# Bergvliet High School

GRADE 8

NATURAL SCIENCES:

Science Exams

17 November 2023

MARKS: 75

TIME: 75 min

EXAMINER: Z Booysen

MODERATOR/S: Am, Vh, La, Sk

This question paper consists of 12 pages. Disconnect this page and attach it to the front of your answer script.

**Name** _____ **Teacher: Vh/La/Am/Bn /Sk Class:**

| For official use only | | | | | |
|---|---|---|---|---|---|
| **Question 1** | Marker | Moderator | **Question 6** | Marker | Moderator |
| **Question 2** | Marker | Moderator | **Question 7** | Marker | Moderator |
| **Question 3** | Marker | Moderator | **Question 8** | Marker | Moderator |
| **Question 4** | Marker | Moderator | **Total** | Marker | Moderator |
| **Question 5** | Marker | Moderator | **Percentage** | Marker | Moderator |
| **Signature** | Marker | | **Signature** | Moderator | |

**INSTRUCTIONS**

1. Write your **NAME** and science teacher code (**Am/Bn/Sk/Vh/La**) in the appropriate space on the Cover Page and all scripts handed in.
2. The question paper consists of 8 questions. Answer ALL the questions.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Leave ONE line between two sub questions, for example between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments.
8. You are advised to use the attached DATA SHEET.
9. Show ALL formulae and substitutions in ALL calculations.
10. Round off your **final numerical answers** to a minimum of **TWO decimal places**.
11. Give brief motivations, discussions, et cetera where required.
12. Write neatly and legibly.

## Answer Sheet

**Name:**_____ **Teacher Code: Am/Bn/Vh/Oc/Sk**

## Question 1

Make a **cross (X)** in the appropriate box next to the relevant question number (1.1 – 1.10)

| | | | | |
|---|---|---|---|---|
| 1.1 | A | B | C | D |
| 1.2 | A | B | C | D |
| 1.3 | A | B | C | D |
| 1.4 | A | B | C | D |
| 1.5 | A | B | C | D |
| 1.6 | A | B | C | D |
| 1.7 | A | B | C | D |
| 1.8 | A | B | C | D |
| 1.9 | A | B | C | D |
| 1.10 | A | B | C | D |
| | | | **Total** | **/10** |

# Question 1 Multiple choice questions

Four options are provided as possible answers to the following questions. Each question has only **ONE** correct answer. Choose the answer and only write the letter (**A-D**) next to the question number (**1.1-1.5**) in the answer book provided.

1.1 A reaction in which something new is made is called a …… reaction.

A Decomposition

B Electrolysis

C Synthesis

D All of above (1)

1.2 What causes the build-up of charge when a balloon is rubbed against a woollen jersey?

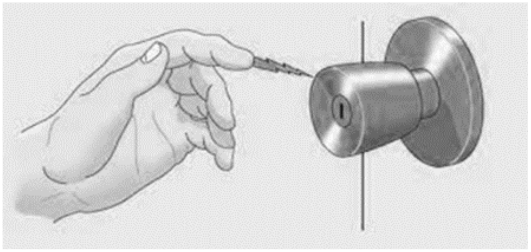
A Friction

B Current

C Resistance

D Potential Energy (1)

1.3 The spark between the finger and the doorknob is caused by ...



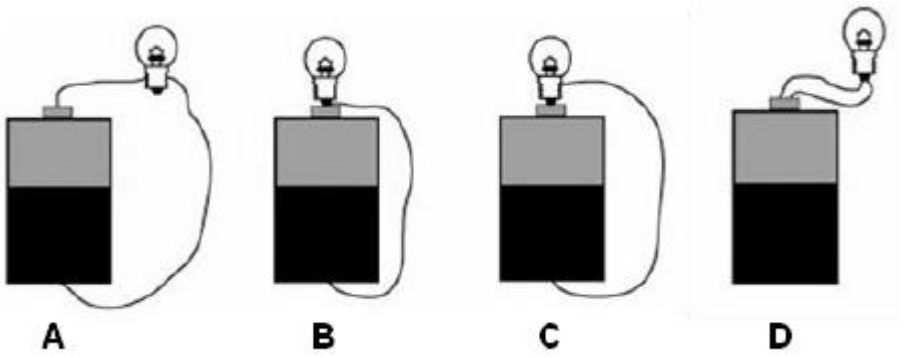
A friction.

B electricity.

C electrostatic forces.

