



education
Department: Education
GAUTENG PROVINCE

GRADE 9

NATURAL SCIENCES
MID-YEAR TEST

TIME : 2 hours

MARKS : 100

DISTRICT: TSHWANE WEST D15

DATE: ___ JUNE 2024

NAME OF LEARNER: _____

EXAMINER: Winterveldt Educators

MODERATOR :Malebye P

CLUSTER : Winterveldt

CLASS: 9 _____

INSTRUCTIONS:

- This question paper serves as an answer sheet and consists of 13 PAGES
- This question paper consists of TWO SECTIONS, A and B
- Read instructions carefully and answer all questions accordingly
- Allocation of marks SECTION A: 26 AND SECTION B:74
- YOU ARE ADVISED TO USE THE DATA SHEET ATTACHED ON PAGE 13
- Write neatly and legibly only in blue ink and use a pencil to draw
- CONTENT COVERED : TERM 2 (MATTER AND MATERIAL)

QUESTIONS	1	2	3	4	5	6	7	8	9	10	TOTAL
ALLOCATED MARKS	16	10	12	9	14	9	9	8	7	6	100
LEARNER'S MARK											

SECTION A**QUESTION 1: MULTIPLE CHOICE**

CHOOSE the correct term for the following by circling the correct answer. There is Only one (1) possible answer. [9x1]

1.1.1 Name given to group 18 elements of the Periodic Table.

- A. Green house gases
- B. Nobles gases
- C. Air
- D. Atmospheric gases

1.1.2 The vertical columns of the Periodic Table are called.

- A. Periods
- B. Group
- C. Elements
- D. Atomic

1.1.3 The total number of atoms contained in 5NaHCO_3 .

- A. 25
- B. 35
- C. 30
- D. 15

1.1.4 The forces that hold atoms together.

- A. Reactants
- B. Chemical reactions
- C. Chemical formula
- D. Chemical bonds

1.1.5 The chemical symbol for Gold

- A. Ga
- B. Au
- C. Ag
- D. Ar

1.1.6 Hydrogen nitrate (HNO_3) consists of the following elements:

- A. Helium, Nitrate and Oxygen
- B. Hydrogen, Nitrate
- C. Hydrogen, Nitrogen and Oxygen
- D. Hydrogen, Oxygen and Ozone



1.1.7 Which one of the following is an example of a compound

- A. H_2
- B. F
- C. 2Fe
- D. H_2SO_4

1.1.8 What do the following elements have in common
Oxygen and sulphur

- A. They have the same number of protons.
- B. They have the same number of protons in the nucleus.
- C. They have the same number of electron shells.
- D. They are found in the same group on the periodic table.

1.1.9 The prefix 'di' in diatomic molecule means.....

- A. One
- B. Two
- C. Three
- D. Four

1.2 Scientific terminology

Give a scientific term for the following descriptions Which one of the following is an example of a compound? [1 x 7= 7]

1.2.1 A testable, clear statement about what you think will happen in a science experiment based on your prior knowledge

1.2.2 The only non-metal in group 1 of the periodic table

1.2.3 The smallest unit that makes up an element

1.2.4 The smallest of the three subatomic particles that are negatively charged and are located outside the nucleus

1.2.5 Scientific name for tables salt

1.2.6 An arrangement of elements according to their properties in an organised pattern

1.2.7 A compound that is formed when non-metal burns in Oxygen

QUESTION 2: Matching columns

MATCH each term in **COLUMN A** with its corresponding description in **COLUMN B**. **FILL** in the possible answer in **COLUMN C** by writing the **LETTER** only.

COLUMN A	COLUMN B	COLUMN C
2.1 Neutralisation	(A) Base that can dissolve in water.	2.1.1.
2.2 Galvanising	(B) Rapid chemical reaction with oxygen that produces heat and light.	2.2.
2.3 Combustion	(C) Taste sour and have pH value < 7 .	2.3.
2.4 Alkali	(D) Compounds that are formed when a metal reacts with oxygen.	2.4.
2.5 Corrosive	(E) Copper sulphate	2.5.
2.6 Water	(F) To cover a steel or iron with a more reactive metal such as zinc	2.6.
2.7 Metal oxides	(G) A chemical reaction in which an acid and a base react to produce salt and water.	2.7.
2.8 Vinegar	(H) The rain water is more acidic than natural rainwater because of gases that are released into the atmosphere.	2.8.
2.9 Acid rain	(I) Neutral substance.	2.9.
2.10 CuSO_4	(J) The substance that dissolves or eats away at metals and other strong materials.	2.10.

