GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

EKHURULENI NORTH DISTRICT MID-YEAR EXAMINATION

JUNE 2023

GRADE 9

NATURAL SCIENCES

NAME OF LEARNER: _____

CLASS: _____ **DATE:** _____

EDUCATOR: _____

MARKS: 90

TIME: $1^1/_2$ hours

11 pages

QUESTION	Section A			Section B					TOTAL
	1	2	3	4	5	6	7	8	
LEARNER'S MARK									
MODERATED MARK									
ALLOCATED MARK	8	8	8	20	7	9	15	15	90

EDUCATOR'S SIGNATURE: _____

MODERATOR'S SIGNATURE: _____

INSTRUCTIONS AND INFORMATION

1. Write your name, surname, class, Educator's name and date on the front cover of the QUESTION PAPER.

2. Answer ALL the QUESTIONS in the spaces provided on the QUESTION PAPER.

3. The QUESTION PAPER consists of Sections A, B, and C based on the prescribed content framework in the CAPS document

4. Allocation of marks:

   SECTION A [24]
   SECTION B [66]

5. The QUESTION PAPER consists of 8 questions and 10 pages.

6. Present your answers according to the instructions of each question.

7. You may use a non-programmable calculator, where necessary.

8. You may use appropriate mathematical drawing instruments.

9. All diagrams must be in pencil with labels in ink.

10. Write neatly and legibly.

11. Do not use correction fluid.

12. Use the Periodic Table on page 11 to help you.

SECTION A: SHORT QUESTIONS
QUESTION 1: MULTIPLE CHOICE

Various possible answers are provided for each of the following questions. Each question has only ONE correct answer. Write only the correct LETTER (A to D) next to the corresponding number (1.1 - 1.8) in the space provided at the end of the question, for example 1.9 D.

1.1 Why are the elements magnesium and calcium in the same group?

A. They have similar chemical properties.
B. They have the same atomic number.
C. They are both non-metals.
D. They are both liquids. (1)

1.2 The ratio in which the atoms of sulfur trioxide combine to form a molecule can be represented by …

A. 2:1:3
B. 3:1
C. 1:3
D 3:3 (1)

1.3 The prefix “di” in diatomic molecule means …

A. 4
B. 3
C. 2
D. 1 (1)

1.4 The name of the compound $FeSO_4$.

A. iron sulfate.
B. iron sulfite.
C. iron sulfide.
D. iron sulfur. (1)

1.5 The elements on the right hand side of the Periodic Table.

A. Metalloids
B. Metals
C. Semi-metals
D. Non-metals (1)

1.6 A reddish-brown solid formed by the reaction of iron and oxygen in the presence of water is known as …

A. Combustion
B. Rust
C. Galvanising
D. Electroplating (1)

1.7 Why is a universal indicator the most recommended indicator?

A. It does not change colour.
B. It only works in acids.
C. It is homemade
D. It functions in a wide range of pH values. (1)

1.8 A pH meter detects 7,52 for a substance. The substance is …

A. an acid.
B. a base.
C. neutral.
D. a salt. (1)

Answers:

1.1		1.2		1.3		1.4	

1.5		1.6		1.7		1.8	

[8]

QUESTION 2: TERMINOLOGY

Give the correct term for each of the following descriptions.
Write only the answer on the line below the question (2.1 to 2.8), for example 2.9 atoms.

2.1 The smallest of the THREE sub-atomic particles. (1)

_____

2.2 A row in the Periodic Table. (1)

_____

2.3 Boron is one of the ... (1)

_____

2.4 A substance where two or more different atoms are chemically bonded in a fixed ratio. (1)

_____

2.5 The type of chemical reaction where a substance reacts with oxygen during burning to form a new substance. (1)

_____

2.6 A compound that is formed when a non-metal reacts with oxygen. (1)

_____

2.7 The salts of nitic acid. (1)

_____

2.8 Coating iron with zinc to protect it. (1)

[8]

QUESTION 3: MATCH THE COLUMNS

Pair the description in Column A with the correct term in Column B.
Write the correct LETTER in Column C, for example 3.6 G

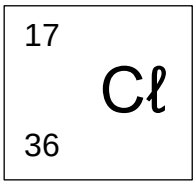
COLUMN A	COLUMN B	COLUMN C	
3.1 Ensuring that the total number of atoms of each element are the same on both sides of the reaction.	A. alkali	3.1 ___	(1)
3.2 The substances present before a reaction takes place.	B. oxygen	3.2 ___	(1)
3.3 The colour of the flame when sulfur burns.	C. reactants	3.3 ___	(1)
3.4 A base that is soluble in water.	D. purple	3.4 ___	(1)
3.5 Colour of pure water in universal indicator.	E. green	3.5 ___	(1)
3.6 A gas released when an acid reacts with a carbonate.	F. neutralisation reaction	3.6 ___	(1)
3.7 Ignites with a popping sound.	G. balancing	3.7 ___	(1)
3.8 NaOH + HCℓ	H. hydrogen	3.8 ___	(1)
	I. carbon dioxide		

[8]

TOTAL FOR SECTION A: 24

SECTION B: LONG QUESTIONS
QUESTION 4

Study the diagram of an element given below and answer the following questions.



4.1 What is the atomic mass of the element above? (1)

4.2 How many protons does one atom of this element have? (1)

4.3 Is this element a metal, non-metal or semi-metal? (1)

4.4 Give the NAME of the group that this element is in. (2)

4.5 In the space below, draw an atom of this element. (4)

4.6 Balance the following equations.

4.6.1 $Na + O_2 \rightarrow Na_2O$ (2)

4.6.2 $Fe + O_2 \rightarrow Fe_2O_3$ (3)

4.6.3 $H_2 + NO \rightarrow H_2O + N_2$ (3)

4.6.4 $P + O_2 \rightarrow P_2O_5$ (3)

[20]

QUESTION 5

When magnesium is burnt in air it forms a white powder.

