



education

Department of
Education
FREE STATE PROVINCE

GRADE 9

NATURAL SCIENCES

NOVEMBER 2023

MEMORANDUM

MARKS: 100

This memorandum consists of 8 pages

SECTION A**QUESTION 1**

- | | | |
|------|-----|-------------|
| 1.1 | A ✓ | (1) |
| 1.2 | C ✓ | (1) |
| 1.3 | D ✓ | (1) |
| 1.4 | B ✓ | (1) |
| 1.5 | D ✓ | (1) |
| 1.6 | B ✓ | (1) |
| 1.7 | C ✓ | (1) |
| 1.8 | C ✓ | (1) |
| 1.9 | D ✓ | (1) |
| 1.10 | B ✓ | (1) |
| | | [10] |

QUESTION 2

- | | | |
|-----|----------------------|------------|
| 2.1 | (Electrical) power ✓ | (1) |
| 2.2 | Koeberg ✓ | (1) |
| 2.3 | Hydroelectricity ✓ | (1) |
| 2.4 | Transformer ✓ | (1) |
| 2.5 | Earth ✓ (wire) | (1) |
| | | [5] |

QUESTION 3

- | | | |
|-----|-----|------------|
| 3.1 | B ✓ | (1) |
| 3.2 | E ✓ | (1) |
| 3.3 | G ✓ | (1) |
| 3.4 | H ✓ | (1) |
| 3.5 | I ✓ | (1) |
| | | [5] |

TOTAL SECTION A: 20

SECTION B**QUESTION 4**

4.1.1 The objects are not in contact with each other, and the forces are exerted (work) over a distance. ✓ (1)

4.1.2 Iron, cobalt, nickel, a ferromagnetic substance ✓ (ANY ONE) (1)

4.1.3 (a) Negative ✓ (1)

(b) Positive **OR** Neutral ✓ (1)

4.2.1 Mass ✓ (of the objects)
Distance ✓ (between the centers of the two objects) (2)

4.2.2 Mass is the amount of matter an object consists of. ✓
Weight is the gravitational force the earth exerts on an object. ✓ (2)

4.2.3 (a) 1 N ✓ (1)

(b) 0,45 kg ✓ (1)

(c) As mass increases, weight also increases.

OR

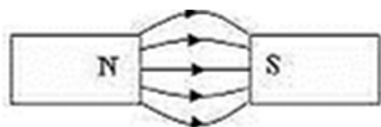
Weight is directly proportional to mass.

Marking criteria	Marks
Both variables are mentioned: mass and weight	1
The relationship between the variables is indicated.	1

(2)

(d) The distance from the (center) of the earth. ✓ (1)

4.3



Marking criteria:

- ✓ Shape of the magnetic field.
- ✓ Direction indicated from N to S.

(2)

4.4.1 Friction / Frictional force ✓ (1)

4.4.2 C ✓ (1)

[17]

QUESTION 5

5.1.1 To provide energy for the current to flow. ✓

OR

A cell is a source of energy. ✓

(1)

5.1.2 Connect more (lemon) cells ✓ in series. ✓

(2)

5.2.1 **Length ✓ of the resistor:**

The longer a resistor, the higher the resistance. ✓

OR

The shorter a resistor, the lower the resistance. ✓

Thickness ✓ of the resistor:

The thinner the resistor, the higher the resistance. ✓

OR

The thicker the resistor, the lower the resistance. ✓

Type of resistor: ✓

Some metals have a lower/higher resistance than others. ✓

Marking criteria:

✓Thickness; ✓Discussion

✓Length; ✓Discussion

✓Type; ✓Discussion

(ANY TWO) (4)

5.2.2 (a) Nichrome ✓

(1)

(b) The bulb will glow brighter. ✓

(1)

(c) Elements in kettles, geysers, heaters, toasters, stove plates ✓

Bulb filaments ✓

Rheostats (variable resistors) ✓

Motors ✓

Light sensitive diodes, light emitting diodes/LEDs ✓

(ANY ONE) (1)

[10]

QUESTION 6

6.1.1 The number of bulbs in series increases from circuit A to B to C. ✓ (1)

6.1.2 More bulbs/resistors in series ✓ in circuit C.
Higher overall resistance. ✓
Lower current / Smaller ammeter reading. (Given; no mark awarded.) (2)

6.2.1 $V_2 = 12\text{ V} - (2\text{ V} + 7\text{ V})$ ✓
 $= 3\text{ V}$ ✓ (2)

6.2.2 R_1 ✓ (1)
[6]

QUESTION 7

7.1 The bulbs are connected in parallel ✓ (to batteries with the same potential difference).
OR
Bulbs connected in parallel are NOT potential dividers, ✓ but current dividers. (1)

7.2 Circuit 1 has less bulbs connected in parallel. ✓
Overall resistance is higher ✓ than in circuit 2.
The overall current in circuit 1 is therefore less than the current in circuit 2.