[1 x 10 =10]

TOTAL SECTION A = [26]

SECTION B

QUESTION 3: PERIODIC TABLE OF ELEMENTS

1. STUDY THE FOLLOWING DIAGRAM AND ANSWER THE QUESTIONS THAT FOLLOWS:

For the following element



Write down the :

3.1 Symbol of the element. (1)

3.2 Name of the element. (1)

3.3 Atomic number. (1)

3.4 Atomic mass or mass number. (1)

3.5 Number of protons in the nucleus of the atom. (1)

3.6 Number of electrons in a neutral atom of the element. (1)

3.7 Number of neutrons in the nucleus. (1)

3.8 Group number and period number ? (2)

3.9 Metal or non-metal? (1)

3.10 Conductor of electric current or insulator? (1)

3.11 substance commonly used for? (1)

[12]

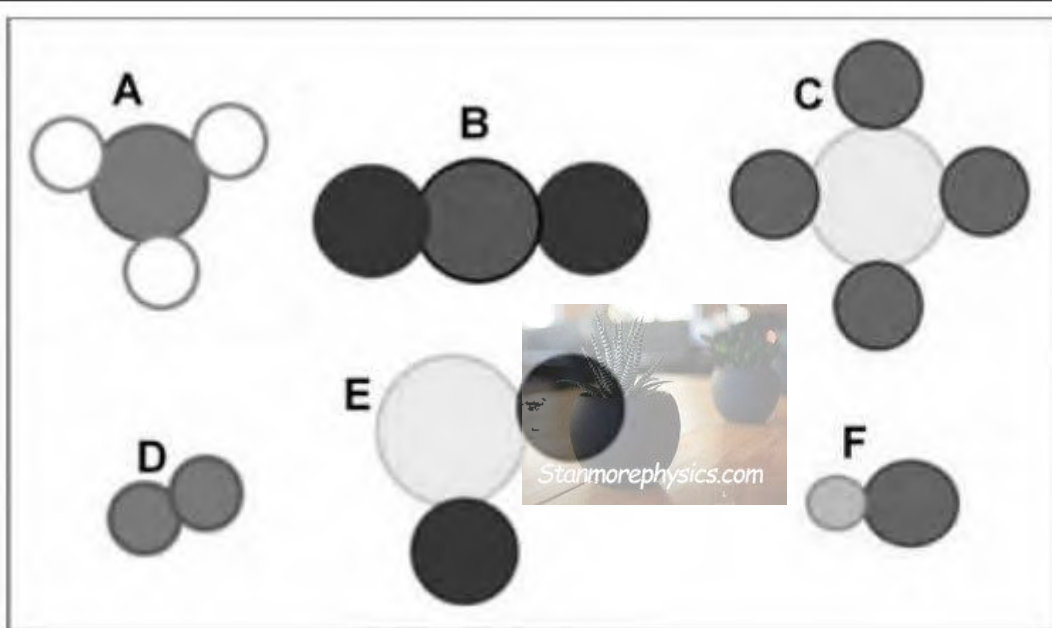
QUESTION 4.**NAMING COMPOUNDS AND USING MODELS TO REPRESENT MOLECULES
BALANCING CHEMICAL EQUATIONS AND CHEMICAL REACTIONS TO
REPRESENT REACTIONS**

4.1. Give names of the following compounds

a NaCl _____ (1)

b CaSO₄ _____ (1)c CaSO₃ _____ (1)

4.2 Study the following molecules



Match each molecule with one of the chemical formulae below. Only write down the LETTER of the molecule (6x1)

4.2.1 CH₄ _____4.2.2 NH₃ _____4.2.3 H₂ _____





4.2.4 LiF _____

4.2.5 CO₂ _____ (HINT: Shape of molecule: O=C=O or linear)4.2.6 SO₂ _____ (Atoms NOT in a straight line)**[9]**

QUESTION 5

BALANCING CHEMICAL EQUATIONS AND REPRESENTING CHEMICAL REACTIONS

Study the given models for the atoms of different elements:

Element	Model
Hydrogen (H)	
Oxygen (O)	
Carbon (C)	
Magnesium (Mg)	

For each of the following picture equations, write down the:

(a) balanced chemical equation, using chemical formulae.

