Hillcrest High School

NATURAL SCIENCE

NOVEMBER 2023

Grade 9

MARKS: 120

TIME: 2 Hours

EXAMINERS: Mrs Smith & Mrs Knox-Whitehead

MODERATOR: Mrs R. Harmse

MEMO

SECTION A : ENERGY AND CHANGE [60]

QUESTION 1: MULTIPLE CHOICE QUESTIONS [1 x 5 = 5]

1.1 B
1.2 B
1.3 D
1.4 C
1.5 B

QUESTION 2: TERMINOLOGY [5]

2.1 heliostats (1)
2.2 diode (1)
2.3 resistance (not resistor) (1)
2.4 electrostatic (1)
2.5 fuse (1)

QUESTION 3: FORCES [18]

3.1.1 electrostatic force
3.1.2 tension (accept gravitational force….it is causing the tension)
3.1.3 compression
3.1.4 magnetism

(4)

3.2 **X** = N or North ✓
Y = S or South ✓ (2)

3.3
3.3.1 $F_{net/res} = F_1 + F_2$ ✓
$= 125 + 70$ ✓
= 195 N right ✓ **(must have direction and unit for this mark)** (3)

3.3.2 left (1)

3.3.3 $F_{net/res} = F_1 + F_2$ ✓
$187,5 = 195 + F_f$ ✓

Ff = -7,5 = 7,5N ✓

(must show layout clearly or no marks for workings. No direction required for answer. Answer must be given as a positive as the - indicates direction.)

(3)

3.4.1 W = mg ✓

= 2700 x 9,8 ✓

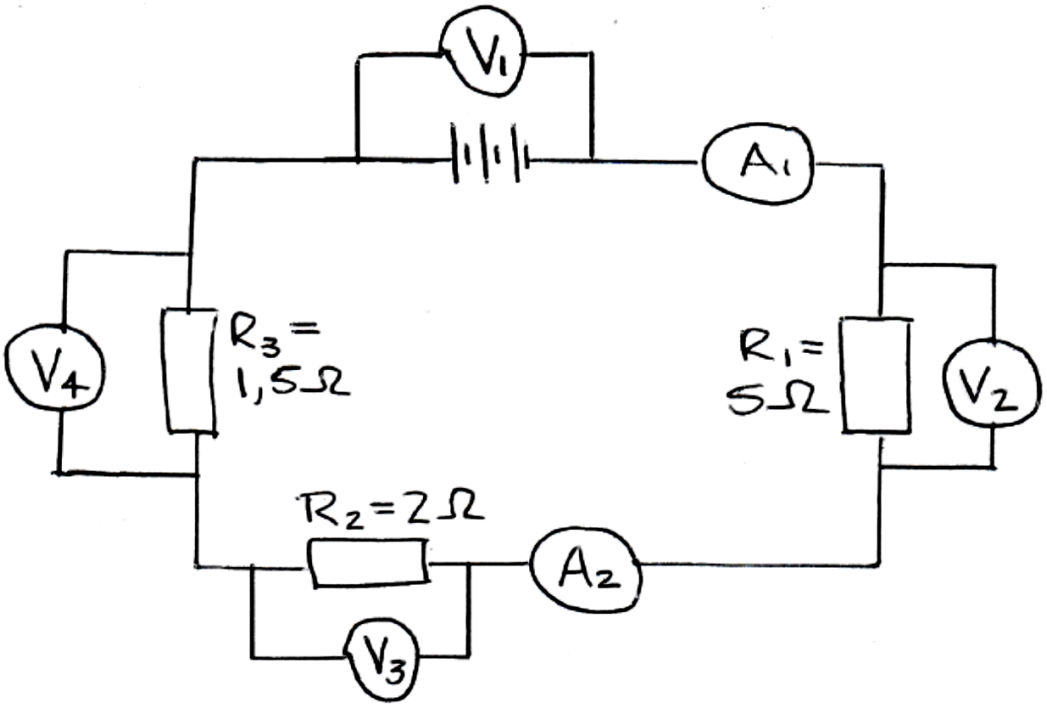
= 26 460 N ✓ **(must have unit for this mark)** (3)

