



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

**NATURAL SCIENCES**

**MEMORANDUM**

**10 pages**

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MEMORANDUM

**SECTION A**

**MULTIPLE-CHOICE QUESTIONS**

**QUESTION 1**

- |     |     |            |
|-----|-----|------------|
| 1.1 | C ✓ | (1)        |
| 1.2 | B ✓ | (1)        |
| 1.3 | A ✓ | (1)        |
| 1.4 | B ✓ | (1)        |
| 1.5 | A ✓ | (1)        |
| 1.6 | D ✓ | (1)        |
| 1.7 | A ✓ | (1)        |
| 1.8 | B ✓ | (1)        |
|     |     | <b>[8]</b> |

**QUESTION 2**

**TERMINOLOGY**

- |     |                 |            |
|-----|-----------------|------------|
| 2.1 | Newton✓         | (1)        |
| 2.2 | Electrolyte✓    | (1)        |
| 2.3 | Resistor✓       | (1)        |
| 2.4 | Ore✓            | (1)        |
| 2.5 | Global warming✓ | (1)        |
| 2.6 | Supernova✓      | (1)        |
|     |                 | <b>[6]</b> |

**QUESTION 3**

**MATCHING COLUMNS**

- |     |                           |            |
|-----|---------------------------|------------|
| 3.1 | C (Power surge) ✓         | (1)        |
| 3.2 | H (Power station) ✓       | (1)        |
| 3.3 | B (Ammeter) ✓             | (1)        |
| 3.4 | A (Gravitational force) ✓ | (1)        |
| 3.5 | E (Troposphere) ✓         | (1)        |
| 3.6 | D (Larva) ✓               | (1)        |
|     |                           | <b>[6]</b> |

**TOTAL SECTION A: [20]**

**SECTION B****ENERGY AND CHANGE****FORCE**

4.1 Forces can cause object to:

Start moving✓

To speed up✓

To change direction✓

To change shape✓

To rotate✓

(Mark any two correct answers) (2)

4.2 4.2.1 Tension force ✓ (1)

4.2.2 Compression✓ (1)

4.3 4.3.1 Magnetic force. ✓ (1)

4.3.2 **Photo A** – Magnetic fields are attracted at the poles as a result of strong forces of unlike poles. ✓✓

**Photo B** – Magnetic fields repel each other at the pole as a result of weaker forces at the like poles. ✓✓ (4)

4.3.3 Gravitational forces ✓ (1)

Electrostatic force ✓ (1)

**[11]**

## QUESTION 5

## SERIES AND PARALLEL CIRCUIT

- 5.1 5.1.1  $3V \times 4$ ✓  
=12V✓ (2)
- 5.1.2 The currents through the light bulbs 2 and 3 are equal to each other because they are connected in parallel.✓✓ (2)
- 5.1.3 The current through the light bulb 1 is higher than the current in bulb 2. ✓✓ (2)
- 5.1.4 Light bulb 3 will go out / off. Because bulb 1 is connected in series, so if it blows there is a gap in the circuit✓✓ (2)
- 5.1.5 It will continue to shine / burn. Because bulb 2 is connected in parallel, so if it blows there is still a path in which the current can flow. ✓✓ (2)
- 5.2
- Thickness of the conductor✓
  - Length of the conductor ✓
  - Type of material ✓
  - Temperature of the conductor ✓ (Any two) (2)

**[12]**

**QUESTION 6****ELECTRICITY GENERATION IN SOUTH AFRICA**

- 6.1 6.1.1 Because there are no coal reserves in Western Cape.✓ (1)
- 6.1.2 Uranium. ✓ (1)
- 6.1.3 Nuclear waste can cause  
- burns  
- cancer, and  
- genetic mutation ✓ (Any one) (1)
- 6.2 6.2.1 Sun✓ / Solar energy (1)
- 6.2.2 No air pollution✓ (1)
- 6.2.3 Water✓ (1)
- 6.2.4 Renewable energy✓ (1)
- 6.2.5 The up-and-down motion of waves can be converted into electrical energy. ✓ (1)
- 6.2.6 renewable✓ (1)
- 6.2.7 Radioactive element✓ (1)

**[10]**

**QUESTION 7**

**COST OF ELECTRICAL POWER**

7.1 Laptop✓ (1)

7.2 You can use a geyser blanket.✓  
Use a geyser timer.✓  
Switch the geyser on and off when required.✓ (2)

[Mark any two correct answers.]

7.3 Cost of energy use =  $kw \times h \times cost$   
=  $2 \times 3 \times 60c$ ✓✓  
360c✓

Total cost = R3, 60c✓ (4)  
[7]

**TOTAL SECTION B: [40]**

## SECTION C

## QUESTION 8

## EARTH AND BEYOND

## EARTH AS A SYSTEM

## 8.1

- Lithosphere and Hydrosphere ✓ (Water erodes soil.)
- Atmosphere and Hydrosphere ✓ (Water evaporates from oceans becoming vapour in the atmosphere.)
- Lithosphere and atmosphere ✓ (Volcanoes erupt, shooting gases and dust into the atmosphere.)
- Biosphere and atmosphere ✓ (Plants give off oxygen during photosynthesis. Plants use carbon dioxide during photosynthesis.)
- Biosphere and Hydrosphere ✓ (Water is used by plants and animals.)
- Biosphere and Lithosphere ✓ (Plants derive water from the soil. Animals use water to sustain life.) (6)

## 8.2

- 8.2.1
1. Igneous rock ✓ (1)
  2. Sediment ✓ (1)
  3. Sedimentary rock ✓ (1)
  4. Metamorphic rock ✓ (1)
  5. Magma or Lava ✓ (1)

- 8.2.2 **Magma** is a hot melted rock. ✓  
**Igneous rock** is the rock that forms when Magma cools down. ✓ (2)

## 8.3

- Heat ✓  
 Cold ✓  
 Water ✓  
 Wind ✓
- (Any three) (3)

**[16]**



## QUESTION 9

## MINING IN SOUTH AFRICA

- 9.1 9.1.1 (a) It generates revenue for a country. ✓✓  
 It provides employment for people. ✓✓  
 It provides opportunities for scientific and technological research. ✓✓  
 (Any two) (4)
- (b) It changes the landscape around the site. ✓✓  
 The waste products pollute the water, air and land. ✓✓  
 It damages places with high value in tourism. ✓✓  
 It damages places of cultural heritage. ✓✓  
 Farming land and conservation areas are lost because mining uses a lot of land. ✓✓  
 (Any two) (4)
- 9.1.2 There should be strict government laws that govern mining. ✓✓  
 Old unused mines could be restored to their original condition. ✓✓  
 There should be laws to govern pollution. ✓✓  
 Guidelines should be drawn up to make sure that mining activities do not damage the environment of the surrounding communities. ✓✓  
 (Any two) (4)
- 9.1.3 Troposphere ✓  
 Stratosphere ✓  
 Mesosphere ✓  
 Thermosphere ✓ (4)
- 9.2 Global climate change would follow. ✓ E.g. the snow would melt, the rivers might dry up, the plants and animals would suffer from an increase in average temperature. ✓ (2)

[18]

**QUESTION 10**

**BIRTH, LIFE AND DEATH OF STARS**

10.1 The colour of a star is determined by age ( life cycle). ✓

OR

The colour of a star is determined by its temperature. ✓

(Any one)

(1)

10.2 Nebula✓ → Protostar✓ → Blue star✓ → Red gaint✓ → White dwarf✓

(5)

[6]

**TOTAL SECTION C: [40]**