(b) word equation.

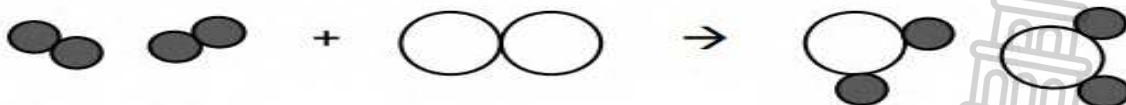
5.1



a _____ (2)

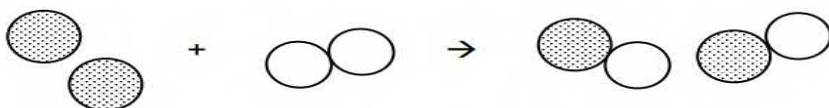
b _____ (2)

5.2



a _____ (3)

b _____ (2)



a _____ (3)

b _____ (2)

[14]

QUESTION 6

CASE STUDY: Reactions of metals with oxygen

Read the extract below and answer the questions that follow.

Themba is an intelligent boy in the grade 9 class. On his way to school, he passes by the scrapyard. One day, Themba visited the scrapyard to investigate what causes the cars to change their various colours to brown after being neglected for many years. He asked the owner of the scrapyard Mr Booleng, the possible causes of this deterioration. Mr Booleng told him that this was due to prolonged exposure to water.

At school, his teacher taught him about the reaction of metals and oxygen, and one of the metals was iron. He was also taught about copper, magnesium and calcium. The teacher told him about ways to protect metals to avoid the rusting (damage)

6.3.1 Rusting is a form of corrosion. What is corrosion? (1)

6.3.2 According to Mr Booleng, what caused the deterioration of cars in the scrapyard? (1)

6.3.3 Which metal is involved in rusting? (1)

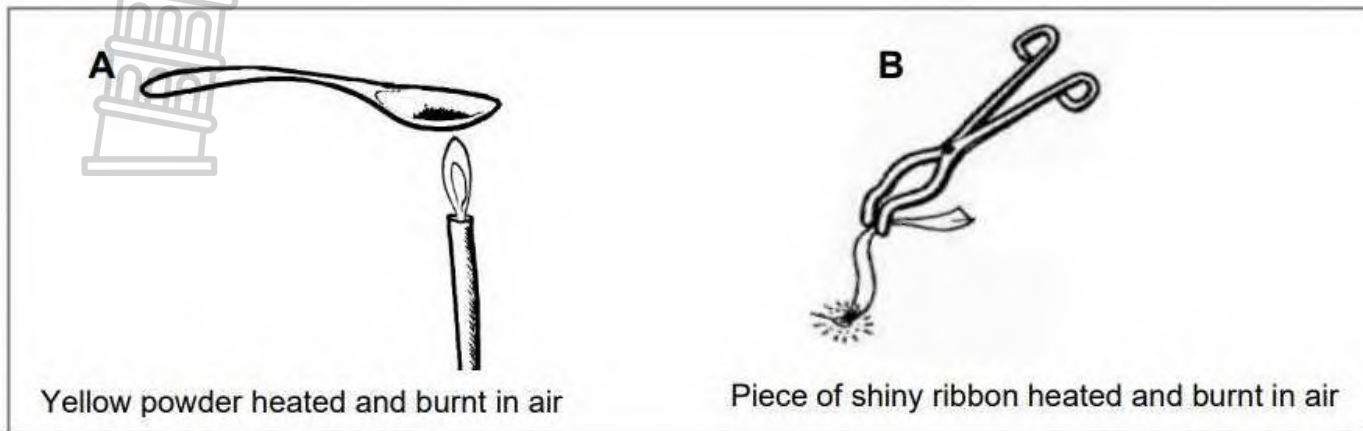
6.3.4 Beside the substance named in 6.3.3, name other two substances involved in a process of rusting (2)

