



**GAUTENG DEPARTMENT OF EDUCATION
PROVINCIAL EXAMINATION
NOVEMBER 2021
GRADE 9**

NATURAL SCIENCES

TIME: 2 hours

MARKS: 100

17 pages

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INSTRUCTIONS AND INFORMATION

1. Write your surname, name and class on the question paper.
2. Answer all questions on the question paper.
3. This question paper consists of SECTION A, SECTION B and SECTION C based on the prescribed content framework in the CAPS document.
4. Allocation of marks:

SECTION A [20]
SECTION B [40]
SECTION C [40]
5. This examination paper consists of ten questions.
6. Follow the instructions and numbering of each question.
7. All drawings should be done in pencil and labelled in blue or black ink.
8. Write neatly and legibly.

SECTION A

QUESTION 1

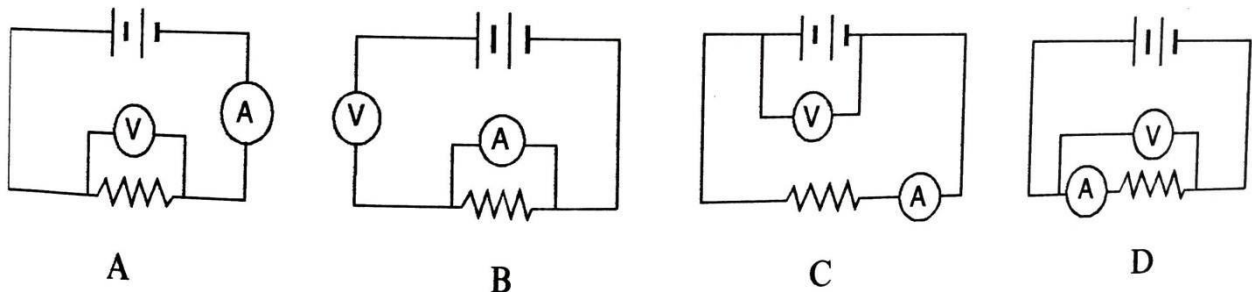
MULTIPLE- CHOICE QUESTIONS

Various options are provided as possible answers to the following questions. Choose the correct answer by circling, or placing a cross over the correct letter (A – D).

1.1 A field force ...

- A is always a force of attraction.
- B occurs only between magnetic and electrical charges.
- C results in an action over a distance between two bodies.
- D is the only type of force that is able to change the speed of an object. (1)

1.2 In which of the following diagrams are the volt meter and ammeter connected incorrectly?



(1)

1.3 If all the conductors are made of copper wire, which one has the greatest resistance?

- A Long, thin and hot
- B Short, thin and cool
- C Long, thick and hot
- D Short, thin and cool (1)

1.4 The crust and the uppermost part of the mantle together form the ...

- A troposphere.
- B lithosphere.
- C atmosphere.
- D oceanic crust. (1)

- 1.5 A natural solid with a definite chemical composition and a specific crystalline structure is called a ...
- A mineral.
 - B silt.
 - C steel.
 - D nutrient.
- (1)
- 1.6 Which of the following gases is a greenhouse gas?
- A Helium
 - B Hydrogen
 - C Oxygen
 - D Methane
- (1)
- 1.7 What is the difference between a series circuit and a parallel circuit?
- A A series circuit has one path, and a parallel circuit splits into branches.
 - B A series circuit must have a fuse.
 - C A parallel circuit must have a circuit breaker.
 - D A parallel circuit has one path and a series circuit splits into branches.
- (1)
- 1.8 Generating electricity by falling water is called ...
- A nuclear power.
 - B hydroelectricity.
 - C transformation.
 - D earth leakage.

(1)
[8]

QUESTION 2

TERMINOLOGY

Give the correct scientific term for each of the following descriptions. Write only the term (2.1 – 2.6) in the spaces provided.

