✓✓) (4)

7.1.3 $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (✓✓✓✓) (4)

7.1.4 $Mg + 2HCl \rightarrow H_2MgCl_2$ (✓✓✓✓) (4)

7.1.5 $2Mg + O_2 \rightarrow 2MgO$ (✓✓✓✓) (4)

7.1.6 $2Ca + O_2 \rightarrow 2CaO$ (✓✓✓✓) (4)

7.1.7 $H_2 + I_2 \rightarrow 2HI$ (✓✓✓✓) (4)

7.2.1 $3Fe + 2O_2 \rightarrow Fe_3O_4$ (✓✓✓) (3)

7.2.2 $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$ (✓✓✓✓) (4)

7.2.3 $Al_2O_3 + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 2H_2O$ (✓✓✓✓) (4)

7.2.4 $2NaNO_3 \rightarrow 2NaNO_2 + O_2$ (✓✓✓) (3)

7.2.5 $2KClO_3 \rightarrow 2KCl + 3O_2$ (✓✓✓)
(3)

7.2.6 $2Cu(NO_3)_2 \rightarrow 2CuO + 4NO_2 + O_2$ (✓✓✓✓) (4)

7.2.7 $Al_2O_3 + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2O$ (✓✓✓✓)
(4)

QUESTION 8:

8.1.1 A glowing splinter (match) ignites. (✓) (1)
8.1.2 Clear lime water becomes milky. (✓) (1)

8.2.1 B (✓✓) (2)
8.2.2 D (✓✓) (2)

8.3.1 HCl (✓) (1)

8.3.2 $NaOH$ (✓) (1)

8.3.3 HNO_3 (✓) (1)

8.4.1 Ferric Oxide. (✓) (1)

8.4.2 Iron and Oxygen. (✓✓) (2)

8.5.1 $2Cu + Cl_2 \rightarrow 2CuCl$ (✓✓) (2)

8.5.2 $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (✓✓) (2)

8.5.3 $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (✓✓) (2)

QUESTION 9:

9.1 $FeS + 2HCl \rightarrow FeCl_2 + H_2S$ (✓✓) (2)

9.2 $N_2 + 3H_2 \rightarrow 2NH_3$ (✓✓) (2)

9.3 $2KClO_3 \rightarrow 2KCl + 3O_2$ (✓✓) (2)

9.4 $2HgO \rightarrow 2Hg + O_2$ (✓✓) (2)

9.5 $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (✓✓) (2)

9.6 $4Li + O_2 \rightarrow 2Li2O$ (✓✓) (2)

9.7 $2H_2 + O_2 \rightarrow 2H_2O$ (✓✓) (2)

9.8 $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$ (✓✓) (2)

9.9 $Zn + 2HCl \rightarrow ZnCl_2 + H_2$ (✓✓) (2)

9.10 $C_3H_8 + 5O_2 \rightarrow 3O_2 + 4H_2O$ (✓✓) (2)

9.11 $2Cu + Cl_2 \rightarrow 2CuCl$ (✓✓) (2)

9.12 $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (✓✓) (2)

9.13 $P_2O_5 + 3H_2O \rightarrow 2H_3PO_4$ (✓✓) (2)

9.14 $CaCO_3 + 2HCl \rightarrow CO_2 + CaCl_2 + H_2O$ (✓✓) (2)

QUESTION 10:

10.1.1 $KMnO_4$ (✓) (1)

10.1.2 $NaOH$ (✓) (1)

10.1.2 NH_4Cl (✓) (1)

10.2.1 Nitric Acid. (✓) (1)

10.2.2 Hydrogen+ Nitrogen + Oxygen. (✓✓✓) (3)

10.2.3 $1H + 1N + 3O$ = five atoms. (✓) (1)

10.3.1 $2Cu + Cl_2 \rightarrow 2CuCl$ (✓✓) (2)

10.3.2 $Mg + 2HCl \rightarrow MgCl_2 + H_2$ (✓✓) (2)

10.3.3 $2Na + 2H2O \rightarrow 2NaOH + H_2$ (✓✓) (2)

QUESTION 11:

11.1 D (✓✓) (2)
11.2 D (✓✓) (2)
11.3 C (✓✓) (2)
11.4 D (✓✓) (2)

QUESTION 12:

12.1.1 Ca (✓) (1)
12.1.2 Na (✓) (1)
12.1.3 P (✓) (1)
12.1.4 Hg (✓) (1)

12.2.1 CO_2 (✓✓) (2)
12.2.2 $KMnO_4$ (✓✓) (2)
12.2.3 HCl (✓✓) (2)
12.2.4 $CaCO_3$ (✓✓) (2)

12.3.1 Potassium, Nitrogen, Oxygen. (✓✓✓) (3)
12.3.2 Copper, sulphur, oxygen. (✓✓✓) (3)

QUESTION 13:

13.1 A formula consists of the symbols of the elements that appear in the compound. (✓✓) (2)

13.2.1 $FeS + 2HCl \rightarrow FeCl_2 + H_2S$ (✓✓) (2)

13.2.2 $2KClO_3 \rightarrow 2KCl + 3O_2$ (✓✓) (2)

13.2.3 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ (✓✓) (2)

13.2.4 $2Na + 2H_2O \rightarrow 2NaOH + H_2$ (✓✓) (2)

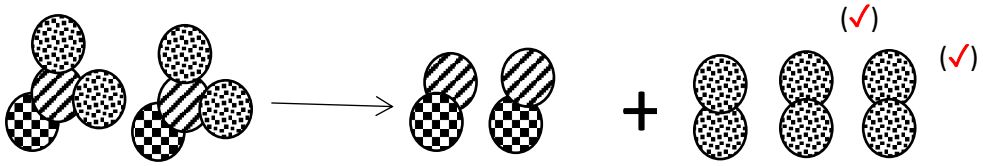
3 COMPOUNDS AND CHEMICAL REACTIONS – TEST 1 MEMORANDUM:

QUESTION 1:

1.1 B (✓✓)
1.2 B (✓✓)
1.3 C (✓✓)
1.4 C (✓✓)
1.5 A (✓✓) (10)

QUESTION 2:

2.1 (✓)



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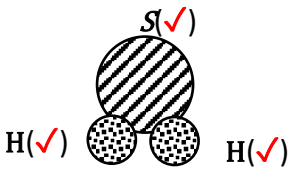
2.2. KCl and O_2. (✓✓) (2)
2.3. Potassium, Chlorine, Oxygen. (✓✓✓) (3)
2.4. 2 atoms. (✓) (1)

QUESTION 3:

3.1.1. Hydrogen as a reactant. (✓✓) (2)
3.1.2. Hydrogen sulphide as a product. (✓✓) (2)
3.2. To the left of the arrow, hydrogen is represented as diatomic and to the right of the arrow, hydrogen is in a compound, so hydrogen is part of the molecule. (✓✓) (2)
3.3. Compound. (✓) (1)
3.4.



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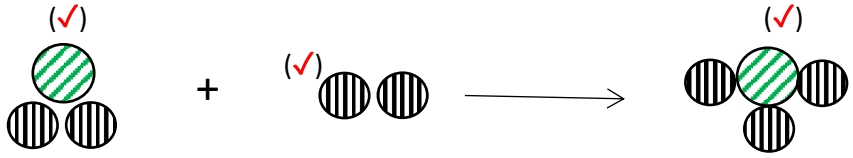
4 COMPOUNDS AND CHEMICAL REACTIONS – TEST 2 MEMORANDUM:

QUESTION 1:

1.1 B (✓✓)
1.2 A (✓✓)
1.3 A (✓✓)
1.4 D (✓✓)
1.5 C (✓✓) (10)

QUESTION 2:

2.1. A diatomic element is a compound that consists of two identical atoms (✓) O_2 . (✓) (2)
2.2. Rust: Fe_2O_3(✓) (1)
2.3. $4Fe$(✓) + $3O_2$(✓) → $2\ Fe_2O_3$(✓) (3)
2.4.