6.3.4 Provide TWO ways on how one can protect a metal from rusting. (2)

6.3.5 Give the chemical formula for rust. (2)

QUESTION 7: Practical: Reaction of non-metals with oxygen

A practical demonstration is conducted to demonstrate combustion of elements. In A, a yellow powder in a teaspoon is heated over a flame and burnt in the air. In B, a piece of shiny ribbon held with a pair of tongs, is also heated, and burnt in the air.



7.1 Which part of the air is responsible for the combustion reactions that take place? (1)

7.2 The yellow powder in A burns with a bluish-purple flame.

7.2.1 Give the name of the yellow powder. (1)

7.2.2 Classify the element as a metal or a non-metal. (1)

7.2.3 Give the name of the product that forms. (1)

7.2.4 Is the product a solid, a liquid or a gas? (1)

7.2.5 Write down the balanced chemical equation for the reaction that takes place in A. (2)

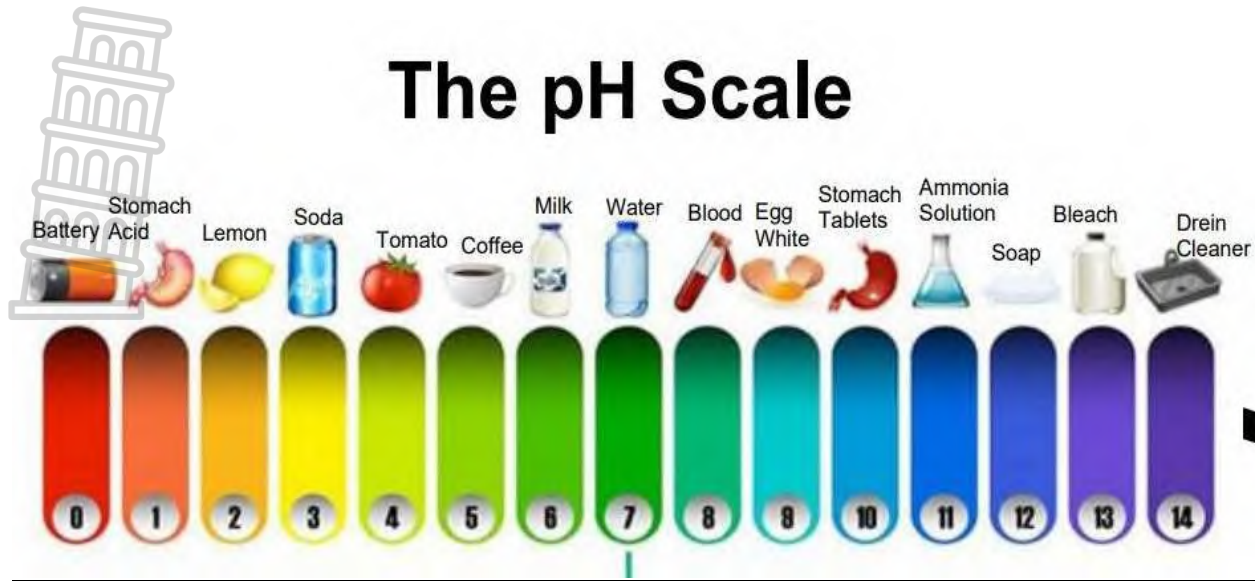
7.3 The element used in B is magnesium.