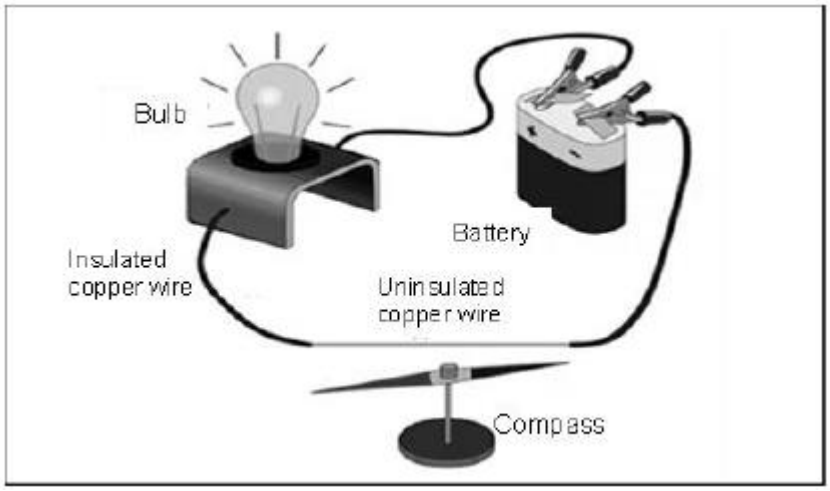
D a discharge of electrons. (1)

1.4 Study the connections in each of the diagrams below. In which ONE of the diagrams will the bulb light up?




(1)

1.5 When the current starts to flow through the copper wire, the magnetic needle of the compass deviates (rotates) because ...



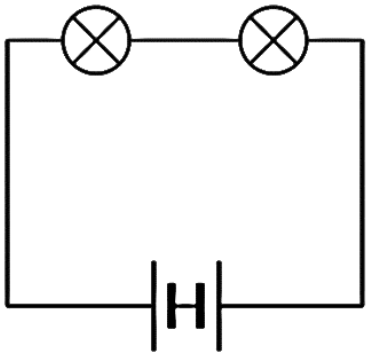

A of an electrostatic force between the wire and the needle.

B a magnetic field is created around the wire.

C of the chemical effect of an electric current.

D of the heating effect of a current. (1)

1.6 Which statement is TRUE for the circuit below?



A None of the bulbs glow.

B The two cells are connected in parallel.

C The two cells are connected in series.

D The bulbs glow with equal brightness. (1)

1.7 Where are electromagnets used?

A Computer Hard Drives

B Loud speakers

C Motors

D All of the above (1)

1.8 Which device does not involve the conversion of electrical energy into heat energy?

A Toaster

B Kettle

C Flat Iron

D Radio (1)

1.9 The straight - line motion of light is called?

A Dispersion

B Reflection

C Rectilinear propagation of light

D Radiation (1)

1.10 What is meant by the frequency of light?

A It is the number of waves that travel past a point in one second.

B It is the measure of the length between two consecutive troughs in a wave.

C It is the number of colours that white light can be broken down into.

D It is the lowest point of the wave of light. (1)

**[10]**

# Question 2

Give the correct SCIENTIFIC TERM for each of the following descriptions. Write only the number and the answer.

2.1 Two or more cells connected to each other. (1)

2.2 When an electric current follows the path of least resistance. (1)

2.3 The colour of light with the highest frequency and the shortest wavelength. (1)

2.4 The charge that results due to the loss of electrons. (1)

2.5 What do like charges do to each other? (1)

**[5]**

# Question 3

Ammonia is a useful substance that is used in the production of household cleaning products. The equation for the production of ammonia is as follows:

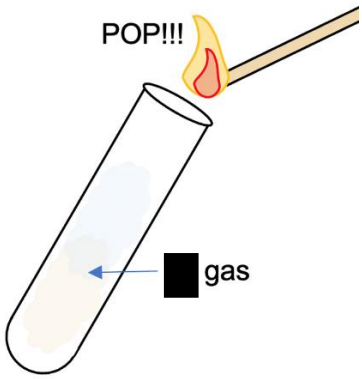
Hydrogen + Nitrogen ⟶ Ammonia ($NH_3$)