3.4.2 DECREASE ✓ (1)

3.4.3 The mass of the moon is smaller than earth. ✓ (1)

QUESTION 4: CIRCUITS **[14]**

4.1



4.1.1 Rt = R1 + R2 + R3 ✓

= 5 + 2 + 1,5 ✓

= 8,5 Ω ✓ **(must have unit)** (3)

4.1.2 I = V/R ✓ **(must NOT say A = V/R; this is NOT the formula)**

= 6/8,5 ✓

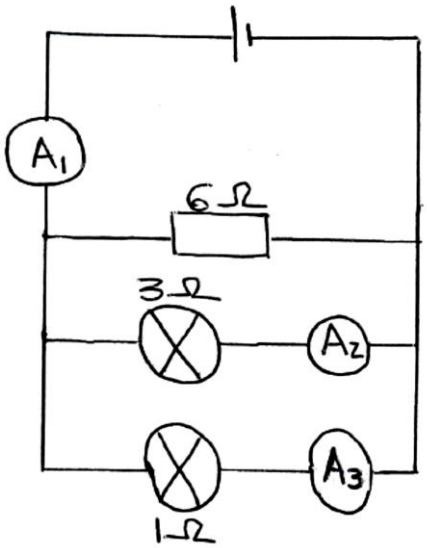
= 0,71 A ✓ **(must have unit and correctly rounded to 2 dec places)** (3)

4.1.3 V = I x R ✓
= 0,71 x 2 ✓
= 1,42 V ✓ **(must have unit; if used wrong answer from Q4.1.2 correctly, give the marks for this question)** (3)

4.2

4.2.1 1/Rp = 1/R1 + 1/R2 + 1/R3 ✓
= 1/6 + 1/3 + 1/1 ✓
= 3/2
Rp = 2/3 } ✓ **clearly changing LHS to Rp**
= 0,67Ω✓ **(with unit)** (4)

4.2.2 **A_1, A_3, A_2** ✓ **(for all correct)** (1)



QUESTION 5: SCIENTIFIC METHOD [16]

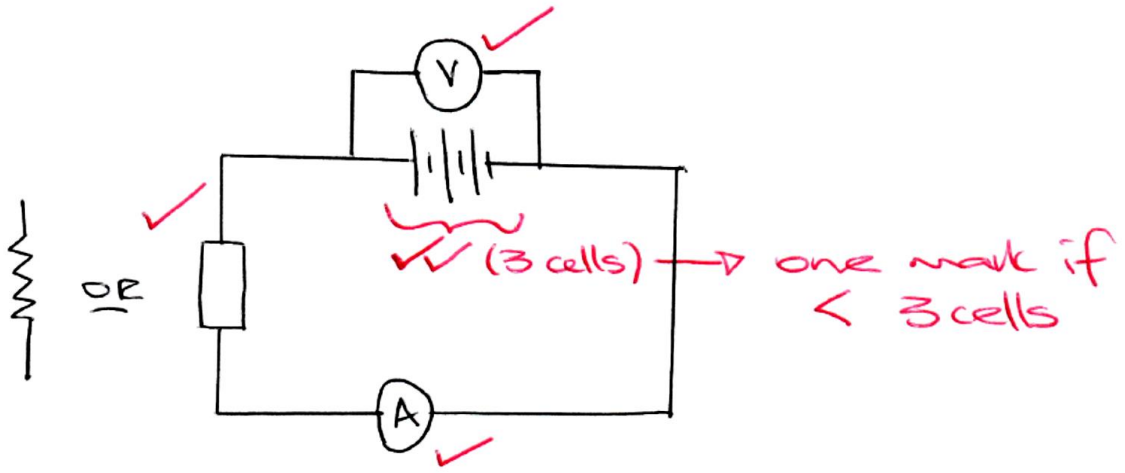
TABLE SHOWING VOLTAGE AND CURRENT STRENGTH