7.3.1 Classify magnesium a metal or a non-metal. (1)

7.3.2 What is the colour of the flame magnesium burns with in air? (1)

[9]

QUESTION 8 : The pH Scale



8.1 Define the term pH

(2)

8.2 Use the pH scale above to identify:

8.2.1 Which substance will be more basic, drain cleaner or soap?

(1)

8.2.2 Which substance will be more acidic, coffee or lemon?

(1)

8.2.3 Which substance is used to determine the strength of acids and bases?

(1)

8.3 Indicate the pH range of the substances you mentioned in 8.2.1 and 8.2.2
(3x1=3)

(a) Strong base

(b) Strong acid

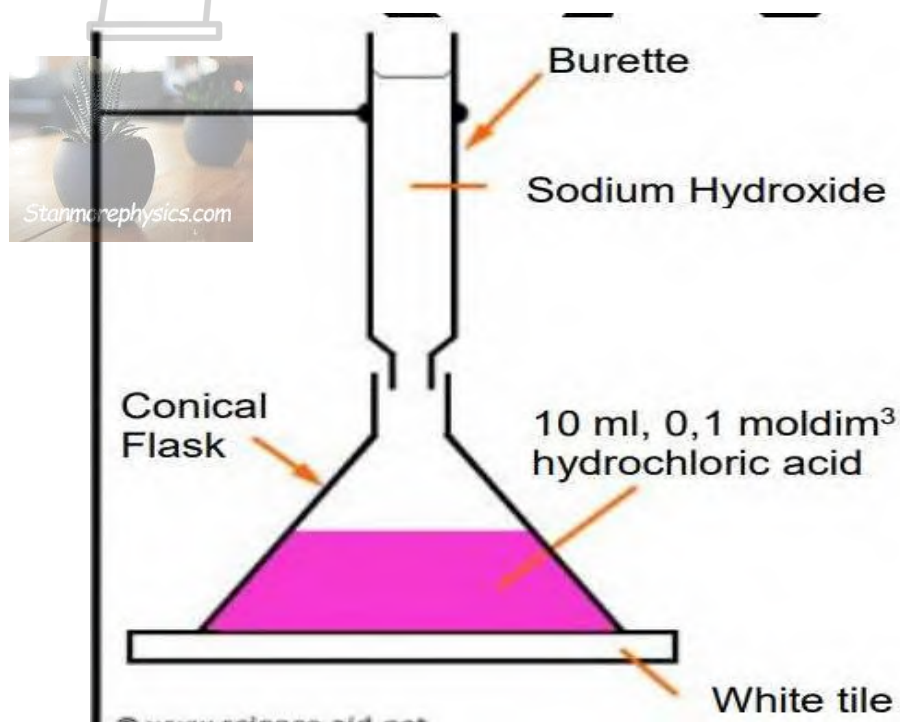
(c) Neutral substance

[8]

QUESTION 9: INVESTIGATION: ACIDS-BASE REACTIONS

When an acid reacts with a base, the pH value of the solution changes. A group of grade 9 learners conducted an investigation to find out how the pH changes. In the experiment, they added sodium hydroxide solution (base) to the burette and slowly added it into 25 cm³ of diluted hydrochloric acid which was mixed with a few drops of bromothymol blue (indicator).

Neutralization of NaOH with dilute Hydrochloric acid (HCl)



9.1. What was the aim of the investigation? (1)

9.2 Why should the apparatus be handled with care (1)

9.3 What do we call the reaction between an acid and a base? (1)

9.4 What is the general equation for an acid-base reaction? (2)

9.5 Identify your acid and your base in the substances used for this reaction (2)

[7]

QUESTION 10: REACTION OF AN ACID WITH A METAL CARBONATE (BASE)

10.1 What is the nature of metal carbonates? (1)

10.2 Discuss the general equation below: (2)



10.3 What is the chemical formula for lime water? (2)

10.4 Elaborate what is expected when carbon dioxide is bubbled through clear lime water. (1)

[6]

TOTAL SECTION B : [74]

