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: MATTER AND MATERIALS (25 MARKS)

QUESTION 1: PROPERTIES OF MATTER (10 MARKS)

1.1 Define the term **density**. (2)

1.2 Describe how you would calculate the density of a regular solid. Include the formula. (3)

1.3 A metal block has a mass of 250 g and a volume of 50 cm^3. Calculate its density. Show all calculations. (3)

1.4 State two physical properties that can be used to identify a substance. (2)

QUESTION 2: ELEMENTS, COMPOUNDS AND MIXTURES (15 MARKS)

2.1 Define the terms:
a) Element
b) Compound
c) Mixture (3)

2.2 Give one example of each:
a) Element
b) Compound
c) Mixture (3)

2.3 What is the difference between a homogeneous and heterogeneous mixture? (2)

2.4 Describe one method to separate a mixture of sand and water. (2)

2.5 What happens to the properties of elements when they combine to form compounds? (2)

2.6 Explain why mixtures can be separated easily but compounds cannot. (3)

SECTION B: FORCE, MOTION AND ENERGY (30 MARKS)

QUESTION 3: SPEED AND ACCELERATION (15 MARKS)

3.1 Define the terms:
a) Speed
b) Acceleration (4)

3.2 A car travels 150 km in 3 hours. Calculate its average speed. Show your working. (3)

3.3 Explain the difference between speed and velocity. (2)

3.4 A cyclist starts from rest and reaches a velocity of 18 m/s in 6 seconds. Calculate the acceleration. Show working. (3)

3.5 What is meant by deceleration? Give an example from daily life. (3)

QUESTION 4: SIMPLE MACHINES (15 MARKS)

4.1 Name four types of simple machines. (4)

4.2 Describe how a lever works and identify its three parts. (5)

4.3 Explain the mechanical advantage of a pulley system. (3)

4.4 Give one example of where an inclined plane is used in everyday life. (3)

SECTION C: EARTH AND BEYOND (25 MARKS)

QUESTION 5: MINERALS AND ROCKS (15 MARKS)

5.1 What is the difference between minerals and rocks? (3)

5.2 Name and describe the three main types of rocks. (6)

5.3 Explain how sedimentary rocks are formed. (3)

5.4 What is erosion and how does it affect rocks? (3)

5.5 Why is recycling important for preserving natural resources? (2)

QUESTION 6: THE SOLAR SYSTEM (10 MARKS)

6.1 Name the eight planets in our solar system in order starting from the sun. (4)

6.2 What is the difference between a meteor, a meteorite, and a comet? (3)

6.3 Explain why the moon appears to change shape during a lunar cycle. (3)

TOTAL : 80

MEMO

SECTION A: MATTER AND MATERIALS

QUESTION 1: PROPERTIES OF MATTER

1.1

- Density is the mass per unit volume of a substance. (2)

1.2

- Density = Mass ÷ Volume
- Measure mass using a balance and volume using a ruler (for regular solids) or displacement method. (3)

1.3

- Density = 250 g ÷ 50 cm^3 = 5 g/cm^3 (3)

1.4

- Colour, hardness, melting point, boiling point, conductivity, etc. (any two) (2)

QUESTION 2: ELEMENTS, COMPOUNDS AND MIXTURES

2.1
a) Element: A pure substance made of only one kind of atom.
b) Compound: A substance made from two or more elements chemically combined.
c) Mixture: A combination of two or more substances not chemically combined. (3)

2.2
a) Element: Oxygen (O_2)
b) Compound: Water (H_2O)
c) Mixture: Salt and water solution (saltwater) (3)

2.3

- Homogeneous mixtures have uniform composition throughout (e.g., saltwater).
- Heterogeneous mixtures have visibly different substances or phases (e.g., sand in water). (2)

2.4

- Filtration or decanting can be used to separate sand and water. (2)

2.5

- The properties of compounds are different from the properties of the elements that form them. (2)

2.6

- Mixtures can be separated by physical methods because substances are not chemically bonded.
- Compounds require chemical reactions to separate elements because atoms are chemically bonded. (3)

SECTION B: FORCE, MOTION AND ENERGY

QUESTION 3: SPEED AND ACCELERATION

3.1
a) Speed is the distance travelled per unit time.
b) Acceleration is the rate of change of velocity per unit time. (4)

3.2

- Speed = Distance ÷ Time = 150 km ÷ 3 h = 50 km/h (3)

3.3

- Speed is scalar (only magnitude), velocity is vector (magnitude and direction). (2)

3.4

- Acceleration = Change in velocity ÷ Time = (18 m/s – 0) ÷ 6 s = 3 m/s² (3)

3.5

- Deceleration is negative acceleration, slowing down.
- Example: Braking a car. (3)

QUESTION 4: SIMPLE MACHINES

4.1

- Lever, pulley, inclined plane, wheel and axle, screw, wedge (any four) (4)

4.2

- A lever is a rigid bar that rotates around a fixed point (fulcrum).

- The three parts: effort (force applied), load (resistance), and fulcrum (pivot). (5)

4.3

- A pulley changes the direction of the force and can reduce the effort needed to lift a load, giving mechanical advantage. (3)

4.4

- Example: A ramp used to load goods into a truck. (3)

SECTION C: EARTH AND BEYOND

QUESTION 5: MINERALS AND ROCKS

5.1

- Minerals are naturally occurring inorganic solids with definite chemical composition.
- Rocks are made up of one or more minerals. (3)

5.2

- Igneous: formed from cooled molten lava or magma.
- Sedimentary: formed by deposition and compression of sediments.
- Metamorphic: formed by heat and pressure altering existing rocks. (6)

5.3

- Sediments like sand, mud, and small pieces of rock are deposited in layers, compressed, and cemented over time to form sedimentary rocks. (3)

5.4

- Erosion is the wearing away and removal of rocks and soil by wind, water, or ice. It breaks down and transports rock material. (3)

5.5

- Recycling conserves natural resources and reduces the need for mining new raw materials. (2)

QUESTION 6: THE SOLAR SYSTEM

6.1

- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune (4)

6.2

- Meteor: A small rocky or metallic body entering Earth's atmosphere, producing a streak of light.
- Meteorite: A meteor that survives the atmosphere and lands on Earth.
- Comet: A body of ice and dust that orbits the sun and has a glowing coma and tail. (3)

6.3

- The moon appears to change shape because of the changing angles of sunlight reflected from the moon as it orbits Earth (phases of the moon). (3)

TOTAL : 80