OR

Circuit 2 has more bulbs connected in parallel. ✓
Overall resistance is lower ✓ than in circuit 2.
The overall current in circuit 2 is therefore more than the current in circuit 1. (2)

7.3 $A_1 = A_2 = 2\text{ A} \div 2 = 1\text{ A}$ ✓ (1)

7.4 $A_4 = A_5 = A_6 = 3\text{ A} \div 3 = 1\text{ A}$ ✓ (1)

7.5 All bulbs will have the same brightness. ✓ (1)
[6]

QUESTION 8

- 8.1 800 W ✓ (1)
- 8.2 $380 \text{ W} \div 1000 = 0,38 \text{ kW}$ ✓ (1)
- 8.3 1 kW used for 1 hour ✓ **OR** 1 kWh ✓ (1)
- 8.4 Cost = Power rating of the appliance x Time used x Unit price of electricity
 $= 0,8 \times 10 \times 3$ ✓
 $= \text{R } 24,00$ ✓ (Accept: R 24; answer with unit) (2)
- 8.5 Cost = Power rating of the appliance x Time used x Unit price of electricity
 $= 0,38 \times 10 \times 3$ ✓
 $= \text{R } 11,40$ ✓ (Rounded to 2 decimals) (2)
- 8.6 It saves money / is cheaper / costs less to use energy-saving devices. ✓
 Less electricity must be generated, therefore less fossil fuel is used. ✓
 Smaller negative impact on the environment / less greenhouse gases are emitted /
 less pollution. ✓
 Reduces the demand for electricity and can lead to less loadshedding. ✓
(ANY TWO) (2)
[9]

QUESTION 9

- 9.1 Power station / Coal-fired power station ✓ (1)
- 9.2 Coal ✓ (1)
- 9.3 Steam ✓ (1)
- 9.4 Generator ✓ (1)
- 9.5 Coal is a fossil fuel and cannot be replaced / replenished. ✓ (1)
- 9.6 Solar energy ✓
 Wind energy ✓
 Hydro-energy ✓
 Wave energy ✓
 Biomass ✓
 (Accept: Nuclear energy ✓) **(ANY THREE)** (3)
[8]

QUESTION 10

- 10.1 Lithosphere✓ (1)
- 10.2 The roots of the tree are anchored by the soil and keep the tree upright.✓ (1)
- 10.3 Hydrosphere✓ (1)
- 10.4 The leaves of the tree absorb carbon dioxide from the atmosphere for photosynthesis✓ and releases oxygen which supports the respiration of other organisms.✓ (2)
- [5]**

QUESTION 11

- 11.1 P – inner core✓
R - mantle✓
S - crust✓ (3)
- 11.2.1 Magma✓ (1)
- 11.2.2 Igneous rock✓ (1)
- 11.2.3 Fossils are not found in igneous rock because plant and animal remain trapped in lava/igneous rock will be burnt off (incinerated) due to the extreme heat. ✓ (1)
- 11.2.4 When igneous / sedimentary rocks are subjected to high pressure✓ and high temperatures, ✓ they change into metamorphic rock. (2)
- 11.2.5 Coal✓ (1)
- [9]**

QUESTION 12

- 12.1 A - Troposphere✓
 B - Stratosphere✓
 C – Mesosphere✓
 D - Thermosphere✓ (4)

- 12.2 -60°C✓ (1)

- 12.3 As the height increases, temperature also increases.

OR

Temperature increases with the increase in height.

Marking criteria	Marks
Both variables are mentioned: height and temperature	1
The relationship between the variables is indicated.	1

(2)

- 12.4 Ozone✓ (1)

- 12.5 Global warming can lead to:
- climate change / severe storms / severe droughts✓
 - rising sea levels / warming oceans✓
 - food shortages✓
 - mass extinction✓
 - health risks✓
 - poverty / displacements✓

(ANY TWO) (2)
[10]

TOTAL SECTION B: 80
GRAND TOTAL: 100