GRADE 8 **NATURAL SCIENCES EXAM** **NOVEMBER 2022**

MARKS: 100 **TIME: 2 Hours**

EXAMINER: MRS HARMSE **MODERATOR: MRS SMITH**

Instructions:

1. Answer ALL the questions.
2. This paper consists of 3 sections:

   SECTION A: Multiple Choice and Short Questions

   SECTION B: Energy and Change

   SECTION C: Planet Earth and Beyond
3. Number and answer correctly according to the numbering system used in the question paper.
4. Present your answer according to the instructions of each question.
5. Do ALL drawings in pencil and label them in blue or black ink.
6. Write neatly and legibly.

SECTION A: MULTIPLE CHOICE AND SHORT ANSWERS

QUESTION 1 [1 x 5 = 5]

Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (**A** to **D**) next to the question numbers (**1.1** to **1.5**) in the ANSWER BOOK, e.g 1.6 D.

1.1 How can you tell when static electricity has been discharged?

A Heat is released that can be felt

B Light is released and you can feel a shock

C Static electricity gives off many different colours

D The object begins to spin rapidly when it is shocked

1.2 What is the Milky Way?

A Galaxy

B Star

C Planet

D Comet.

1.3 What is the effect of changing the wire in a circuit from straight thick wire to a longer (coiled) thick wire?

A The lamps/bulbs become dimmer

B The lamps/bulbs become brighter

C The lamps/bulbs stay at the same level of brightness

D The lamps/bulbs will not come on at all

1.4 How are shadows formed?

A By light passing through an object

B By light being reflected from a shiny object

C By light being blocked by an opaque object

D By light being scattered in all directions

1.5 An astronomer wishes to measure the distance between two galaxies. Which of the units of measurement below should she use?

A Light centuries

B Hours

C Light years

D Light days

QUESTION 2 [5]

Give the correct term for each of the following descriptions. Write only the term next to the relevant question number:

2.1 A component which opens and closes a circuit

2.2 A collection of stars held by their gravity

2.3 A material which allows light to pass through it

2.4 Particles that can be removed from an atom

2.5 Circuit with two or more pathways for an electric current to flow

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QUESTION 3 [5]

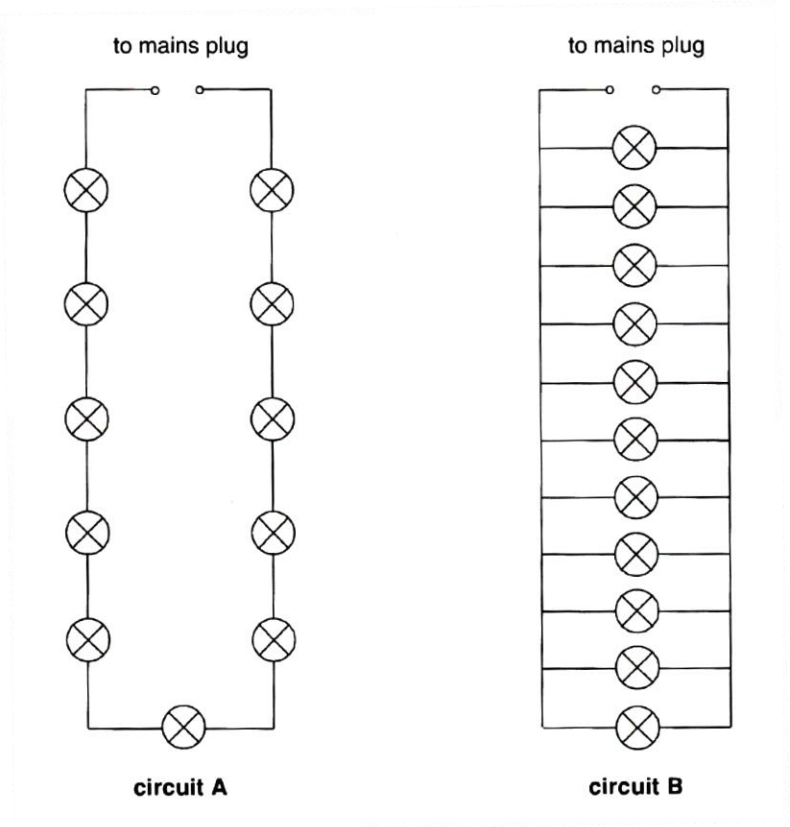
Match the statement in column **I** with the correct term in column **II**. Write only the question number and the letter of your answer, e.g 3.1 B.