3.1 Name the reactants in this reaction. (2)

3.2 Are the reactants in the reaction elements or compounds? (1)

3.3 Write a balanced equation for the word reaction above. (3)

3.4 A positive test for one of the reactants is shown in the figure below.



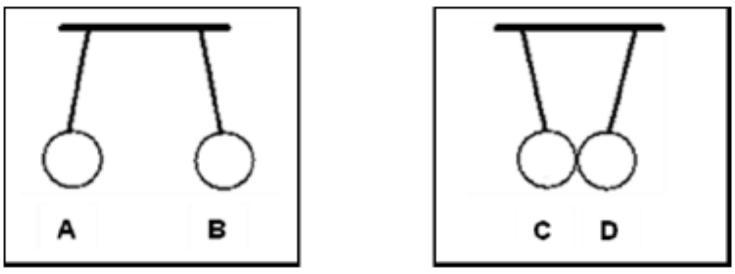

3.4.1 For which of the reactants is it a positive test? (1)

3.4.2 Briefly describe the test for this reactant. (2)

**[9]**

# Question 4

Spheres A, B, C and D shown below, all carry electrostatic charges

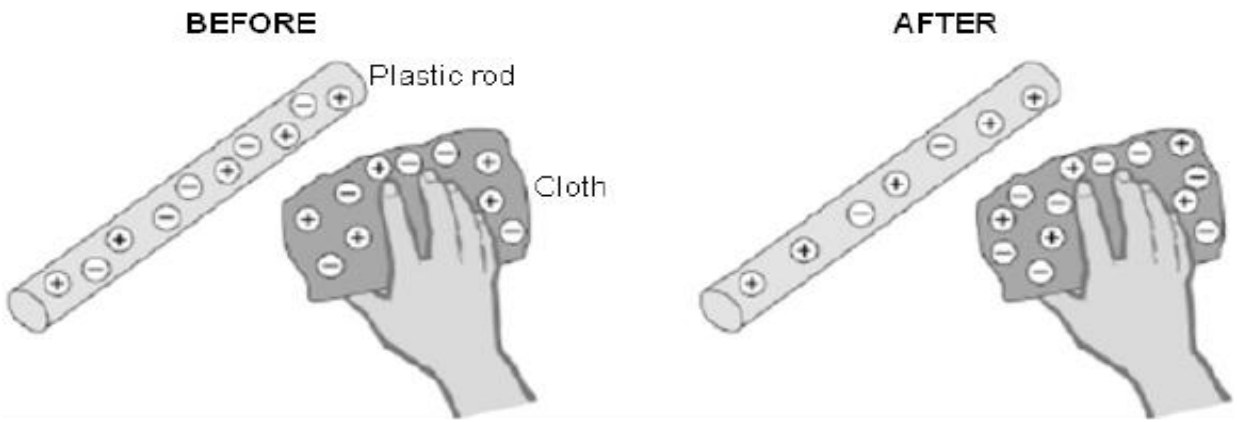



4.1 Which two spheres have like charges? (1)

4.2 Which two spheres attract each other? (1)

4.3 Redraw spheres C and D in your answer book and indicate the possible charge on each sphere. (1)

4.4 A learner rubs a plastic rod with a cloth as shown below.




**Use the DIAGRAM to answer the questions.**

4.4.1 What is the charge on the plastic rod BEFORE it is rubbed with the cloth? (1)

4.4.2 Give a reason for your answer in question 4.4.1 (1)

4.4.3 What is the charge on the rod AFTER rubbing? (1)

4.4.4 The INCORRECT explanation for the charge on the rod AFTER rubbing is given below.

**Due to friction between the hand and the cloth, protons move from the rod to the cloth.**

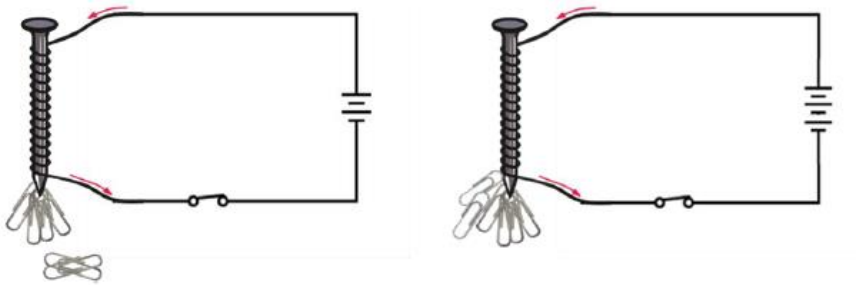
Identify the TWO mistakes in the explanation. Rewrite the sentence and correct BOTH mistakes. (2)

**[8]**

# Question 5

The aim of the scientific investigation below is to determine how the number of cells connected in series affects the strength of an electromagnet.