5.1 Which gas is the magnesium reacting with? (1)

5.2 Give the word equation for this reaction. (3)

5.3 Write the balanced symbol equation for this reaction. (3)

[7]

QUESTION 6

Power stations burn coal to generate electricity.

The burning of coal releases carbon dioxide and sulfur dioxide gas into the atmosphere which can dissolve in rainwater and make the rain acidic.

Carbon dioxide reacts with the rainwater to form carbonic acid and sulfur dioxide reacts with rainwater to form sulfurous acid.

6.1 Write a word equation for the formation of sulfurous acid. (3)

6.2 Convert the equation in QUESTION 6.1 to a balanced symbol equation. (3)

6.3 State THREE negative impacts of acid rain on the environment. (3)

[9]

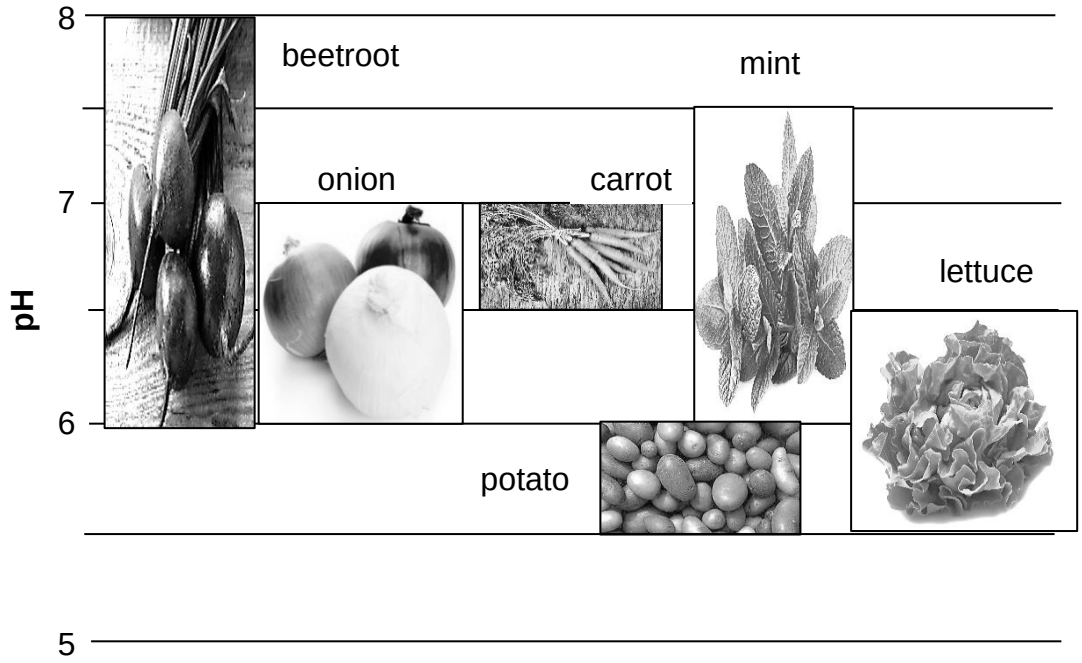
QUESTION 7: CASE STUDY

Different soils have different pH levels. Some soils are acidic and others are alkaline. The pH of a soil depends on the rock from which the soil was formed, and the decomposing plant materials that are in the soil.

Soils from limestone are alkaline with a pH of about 8. Clay soils with decomposing plant material may have a more acidic pH of about 4 or 5. Some plants grow better in acidic soils and others grow better in neutral or alkaline soils. Most plants grow well in soils with a pH of 6,5.

If the pH of the soil is not right, the plant will not grow very well. For this reason, farmers change the pH of the soil so that their crops will grow well. Acidic soil can be neutralised by adding powdered limestone or lime to the soil. Lime is a metal hydroxide and its chemical name is calcium hydroxide.

<u>Graph to show at which pH range certain plants grow</u>



7.1 In what pH range will potatoes grow? (2)

7.2 If the soil had a pH of 6,5, name any THREE plants that a farmer could grow in that soil? (3)

7.3 If the soil has a pH of 7,6, which plant could be grown in that soil? (1)

7.4 What can a farmer do if his soil has a pH of 4 and he wants to be able to grow the above vegetables? (2)

7.5 Write down a general equation to show the chemical reaction in QUESTION 7.4. (2)

7.6 Write down the chemical FORMULA for the hydroxide mentioned in the Case Study. (2)

7.7 Identify the colour of the bromothymol blue in the soil samples of …

7.7.1 limestone. (1)

7.7.2 clay soil. (1)

7.7.3 neutral soil. (1)

[15]

QUESTION 8: SKILLS

A group of Grade 9 Learners researched how much coal is burnt by various Power Stations in South Africa in one year. They wanted to identify which power station produces the largest amount of carbon dioxide and sulfur dioxide. Below is a table of their data.

Power stations (Names)	Amount of coal burnt (%)
Kelvin	4
Bloemfontein	4
Kusile	16
Komati	19
Kendal	27
Arnot	30

8.1 Give a possible aim for their research. (2)

8.2 Identify the …

8.2.1 independent variable. (1)

8.2.2 dependent variable. (1)

8.3 Name the power station that produces the greatest amount of carbon dioxide and sulfur dioxide. (1)

_____

8.4 Use the data in the table to draw a bar graph in the space provided. (10)

[15]

TOTAL FOR SECTION B: 66

GRAND TOTAL: 90

Periodic Table of the Elements