2.1 The SI unit of force

_____ (1)

2.2 A solution that conducts electricity

_____ (1)

2.3 A component that opposes the flow of current in an electric circuit

_____ (1)

2.4 A rock in which a mineral is concentrated

_____ (1)

2.5 The increase in the average temperature of the atmosphere

_____ (1)

2.6 The explosion of a massive star

_____ (1)
[6]

QUESTION 3

MATCHING COLUMNS

Match the statement in COLUMN A with the correct concept in COLUMN B. Write only the letter (A – H) next to the question number (3.1 – 3.6) in the space provided in Column C.

COLUMN A		COLUMN B	COLUMN C
3.1	A surplus of electricity when voltage is 110% above the normal voltage in the power line	A Gravitational force	3.1 _____
3.2	A system that generates electricity	B Ammeter	3.2 _____
3.3	The instrument used to measure current strength	C Power Surge	3.3 _____
3.4	Pulling force that bodies exert on each other over a distance due to their masses	D Larva	3.4 _____
3.5	The sphere in which weather occurs	E Troposphere	3.5 _____
3.6	Magma that escapes to the surface of the earth	F Stratosphere	3.6 _____
		G Fuse	
		H Power Station	

[6]

TOTAL SECTION A: 20

SECTION B

ENERGY AND CHANGE

FORCE

QUESTION 4

4.1 State any TWO effects of force.

(2)

4.2 Identify the type of force that is exerted on the following:

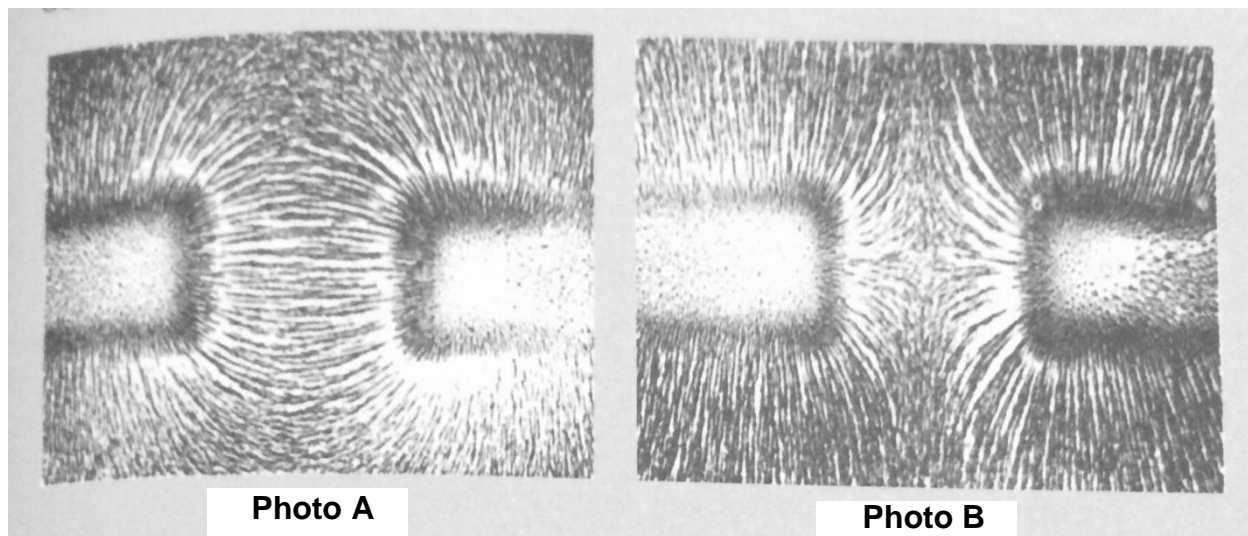
4.2.1 A rubber band that is stretched

(1)

4.2.2 Squeezing toothpaste from a tube

(1)

- 4.3 Study the photographs below which illustrate the magnetic fields between bar Magnets and answer the following questions:



- 4.3.1 Identify the force holding the iron filings in place.