NO OF CELLS	AMMETER READING (A)	VOLTMETER READING (V)
1	0,6	3
2	1,2	6
3	1,8	9

5.1 Current strength (NOT ammeter reading; the name of the variable was given in bold in the blurb) (1)

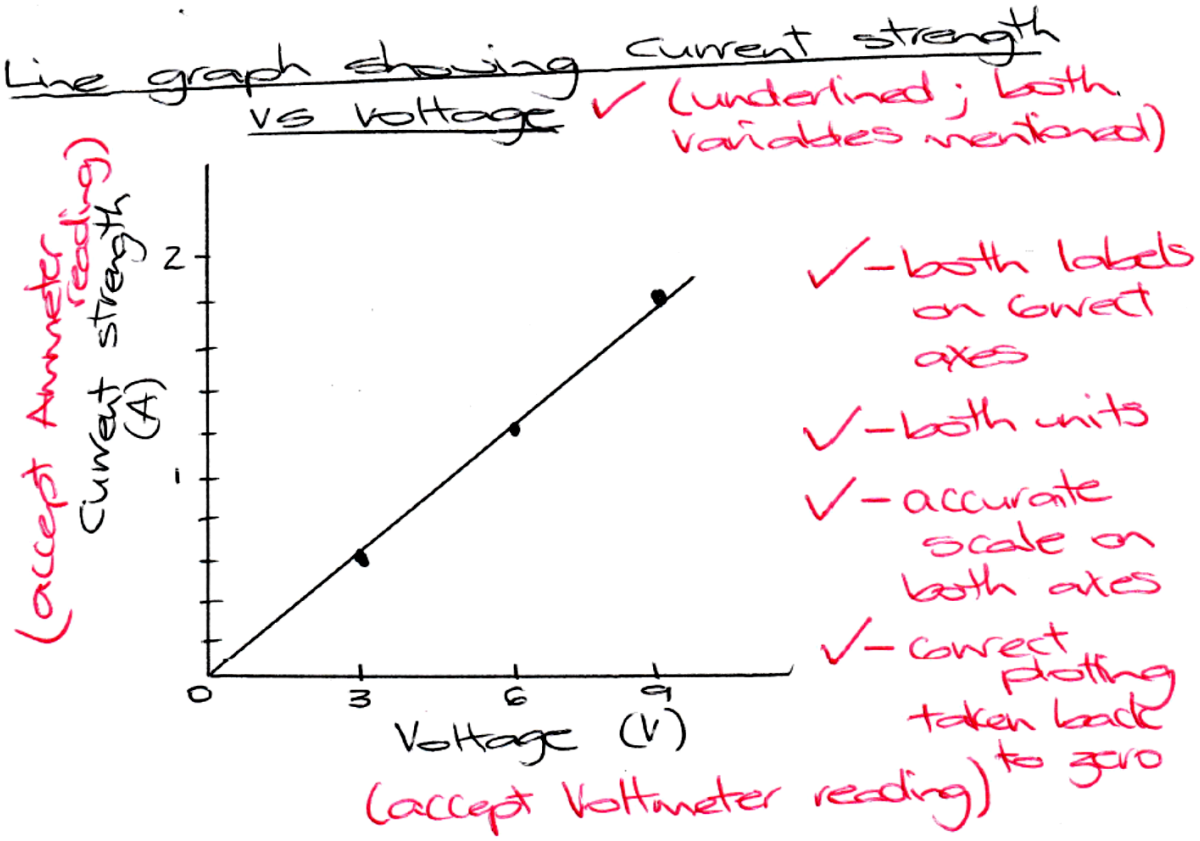
5.2 What is the relationship between voltage ✓ and current strength ✓? (cannot be a YES/NO question) (2)

5.3



(5)

5.4



(5)

5.5 R = V / I ✓

= 3 / 0,6 ✓ **(using any of the 3 values from the table)**

= 5 Ω ✓ (including unit) (3)

QUESTION 6: ALTERNATIVE ENERGY [2]

6.1 Nuclear power / Wind / Sun-heated steam (NOT solar – too vague) /
Hydroelectric / Pumped storage / Sea/Ocean waves (Any one) (1)

6.2 (1)

Nuclear fission : radioactive waste / dangerous

Wind: requires a lot of space / harms birds / very noisy

Sun-heated steam: requires a lot of space / sunshine

Hydroelectric: problem in a drought

Pumped storage: problem in a drought / uses elec to pump water back up

Ocean waves – need to be near the ocean

(Any reasonable disadvantage but MUST match the energy type they named in 6.1.)

