SMARTWIZ

GRADE 9 NATURAL SCIENCE EXAM

MARKS: 80

MARKS	

TIME: 2 hours

SCHOOL_____

CLASS (e.g. 4A) _____

SURNAME_____

NAME_____

Instructions for Students:

> Read all instructions carefully before beginning the exam.

> Write your name and student ID clearly on the answer sheet/booklet.

> Answer all questions unless otherwise stated.

> Show all your work/calculations where applicable.

> Write clearly and legibly.

> Use blue or black ink only. * Do not use correction fluid/tape.

> No electronic devices (calculators, phones, etc.) are allowed unless explicitly permitted.

> Raise your hand if you have any questions.

> Do not talk to other students during the exam.

> Any form of cheating will result in disqualification.

This test consists of 8 pages, excluding the cover page.

SECTION A: LIFE AND LIVING (25 MARKS)

QUESTION 1: RESPIRATION AND GAS EXCHANGE (10 MARKS)

1.1 Define cellular respiration. (2)

_____

_____

1.2 Write the word equation for aerobic respiration. (2)

_____

1.3 State two differences between aerobic and anaerobic respiration. (4)
a) _____
b) _____

1.4 Where in the human body does gas exchange take place? (1)

_____

1.5 What is the role of alveoli in the lungs? (1)

_____

_____

QUESTION 2: HUMAN CIRCULATORY SYSTEM (15 MARKS)

2.1 Name the three main components of blood. (3)
a) _____
b) _____
c) _____

2.2 Match the components in 2.1 with their functions: (3)
i. Carries oxygen
ii. Fights infections
iii. Carries nutrients and waste

2.3 What is the function of the heart in the circulatory system? (2)

_____

2.4 Describe the difference between arteries and veins. (2)

_____

2.5 Draw a simple diagram of the heart showing the left and right chambers. Label any **two** parts. (5)
[Leave space for drawing]

SECTION B: MATTER AND MATERIALS (30 MARKS)

QUESTION 3: STATES OF MATTER AND PARTICLES (12 MARKS)

3.1 Name the three states of matter. (3)
_____ _____ _____

3.2 Describe the arrangement of particles in a solid, liquid, and gas. (3)
Solid: _____
Liquid: _____
Gas: _____

3.3 What happens to the particles of a solid when heat is added? (2)

_____

3.4 Define sublimation and give one example. (2)
Definition: _____
Example: _____

3.5 Is boiling water a chemical or physical change? Explain your answer. (2)

_____
_____

QUESTION 4: CHEMICAL REACTIONS (18 MARKS)

4.1 Define a chemical reaction. (2)

_____

4.2 Identify the **reactants** and **products** in the following reaction:
Magnesium + Hydrochloric acid → Magnesium chloride + Hydrogen (2)
Reactants: _____
Products: _____

4.3 State two signs that a chemical reaction has taken place. (2)
a) _____
b) _____

4.4 Balance the following chemical equation: (3)
__ H_2 + __ O_2 → __ H_2O

4.5 Classify the following as endothermic or exothermic: (4)
a) Combustion of fuel – _____
b) Photosynthesis – _____

c) Melting of ice – _____
d) Burning magnesium – _____

4.6 What is the role of energy in chemical reactions? (2)

4.7 What is the Law of Conservation of Mass? (3)

SECTION C: EARTH AND BEYOND (25 MARKS)

QUESTION 5: THE SOLAR SYSTEM (10 MARKS)

5.1 Name the four terrestrial planets. (4)
a) _____
b) _____
c) _____
d) _____

5.2 What is the difference between a planet and a dwarf planet? (2)

5.3 Why is Earth able to support life? (2)

5.4 What force keeps the planets in orbit around the Sun? (1)

5.5 What is the function of the Moon in relation to tides? (1)

QUESTION 6: LITHOSPHERE AND ROCKS (15 MARKS)

6.1 What is the lithosphere? (2)

6.2 List the three main types of rocks. (3)
a) _____

b) _____
c) _____

6.3 How is sedimentary rock formed? (2)

6.4 Which rock type is formed from magma? (1)

6.5 Identify the rock type in the descriptions below: (3)
a) Formed from layers of sand – _____
b) Changed by heat and pressure – _____
c) Formed when lava cools – _____