An electromagnet (with an iron nail as the core) connected to two cells picks up FOUR iron paper clips. When the same electromagnet is connected to three cells, it picks up SIX paper clips.



5.1 For this investigation, identify the following:

5.1.1 the independent variable. (1)

5.1.2 the dependent variable (1)

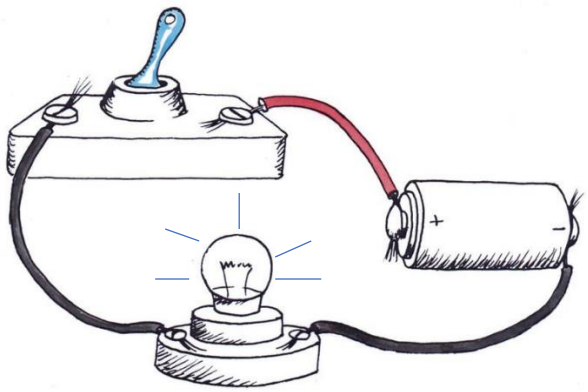
5.1.3 two variables that must be controlled to make this a fair test. (2)

5.2 Use the diagram to formulate the relationship between the number of cells and the strength of an electromagnet. (1)

**[5]**

# Question 6

6.1 Draw the following electric circuit using symbols.

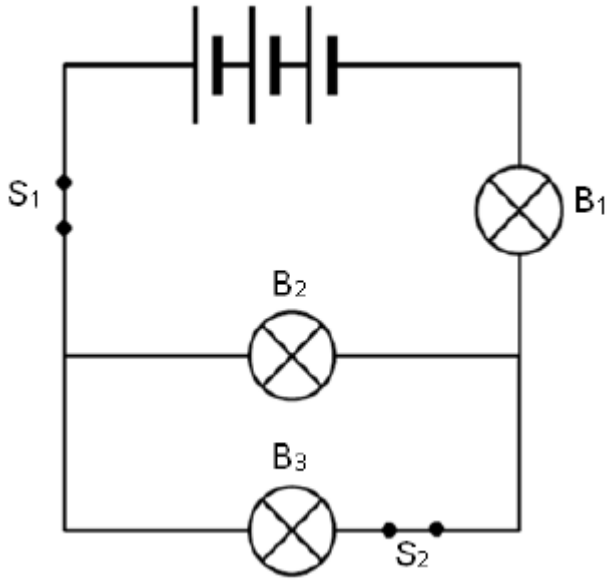


(4)

6.2 What would you include in the circuit above, if you wanted to measure the flow of the charge through the circuit? (1)

6.3 Is the circuit above a closed or open circuit? Give a reason for your answer. (2)

6.4 Study the circuit below.




6.4.1 Which bulb(s) will glow if **S2** is opened? (1)

6.4.2 Which bulb(s) will glow if **S2** is closed but **S1** is opened? (1)

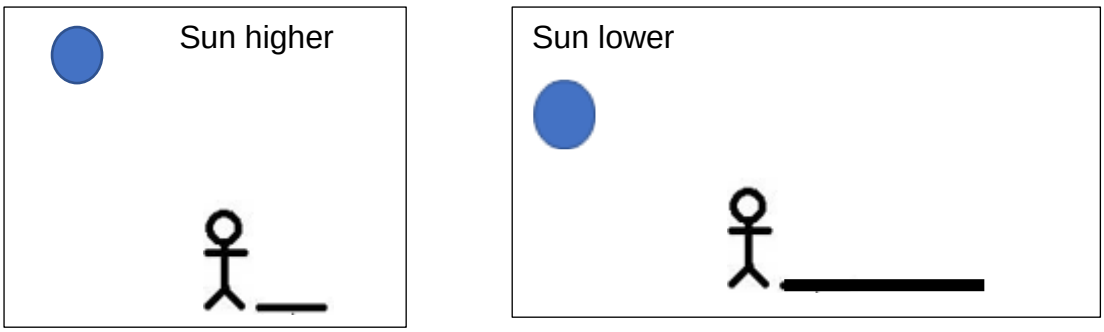
S1 and S2 are closed. **Bulb B2 is now completely REMOVED from the circuit.**