(1)

- 4.3.2 Briefly explain your observation in Photo A and Photo B.

(4)

- 4.3.3 Name TWO other non-contact forces besides the force mentioned in 4.3.1.

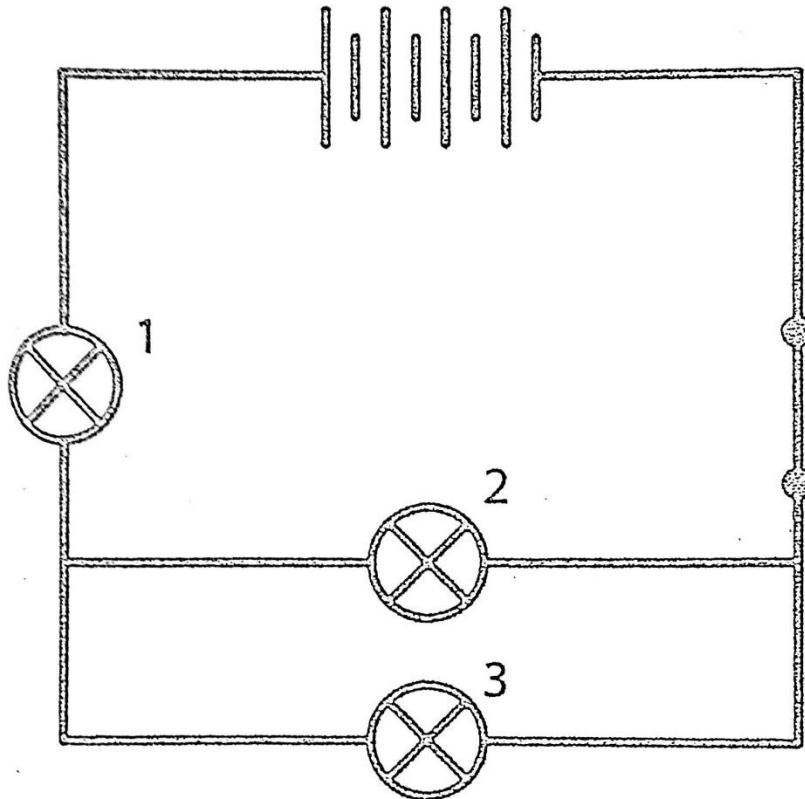
(2)

[11]

QUESTION 5

SERIES AND PARALLEL CIRCUITS

5.1 Consider the following circuit diagram. All the light bulbs are identical.



5.1.1 If the voltage of one cell is 3 V, determine the voltage of the battery.

(2)

5.1.2 State with a reason what you know about the current through light bulbs 2 and 3.

(2)

5.1.3 Compare the current through light bulb 1 with the current through light bulb 2.

(2)

5.1.4 If light bulb 1 blows, what will happen to light bulb 3? Explain your answer.

(2)

5.1.5 If light bulb 2 blows, light bulb 3 will continue to light. Give a reason for the statement.

(2)

5.2 Mention any TWO factors that affect resistance in a circuit.

(2)

[12]

QUESTION 6

ELECTRICITY GENERATION IN SOUTH AFRICA

6.1 Read the text below and answer the questions that follow.

Nuclear fission is the release of energy that occurs when a radioactive element such as uranium is split into other atoms.

South Africa's main coal reserves are concentrated in Mpumalanga. Because moving coal or electricity over long distances is inefficient, it was decided in the mid-1970s to build a nuclear power station at Koeberg near Cape Town in the Western Cape.

A nuclear power station uses radioactive fuel, usually uranium-235, which is placed in a reactor.

Nuclear waste is radioactive because the splitting of uranium atoms also releases gamma radiation. These gamma rays are similar to x-rays and can cause burns, cancer and genetic mutations in living things. They can only be slowed or stopped with thick walls of concrete, lead, or packed ground. It is therefore very important that nuclear waste is disposed of correctly, so that it does not contaminate the environment or harm people.