GRAND TOTAL :100



Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	H Hydrogen 1																	He Helium 4	
2	Li Lithium 7	Be Beryllium 9												B Boron 11	C Carbon 12	N Nitrogen 14	O Oxygen 16	F Fluorine 19	Ne Neon 20
3	Na Sodium 23	Mg Magnesium 24	Sc Scandium 45											Al Aluminium 27	Si Silicon 28	P Phosphorus 31	S Sulfur 32	Cl Chlorine 36	Ar Argon 40
4	K Potassium 39	Ca Calcium 40	Ti Titanium 48	V Vanadium 51	Cr Chromium 52	Mn Manganese 55	Fe Iron 56	Co Cobalt 59	Ni Nickel 59	Cu Copper 64	Zn Zinc 65	Ga Gallium 70	Ge Germanium 73	As Arsenic 75	Se Selenium 79	Br Bromine 80	Kr Krypton 84		
5	Rb Rubidium 86	Sr Strontium 88	Y Yttrium 89	Zr Zirconium 91	Nb Niobium 93	Mo Molybdenum 96	Ru Ruthenium 101	Rh Rhodium 103	Pd Palladium 106	Ag Silver 108	Cd Cadmium 112	In Indium 115	Sn Tin 119	Sb Antimony 122	Te Tellurium 128	I Iodine 127	Xe Xenon 131		
6	Cs Caesium 133	Ba Barium 137	La Lanthanum 139	Hf Hafnium 179	Ta Tantalum 181	W Tungsten 184	Os Osmium 190	Ir Iridium 192	Pt Platinum 195	Au Gold 197	Hg Mercury 201	Tl Thallium 204	Pb Lead 207	Bi Bismuth 209	Po Polonium (209)	At Astatine (210)	Rn Radon (222)		
7	Fr Francium (223)	Ra Radium (226)	Ac Actinium (227)	Rf Rutherfordium (261)	Db Dubnium (268)	Sg Seaborgium (271)	Hs Hassium (277)	Mt Meitnerium (276)	Ds Darmstadtium (281)	Rg Roentgenium (280)	Cn Copernicium (285)	Uut Ununtrium (284)	Uuq Ununquadium (289)	Uup Ununpentium (288)	Uuh Ununhexium (293)	Uus Ununseptium (294)	Uuo Ununoctium (294)		
6	Ce Cerium 140	Pr Praseodymium 141	Nd Neodymium 144	Pm Promethium (145)	Sm Samarium 150	Eu Europium 152	Tb Terbium 159	Dy Dysprosium 163	Ho Holmium 165	Er Erbium 167	Tm Thulium 169	Lu Lutetium 175							
7	Th Thorium 232	Pa Protactinium 231	U Uranium 238	Np Neptunium (237)	Pu Plutonium (244)	Am Americium (243)	Bk Berkelium (247)	Cf Californium (251)	Es Einsteinium (252)	Fm Fermium (257)	Md Mendelevium (258)	No Nobelium (259)	Lr Lawrencium (262)						



GRADE 9

NATURAL SCIENCES

MID-YEAR TEST

MARKING GUIDELINE

TIME : 2 hours

MARKS : 100

DISTRICT: TSHWANE WEST D15

EXAMINER: Winterveldt Educators

MODERATOR : Malebye P

CLUSTER : Winterveldt



INSTRUCTIONS:

- This marking guideline consists of 7 pages.
- Accept relevant answers from learners
- Apply consistent accuracy marking
- Allocation of marks SECTION A: 26 AND SECTION B:74
- CONTENT COVERED : TERM 2 (MATTER AND MATERIAL)



SECTION A

QUESTION 1: MULTIPLE CHOICE

1.1.1 B ✓

1.1.2 B ✓

1.1.3 C ✓

1.1.4 D ✓

1.1.5 B ✓

1.1.6 C ✓

1.1.7 D ✓

1.1.8 D. ✓

1.1.9 B ✓

1.2 Scientific terminology

1.2.1 Hypothesis ✓

1.2.2 Hydrogen ✓

1.2.3 Atom ✓

1.2.4 Electron ✓

1.2.5 Sodium Chloride ✓

1.2.6 Periodic Table ✓

1.2.7 Non-Metal Oxide ✓

QUESTION 2: Matching columns

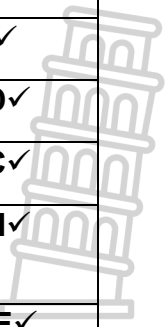
2.1 G ✓

2.2 F ✓

2.3 B ✓

2.4 A ✓

2.5 J ✓
2.6 I ✓
2.7 D ✓
2.8 C ✓
2.9 H ✓
2.10 E ✓



[1 x 10 = 10]
TOTAL SECTION A = [26]