TOTAL SECTION A : [60]

SECTION B: EARTH SCIENCE MEMO

QUESTION 1 MULTIPLE CHOICE (1 X 5 = 5)

1.1 B

1.1 A

1.2 D

1.3 B

1.5 A

QUESTION 2 TERMINOLOGY (1 x 5 = 5)

2.1 global warming

2.2 greenhouse (gases)

2.3 biosphere

2.4 weathering

2.5 sediment

QUESTION 3: (4)

3.1 they will die (1)

3.2 1 the tree takes in carbon dioxide from the air /
the tree releases water vapour into the air /
the tree releases oxygen into the air (any one) (1)

3.2.2 the tree helps to combat soil erosion by root anchoring /
the tree decays and puts nutrients back into the soil /
the tree absorbs water from the soil /
the tree absorbs nutrients form the soil (any one) (1)

3.2.3 birds nest in the tree /
the tree provides shelter for birds and animals /
herbivores eat the leaves of the tree (any one) (1)

QUESTION 4: (7)

4.1 KZN (1)

4.2 Gauteng (1)

4.3 R62770 million – R62667 million ✓ = R 103 million ✓ (2)

4.4 $\frac{542096}{58\,000\,000}$ ✓ x 100 % ✓

= 0,93 % ✓ (3)

QUESTION 5: (7)

5.1 extreme temperature fluctuations (1)

5.2 the amount of variation found in the genes, species, and ecosystems on Earth. (1)

5.3 climate change (1)

5.4 They assist with the production of fruits, vegetables, and flowers through pollination.
They decompose organic matter. /
They even help control other harmful pests. ✓✓ **(any 2)** (2)

5.5 A (1)

5.6 because they lack mechanisms to regulate their body temperature (1)

QUESTION 6: (6)

6.1.1 inner core (1)

6.1.2 crust (1)

6.1.3 mantle (1)

6.2.1 igneous (1)

6.2.2 metamorphic (1)

6.2.3 sedimentary (1)

QUESTION 7: (4)

(cause + effect) of ANY TWO of the following:

- **climate change** ✓
  weather patterns become unpredictable /
  thunderstorms / cyclones more severe ✓

- **rising sea levels** ✓
  increased temps causing icecaps to melt;
  low lying areas will be flooded / islands will disappear ✓

- **food shortages** ✓
  crops may no longer survive because of change in climate;
  leads to food shortages and starvation ✓

- **mass extinctions** ✓
  habitats lost due to flooding or climate change;
  species become extinct if they can't adapt fast enough ✓

QUESTION 8: (14)

8.1 altitude / height above sea – level ✓ (km) ✓ (2)

8.2 altitude (1)

8.3.1 troposphere (1)

8.3.2 stratosphere (1)

8.3.3 mesosphere (1)

8.3.4 thermosphere (1)

8.4 83 – 48 ✓
= 35 km ✓ (2)

8.5 The presence of the ozone layer ✓ which absorbs ultra-violet radiation ✓ (2)

8.6 550 / 100 ✓ = 5,5
30 + 5,5 ✓
= 35,5 °C ✓ (3)

8.7 (i) skin cancers → death ✓
(ii) cataracts → cloudy vision ✓
(iii) supress immune system → increase in illness ✓ (3)

QUESTION 9: (5)

9.1 nebulae
9.2 hydrogen into helium
9.3 fusion
9.4 hotter
9.5 white dwarfs

TOTAL SECTION B: (60)

FINAL TOTAL (120)