6.1.1 Explain why the Koeberg power plant was built in the Western Cape.

(1)

6.1.2 Which element is used in nuclear reactors?

(1)

6.1.3 What health problems are associated with nuclear waste?

(1)

6.2 The table below indicates the alternative sources of power generation in South Africa. Fill in the missing information on the lines provided below.

Type of energy	Description	Renewable / Non-renewable	Advantage
Wind	Inflow of wind causes turbine to turn, which is connected to a generator which produces electricity	Renewable	No air pollution
6.2.1	Heliostats focus the sun's energy on a collector tower	Renewable	6.2.2
6.2.3	Water in dams or pumped storage is released and falls on turbines connected to generators to produce electricity	6.2.4	Immediate source of energy used during peak times
Sea waves	6.2.5	6.2.6	No air Pollution
6.2.7	Energy released when an atom splits to heat water to produce power	Non-renewable	No air pollution

6.2.1 _____

6.2.2 _____

6.2.3 _____

6.2.4 _____

6.2.5 _____

6.2.6 _____

6.2.7 _____

(7)

[10]

QUESTION 7

COST OF ELECTRICAL POWER

The following table shows the energy usage of various household appliances.

Household appliance	Energy use (W)
Stove oven	2 000
Iron	450
Geyser	3 000
TV	700
Laptop	50

7.1 Which component uses the least amount of energy from the above table?

(1)

7.2 List TWO ways of reducing the amount of electrical energy used by the geyser.

(2)

7.3 Electricity is sold at approximately 60c for a kWh. Use this information to calculate the cost of electric energy of the stove oven if it is used for three hours a day.

[Cost = Power rating (Kw) x Hours x unit price]

(4)

[7]