6.4.3 Fully explain why the brightness of **B1** decreases (3)

6.4.4 Give two reasons why the lights in our homes are connected in parallel (2)

**[14]**

## Question 7



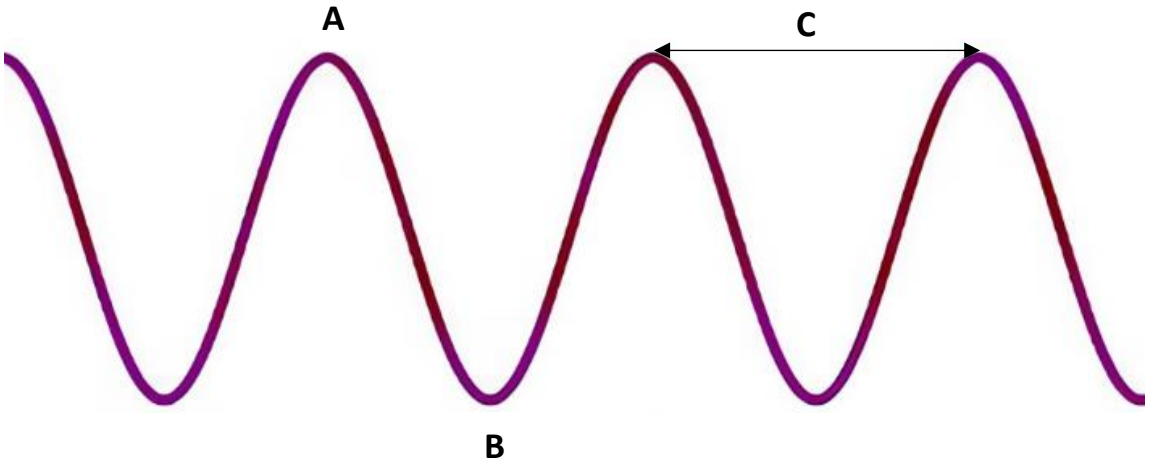

7.1 Suggest a reason why the length of shadow increases or decreases depending on the angle of the sun. (3)

7.2 Draw a ray diagram of a pinhole camera, where the image in the camera is that of a candle. (3)

7.3 Name two characteristics of the image obtained in the pin hole camera. (2)

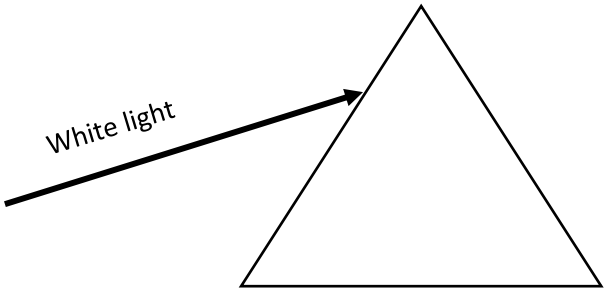
7.4 What do we call objects that emit their own light? (1)

7.5 Provide the missing labels (**A,B** and **C**) on the drawing of the wave of light below:




(3)

7.6 Redraw and complete the following drawing showing the spectrum of white light.



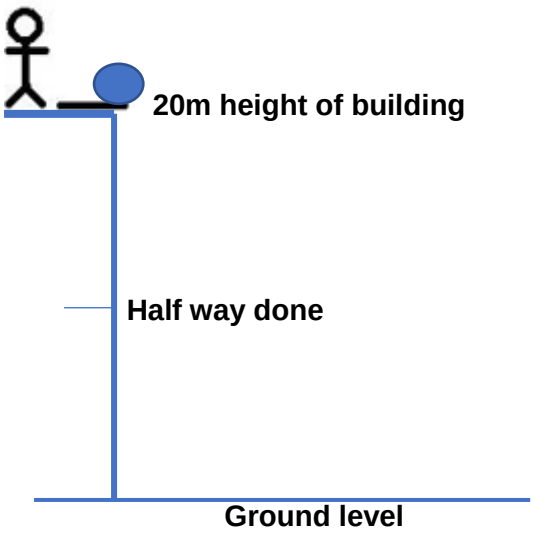

(4)

7.7 Arrange the colours green, orange, violet and yellow from lowest frequency to highest frequency. (1)

**[17]**

# Question 8

Study the diagram below of the boy on the top of a building, about to drop the ball of mass 0,5 kg over the edge. The height of the building is 20 m.




8.1 Calculate the $E_p$ (gravitational potential energy) of the ball at the top of the building. (3)

8.2 Define the *Law of Conservation of Energy*. (1)

8.3 Calculate the velocity of the ball as it passes the have way mark on its way down to the ground. (3)

**[7]**

**TOTAL 75**

**DATA SHEET**

**$E_p = mgh$** **$E_k = ½ mv^2$** **$E_p + E_k = E_m$**

**$g = 9,8\ m.s^{-2}$**