SECTION B

QUESTION 3: PERIODIC TABLE OF ELEMENTS

3.1 Al ✓

3.2 Aluminium ✓ (1)

3.3 13 ✓

(1)

3.4 27 ✓

3.5 13 ✓

3.6 13 ✓

3.7 14. ✓

(1)

3.8 Group 13 ✓ and period 3 ✓

(2)

3.9 Metal ✓

3.10 Conductor of electric current ✓

3.11 To make cans of cold drinks ✓

or
Stanmorephysics.com

-To make aluminium windows ✓

(any one, accept relevant answers)

[12]



QUESTION 4.**NAMING COMPOUNDS AND USING MODELS TO REPRESENT MOLECULES
BALANCING CHEMICAL EQUATIONS AND CHEMICAL REACTIONS TO
REPRESENT REACTIONS**

4.1.

- a NaCl = Sodium Chloride ✓
- b CaSO_4 = Calcium Sulfate / Calcium Sulphate ✓
- c CaSO_3 = Calcium Sulfite / Calcium Sulphite ✓

4.2

(6x1)

4.2.1 = C ✓

4.2.2 = A ✓

4.2.3 = D ✓

4.2.4 = F ✓

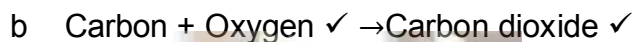
4.2.5 = B ✓

4.2.6 = E ✓

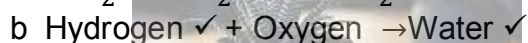
[9]

QUESTION 5**BALANCING CHEMICAL EQUATIONS AND REPRESENTING CHEMICAL
REACTIONS**

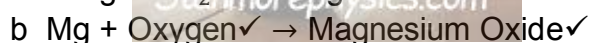
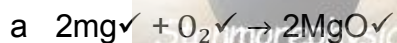
5.1



5.2



5.3



[14]

QUESTION 6**CASE STUDY: Reactions of metals with oxygen**

6.3.1 Process whereby a metal weakens, deteriorate and wears away in presence of air and moisture ✓

6.3.2 Prolonged exposure to water ✓

6.3.3 Iron ✓

6.3.4 water ✓ and Oxygen/air ✓

6.3.4 Electroplating ✓

Galvanising ✓

Painting ✓

Putting oil ✓

Keeping the environment around the material dry ✓

(accept any two)

6.3.5 Fe_2O_3 ✓✓

(2)

[9]

QUESTION 7: Practical: Reaction of non-metals with oxygen

7.1 Oxygen gas ✓

7.2

7.2.1 Sulfur ✓

7.2.2 Non-Metal ✓

7.2.3 Sulfur dioxide ✓

7.2.4 gas ✓

7.2.5 $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$ ✓

7.3

7.3.1 Metal ✓

7.3.2 Bright white Colour ✓

[9]

QUESTION 8 : The pH Scale

8.1 pH is a measure of how acidic or basic/alkaline a substance is ✓✓

8.2

8.2.1 drain cleaner ✓

8.2.2 lemon ✓

8.2.3 The universal indicator ✓

8.3

(a) from 13-14 ✓

(b) from 0-2 ✓

(c) Around 7 ✓

[8]

QUESTION 9: INVESTIGATION: ACIDS-BASE REACTIONS

9.1. To find out how the pH of the solution changes when sodium hydroxide solution is added to the acid ✓

9.2 Acids are corrosive and rough and can be dangerous ✓

9.3 Neutralisation ✓

9.4 Acid + Base ✓ \longrightarrow Salt + Water ✓

9.5 Acid -Hydrochloric acid ✓

Base- Sodium hydroxide ✓

[7]

QUESTION 10: REACTION OF AN ACID WITH A METAL CARBONATE (BASE)

10.1 They are bases ✓

10.2 An acid react with metal carbonate to form salt , carbon dioxide and water ✓✓

10.3 Ca(OH)_2 ✓ Stannmorephysics.com

10.4 Clear lime water turns milky ✓

[6]

TOTAL SECTION B : [74]

GRAND TOTAL :100

