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.

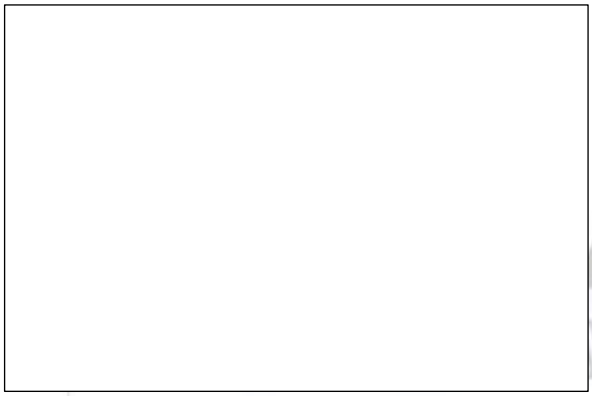
SECTION A: CELLS AND MICROORGANISMS (30 MARKS)

QUESTION 1: CELLS (15 MARKS)

1.1 Define a cell. (2)

1.2 Name two structures found only in plant cells. (2)
a) _____
b) _____

1.3 Draw a neat, labeled diagram of a plant cell. Include at least five labels. (6)



1.4 Match the cell parts in Column A with their functions in Column B. Write only the letter next to the number. (3)

Column A	Column B
1. Nucleus	A. Provides energy
2. Mitochondrion	B. Controls cell activities
3. Cell membrane	C. Controls entry and exit

Answers:

1. _____ 2. _____ 3. _____

1.5 Give two reasons why cells are called the basic units of life. (2)

QUESTION 2: MICROORGANISMS (15 MARKS)

2.1 What are microorganisms? (2)

2.2 Name the three main types of microorganisms. (3)
a) _____
b) _____
c) _____

2.3 Give one useful and one harmful effect of bacteria. (2)
Useful: _____
Harmful: _____

2.4 Study the diagram of a fungus below.

a) Name the type of microorganism. (1)
b) Is it unicellular or multicellular? (1)

2.5 Explain how yeast is used in baking. (2)

2.6 List four safety practices when working with microorganisms. (4)

SECTION B: ENERGY AND THE BIOSPHERE (30 MARKS)

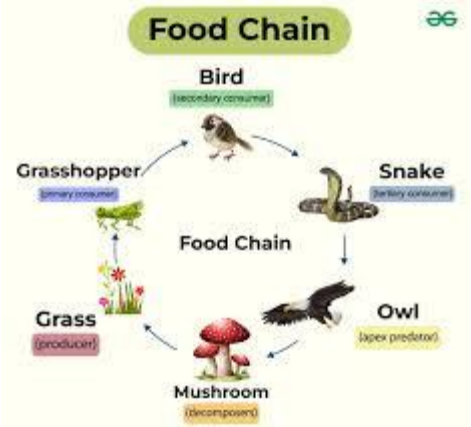
QUESTION 3: ENERGY IN ECOSYSTEMS (15 MARKS)

3.1 Define the term trophic level. (2)

3.2 Arrange the following organisms in a food chain:
Grass, Lion, Zebra, Vulture (2)
Answer: _____

3.3 What is the source of energy for all ecosystems? (1)

3.4 Study the food web below and answer the questions:



a) Identify one producer and one decomposer. (2)
b) Name a consumer that appears in two food chains in the web. (1)
c) What would happen if all producers were removed from this ecosystem? (3)

3.5 Describe the flow of energy through a food chain. (4)

QUESTION 4: HUMAN EFFECTS ON BIODIVERSITY (15 MARKS)

4.1 Define biodiversity. (2)

4.2 List three human actions that threaten biodiversity. (3)

4.3 What is an endangered species? Give one example. (2)

4.4 Study the image of a cleared forest below and answer the questions:

a) What human activity is shown? (1)
b) List two environmental impacts of this activity. (2)
c) Suggest two sustainable practices to protect biodiversity. (2)