	COLUMN I	COLUMN II
3.1	The build-up of electric charge	A. Repulsion
3.2	Like charges are known to have this effect	B. Sunspots
3.3	A grouping of stars with a specific name	C. Meterorite
3.4	Small solid object that crashes into the Earth	D. Galaxy
3.5	Magnetic storms on the Sun's surface	E. Constellation
		F. Static electricity
		G. Electric shock
		H. Meteor

SECTION B: ENERGY AND CHANGE

QUESTION 4 [18]

4.1 Study the diagrams below and answer the following questions. John has bought two sets of lights for his tree. The following diagrams show two circuits:



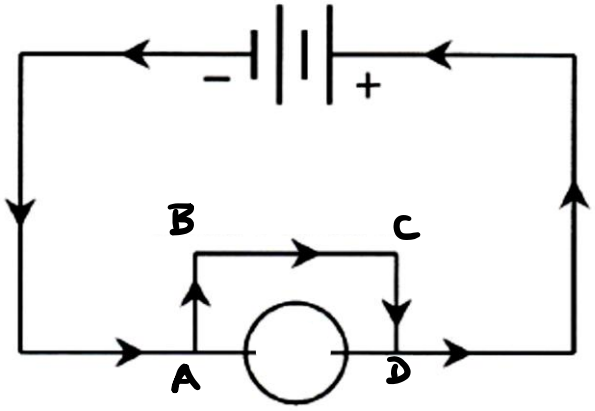
4.1.1 Why is there no battery of cells present in the diagrams? (1)

4.1.2 Which diagram represents a parallel circuit? (1)

4.1.3 Which set of lights would be better to use for John's tree?
Give a reason for your answer. (2)

4.1.4 Draw a circuit diagram of the same type as Diagram **A**. Include 2 cells, 3 light bulbs and an <u>open</u> switch in your circuit. (2)

4.2 Study the circuit diagram below very closely and answer all the questions.



4.2.1 Which path will the current take? Choose from **A – B – C – D** <u>or</u> **A – D**. (1)

4.2.2 Explain WHY current will take the path you have selected from QUESTION 4.2.1. (2)

4.2.3 What do we call this phenomenon in current electricity? (1)

4.3 You have been asked to conduct an experiment to make an electromagnet.

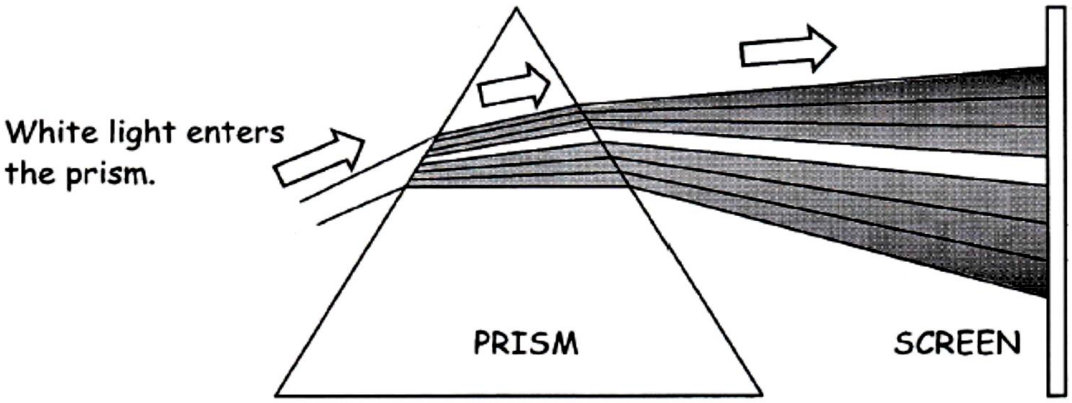
4.3.1 Draw a fully labelled diagram of your final product. (4)