TOTAL SECTION B: 40

SECTION C

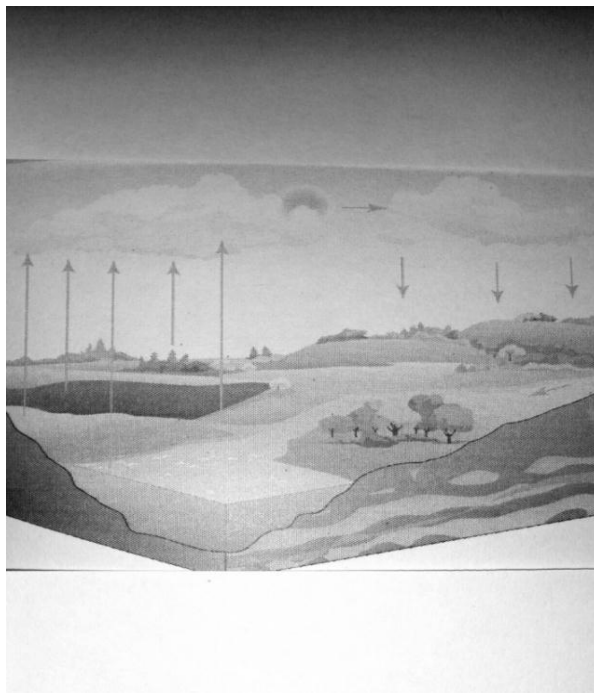
EARTH AND BEYOND

QUESTION 8

EARTH AS A SYSTEM

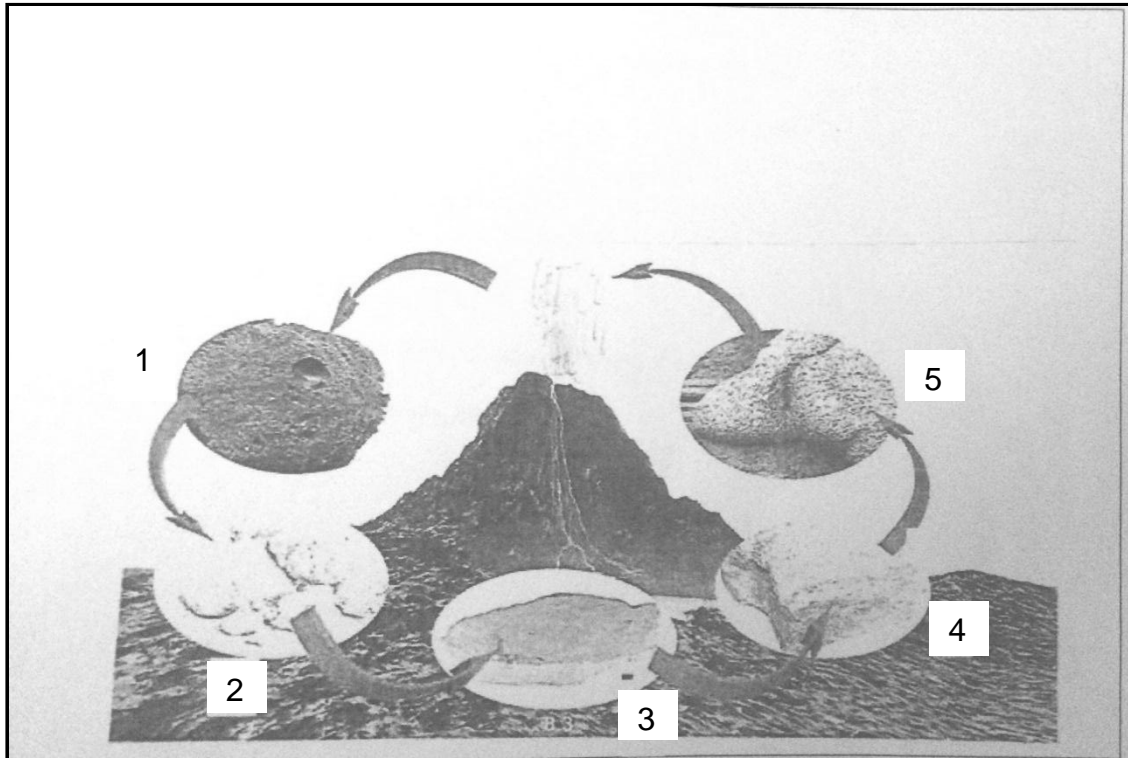
8.1 The diagram below illustrates the interaction of the sphere of the earth as a complex system.

Describe the interaction of the different spheres.



(6)

- 8.2 8.2.1 Complete the flow diagram of the rock cycle below by filling in the stages labelled 1 to 5.



1. _____ (1)
2. _____ (1)
3. _____ (1)
4. _____ (1)
5. _____ (1)

- 8.2.2 Briefly explain the difference between magma and igneous rock.

Magma is _____ (1)

Igneous rock is _____ (1)

- 8.3 Rocks on the surface of the earth are weathered to form smaller particles.
Mention any THREE important factors that influence the process of weathering.

(3)
[16]

QUESTION 9

MINING IN SOUTH AFRICA

- 9.1 Conservationists have realized that instead of fighting against mining operations, it is more effective to work with the mining companies to develop programmes to restore the environment to its original condition.

9.1.1 Give TWO reasons why ...

- (a) mining operations never stop.

(4)

- (b) conservationists are concerned about mining practices.

(4)

- 9.1.2 Suggest TWO ways in which conservationists and mining companies can work together.

(4)

9.1.3 List the four layers of the atmosphere.

(4)

9.2 Discuss what the influence of the following scenario would be on the spheres.
The average temperature rises considerably as a result of global warming.

(2)

[18]

QUESTION 10

BIRTH, LIFE AND DEATH OF STARS

10.1 Why are stars seen as different colours in the sky?

(1)

10.2 Draw a flow diagram showing the life cycle of a star using the terms below:

(red giant, protostar, nebula, white dwarf, blue star)

(5)

[6]

TOTAL SECTION C: 40

TOTAL: 100

END