4.5 What is conservation and why is it important? (3)

SECTION C: THE EARTH'S SPHERES (20 MARKS)

QUESTION 5: EARTH SYSTEMS (20 MARKS)

5.1 Name and briefly describe the four spheres of the Earth. (8)
a) _____ –
b) _____ –
c) _____ –
d) _____ –

5.2 Draw a simple diagram to show how these four spheres interact during a forest fire. Label all spheres. (5)

5.3 Explain the effect of volcanic eruptions on the atmosphere and biosphere. (4)

5.4 What is the greenhouse effect, and why is it necessary for life? (3)

TOTAL : 80

MEMO

SECTION A: CELLS AND MICROORGANISMS (30 MARKS)

QUESTION 1: CELLS

1.1

- A cell is the smallest structural and functional unit of a living organism. (2)

1.2

- Cell wall
- Chloroplast (2)

1.3

- Labeled diagram should include: cell wall, cell membrane, nucleus, cytoplasm, chloroplast. (6)

1.4

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

1.5

- All living things are made up of cells.
- Cells carry out all the basic functions of life (e.g. respiration, growth). (2)

QUESTION 2: MICROORGANISMS

2.1

- Microorganisms are tiny living organisms that can only be seen under a microscope. (2)

2.2
a) Bacteria
b) Viruses
c) Fungi (3)

2.3

- Useful: Used in yogurt production / decomposition / nitrogen fixation.
- Harmful: Can cause diseases like tuberculosis / food spoilage. (2)

2.4
a) Fungus
b) Multicellular (2)

2.5

- Yeast ferments sugars and produces carbon dioxide gas, which causes dough to rise. (2)

2.6

- Wear gloves, sterilize equipment, wash hands, avoid inhaling spores or touching face. (4)

SECTION B: ENERGY AND THE BIOSPHERE (30 MARKS)

QUESTION 3: ENERGY IN ECOSYSTEMS

3.1

- A trophic level is the position an organism occupies in a food chain, based on its source of energy. (2)

3.2

- Grass → Zebra → Lion → Vulture (2)

3.3

- The Sun (1)

3.4
a) Producer: Grass / Tree
Decomposer: Fungus / Bacteria (2)
b) Jackal / Snake / Eagle (1)
c) All consumers would eventually die due to lack of energy input from producers. (3)

3.5

- Energy flows from producers to consumers through feeding.
- Only about 10% of energy is transferred from one level to the next; the rest is lost as heat. (4)

QUESTION 4: HUMAN EFFECTS ON BIODIVERSITY

4.1

- Biodiversity is the variety of different species of plants and animals in a specific area. (2)

4.2

- Pollution, habitat destruction, overfishing, hunting, introduction of invasive species (any 3) (3)

4.3

- An endangered species is one that is at risk of extinction.
- Example: Black rhino / Pangolin (2)

4.4
a) Deforestation (1)
b) Loss of habitat, soil erosion, climate change (2)
c) Planting trees, protected areas, recycling, sustainable farming (2)

4.5

- Conservation is the protection of natural resources and biodiversity.
- It ensures the survival of species and ecosystems for future generations. (3)

SECTION C: THE EARTH'S SPHERES (20 MARKS)

QUESTION 5: EARTH SYSTEMS

5.1
a) Atmosphere – the layer of gases surrounding Earth
b) Hydrosphere – all water on Earth (oceans, lakes, rivers)
c) Lithosphere – Earth's solid crust and upper mantle
d) Biosphere – all living organisms on Earth (8)

5.2

- Diagram should show fire impacting:
  - Atmosphere (smoke)
  - Lithosphere (burnt ground)
  - Biosphere (dead trees)
  - Hydrosphere (runoff to rivers) (5)

5.3

- Volcanic eruptions release gases into the atmosphere, affecting air quality and weather.
- Ash can destroy plant and animal life, impacting the biosphere. (4)

5.4

- The greenhouse effect traps heat in the Earth's atmosphere, keeping the planet warm enough to sustain life. (3)

TOTAL : 80