QUESTION 3:

3.1. 2. (✓) (1)
3.2. 2. (✓) (1)
3.3. Hydrogen (✓) and Bromine. (✓) (2)
3.4. 2. (✓) (1)

5 ELEMENTS, IONS, AND CHEMICALS – WORKSHEET MEMORANDUM:

QUESTION 1:

1.1 *He* (✓)
1.2 *Al* (✓)
1.3 *Au* (✓)
1.4 *Br* (✓)
1.5 *K* (✓)
1.6 *Mg* (✓)
1.7 *Be* (✓)
1.8 *Fe* (✓)
1.9 *Li* (✓)
1.10 *Sn* (✓) (10)

QUESTION 2:

2.1. Carbon. (✓)
2.2. Nitrogen. (✓)
2.3. Sulphur. (✓)
2.4. Phosphorus. (✓)
2.5. Copper. (✓)
2.6. Silver. (✓)
2.7. Mercury. (✓)
2.8. Uranium. (✓)
2.9. Oxygen. (✓)
2.10. Sodium. (✓)
2.11. Chlorine. (✓)
2.12. Calcium. (✓)
2.13. Zinc. (✓)
2.14. Tin. (✓)
2.15. Lead. (✓) (15)

QUESTION 3:

3.1 Ion: It is an atom of an element that has too many or too few electrons. (✓) (1)
3.2 Cation: It's an ion that has too few electrons. (✓) (1)

QUESTION 4:

4.1 NH_3 (✓) (1)
4.2 *HCl* (✓) (1)
4.3 $CaCO_3$ (✓) (1)
4.4 *NaOH* (✓) (1)

QUESTION 5:

5.1 D (✓✓) (2)
5.2 B (✓✓) (2)

QUESTION 6:

6.1.1 Ca (✓) (1)
6.1.2 Na (✓) (1)
6.1.3 P (✓) (1)
6.1.4 Hg (✓) (1)

6.2.1 CO_2 (✓) (1)
6.2.2 $KMNO_3$ (✓) (1)
6.2.3 $HC\ell$ (✓) (1)
6.2.4 $CaCO_3$ (✓) (1)

QUESTION 7:

7.1 Sodium sulphide. (✓) (1)
7.2 Magnesium chloride. (✓) (1)
7.3 Molecules of calcium carbonate. (✓) (1)
7.4 Silver nitrate. (✓) (1)
7.5 Sulfuric acid. (✓) (1)

QUESTION 8:

8.1 MgF_2 (✓) (1)
8.2 $A\ell Cl_3$ (✓) (1)
8.3 $A\ell_2S_3$ (✓) (1)
8.4 $(NH_4)_2CO_3$ (✓) (1)

QUESTION 9:

$$4CaCO_3$$

9.1.1 4(1+1+3) = 20 atoms. (✓✓) (2)
9.1.2 4 Ca+ ions. (✓✓) (2)
9.1.3 4 CO32 ions. (✓✓) (2)
9.1.4 Carbonate ion. (✓) (1)

$$3(NH_4)_2SO_4$$

9.2.1 3(2(1+4) +1+4) = 3(15) = 45 atoms. (✓✓) (2)
9.2.2 6 NH_4^+ ions. (✓✓) (2)
9.2.3 3 SO_4^{2-} ions. (✓✓) (2)
9.2.4 Ammonium ion. (✓) (1)

6 PERIODIC TABLE AND CHEMICAL FORMULAS – TEST MEMORANDUM:

QUESTION 1:

1.1 An element consists of one type of atom. (✓)
1.2 A bond is formed when atoms chemically join. (✓)
1.3 Substances on the right side of the periodic table. (✓)
1.4 The elements on the left side of the table, mainly in group 1 and 2. (✓)
1.5 The names of chemicals that contain the names of the elements that make up the chemical bond. (✓)
1.6 Something that occurs regularly. (✓) (6)

QUESTION 2:

2.1 Calcium carbonate. (✓✓)
2.2 Sodium chloride. (✓✓)
2.3 Hydrogen nitrate. (✓✓) (6)

QUESTION 3:

3.1 Nitric acid. (✓)
3.2 Sulfuric acid. (✓)
3.3 Potash. (✓)
3.4 Baking Soda. (✓) (4)

QUESTION 4:

4.1 Alkali metals. (✓)
4.2 Alkali earth metals. (✓)
4.3 Halogens. (✓)
4.4 Noble gases. (✓) (4)

QUESTION 5:

5.1 Atomic number. (✓)
5.2 Mass number. (✓)
5.3 Element. (✓)
5.4 11. (✓)
5.5 11. (✓)
5.6 12. (✓) (6)

7 METALS AND NON-METALS – WORKSHEET MEMORANDUM:

QUESTION 1:

1.1 B (✓✓) (2)
1.2 C (✓✓) (2)
1.3 C (✓✓) (2)
1.4 C (✓✓) (2)
1.5 B (✓✓) (2)
1.6 D (✓✓) (2)

QUESTION 2:

2.1 D (✓✓) (2)
2.2 C (✓✓) (2)
2.3 A (✓✓) (2)
2.4 B (✓✓) (2)
2.5 E (✓✓) (2)

QUESTION 3:

3.1 Blue (✓) (1)
3.2 Yellow (✓) (1)
3.3 Green (✓) (1)

QUESTION 4:

4.1 A measure of how acidic or alkaline a substance is. (✓) (1)
4.2 A pH of less than 7 is an acid (✓), while a pH of more than 7 is alkaline (✓) and a pH of 7 is neutral. (✓) (3)
4.3 Universal indicator. (✓) (1)
4.4 A chemical substance that changes colour when it comes into contact with acid or alkali.
4.5

(✓)			(✓)				(✓)			(✓)				(✓)	
Strong Acid			Weak Acid				Neutral			Weak Base		Strong Base			
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Red			Orange		Yellow		Green		Blue		Purple			Violet	(5)

QUESTION 5:

5.1 Metal oxide. (✓) (1)
5.2 Corrosion. (✓) (1)
5.3 This weakens the material. (✓) (1)
5.4 Whether there are salts in water (✓). The pH of the solution (✓), the purity of the metal (✓) and number of ions (✓) in contact with the metal. (4)
5.5 Painting (✓), electroplating (✓) and galvanizing. (✓) (3)

QUESTION 6:

6.1 Electroplating. (✓) (1)
6.2 Electrolysis. (✓) (1)
6.3 Neutralization reaction. (✓) (1)

QUESTION 7:

7.1 Dull(✓) and brittle. (✓) (2)
7.2 Non-metal oxide. (✓) (1)

QUESTION 8:

8.1 A splinter of wood that merely glows(✓) will catch fire(✓) in the presence of oxygen (2)
8.2 Lime water (✓) will become milky if carbon dioxide(✓) is bubbled through it. (2)

QUESTION 9:

9.1 The oxidation (✓) of a compound by heat. (✓) (2)
9.2 XO. (✓) (1)
9.3 Non-metals. (✓) (1)
9.4 Insoluble. (✓) The solution remains neutral so only the water's pH was measured. (✓) (2)
9.5 Soluble. (✓) The solution becomes acidic and the pH of the water and the non-metal is measured. (✓) (2)

8 METALS AND NON-METALS – TEST MEMORANDUM:

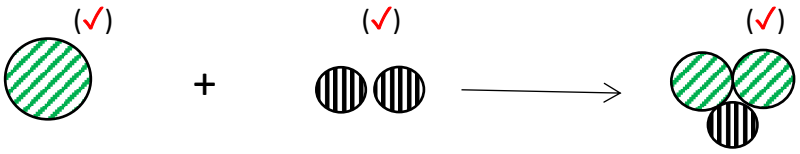
QUESTION 1:

1.1 B (✓✓)✓) (2)
1.2 B (✓✓) (2)
1.3 B (✓✓) (2)
1.4 B (✓✓) (2)
1.5 B (✓✓) (2)

QUESTION 2:

2.1.2 K_2O (✓) (1)
2.1.2 Metaaloksied (✓) (1)

2.2



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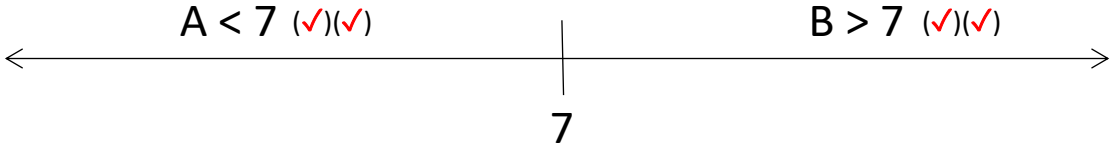
2. 2.3 KOH (✓) + HCl (✓) ⟶ KCl (✓) + H_2O (✓)

(4)

QUESTION 3:

1.1 Chemical substance that changes colour (✓) when it comes into contact with an acid or an alkali. (✓) (2)
1.2.1 Red (✓)
1.2.2 Blue (✓)
1.2.3 Red (✓) (3)

1.3



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