6.6 Why are rocks important in everyday life? Give two uses. (2)
a) _____
b) _____

TOTAL : 80

MEMO

SECTION A: LIFE AND LIVING (25 MARKS)

QUESTION 1: RESPIRATION AND GAS EXCHANGE (10 MARKS)

1.1

- Cellular respiration is the process where cells break down glucose to release energy. ✓✓

1.2

- Glucose + Oxygen → Carbon dioxide + Water + Energy ✓✓

1.3
a) Aerobic uses oxygen; anaerobic does not. ✓
b) Aerobic produces more energy; anaerobic produces less energy and may create lactic acid. ✓

1.4

- In the alveoli of the lungs ✓

1.5

- Alveoli allow gas exchange between air and blood. ✓

QUESTION 2: HUMAN CIRCULATORY SYSTEM (15 MARKS)

2.1
a) Red blood cells ✓
b) White blood cells ✓
c) Plasma ✓

2.2
i → a (Red blood cells – Carries oxygen) ✓
ii → b (White blood cells – Fights infection) ✓
iii → c (Plasma – Carries nutrients and waste) ✓

2.3

- It pumps blood to the lungs and the rest of the body. ✓✓

2.4

- Arteries carry blood away from the heart; veins carry blood to the heart. ✓✓

2.5
Award up to 5 marks for:

- Correct general shape ✓
- Clear labeling of Left Atrium / Right Atrium ✓
- Labeling of Left Ventricle / Right Ventricle ✓
- Arrows showing blood flow ✓
- Neatness/accuracy ✓

SECTION B: MATTER AND MATERIALS (30 MARKS)

QUESTION 3: STATES OF MATTER AND PARTICLES (12 MARKS)

3.1
Solid ✓, Liquid ✓, Gas ✓

3.2
Solid: Particles tightly packed, vibrate in place ✓
Liquid: Particles close, move over each other ✓
Gas: Particles far apart, move freely ✓

3.3

- Particles move faster and spread apart ✓✓

3.4
Definition: A solid changes directly to a gas without becoming liquid ✓
Example: Dry ice (CO_2) ✓

3.5

- Physical change, because the substance remains water (H_2O) ✓✓

QUESTION 4: CHEMICAL REACTIONS (18 MARKS)

4.1

- A process where substances change into new substances ✓✓

4.2
Reactants: Magnesium, Hydrochloric acid ✓
Products: Magnesium chloride, Hydrogen ✓

4.3
a) Colour change ✓
b) Gas production/temperature change ✓

4.4
$2 H_2 + O_2 \rightarrow 2 H_2O$ ✓✓✓

4.5
a) Exothermic ✓
b) Endothermic ✓
c) Endothermic ✓
d) Exothermic ✓

4.6

- Energy is either absorbed or released in chemical reactions ✓✓

4.7

- Matter cannot be created or destroyed in a chemical reaction; the mass of reactants equals the mass of products ✓✓✓

SECTION C: EARTH AND BEYOND (25 MARKS)

QUESTION 5: THE SOLAR SYSTEM (10 MARKS)

5.1
a) Mercury ✓
b) Venus ✓
c) Earth ✓
d) Mars ✓

5.2

- A planet clears its orbit; a dwarf planet does not ✓✓

5.3

- Has water, oxygen, suitable temperature, and atmosphere ✓✓

5.4

- Gravity ✓

5.5

- The Moon's gravity affects the Earth's tides ✓

QUESTION 6: LITHOSPHERE AND ROCKS (15 MARKS)

6.1

- The solid outer layer of the Earth, including crust and upper mantle ✓✓

6.2
a) Igneous ✓
b) Sedimentary ✓
c) Metamorphic ✓

6.3

- Formed from layers of sediments compacted over time ✓✓

6.4

- Igneous rock ✓

6.5
a) Sedimentary ✓
b) Metamorphic ✓
c) Igneous ✓

6.6
a) Building materials ✓
b) Used to make tools/roads/jewelry (any valid use) ✓

TOTAL : 80