4.3.2 When you tried to pick up some paper clips you noticed that you could only pick up one. Name <u>two</u> ways in which you could strengthen the magnetic effect of this electromagnet. (2)

4.3.3 Why do we use an **iron** rod for this process? (1)

QUESTION 5 [27]

5.1 Study the diagram below and answer all the questions that follow:



5.1.1 Give the term for the spreading out of white light through a prism. (1)

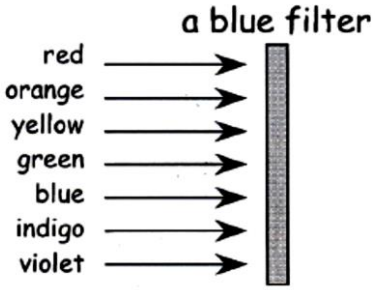
5.1.2 Where in nature can we observe this process? (1)

5.1.3 Write the names of the colours in order starting with the one that has the **shortest wavelength.** (1)

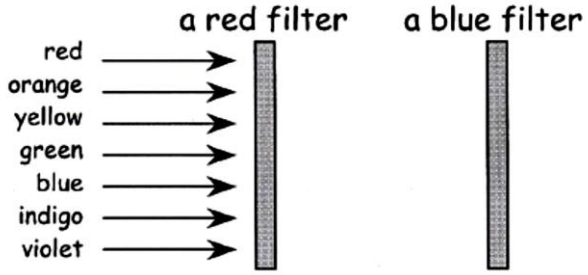
5.1.4 The range of colours in the white light is called the _____. (1)

5.1.5 Study the diagrams below. Redraw them in your answer booklet and complete them by drawing the <u>emerging</u> arrows in the correct place: (3)

A

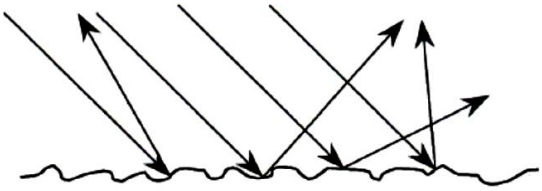


B

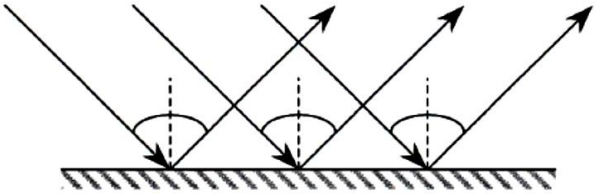


5.1.6 Explain in detail all the results observed in diagram **B** above. (3)

5.2 Shiny smooth surfaces like mirrors reflect light in a certain way. Study the diagrams below and answer the questions that follow:



A



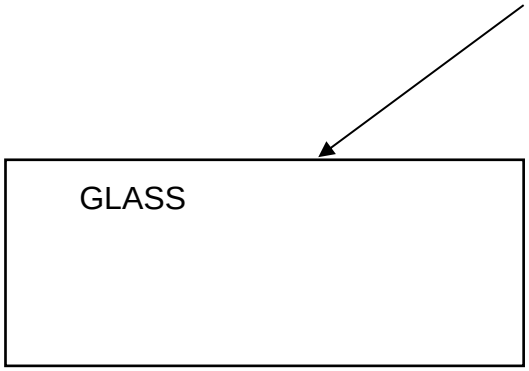
B

5.2.1 Which diagram shows rays being reflected from a smooth surface? (1)

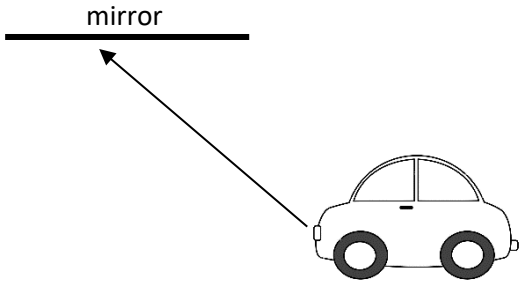
5.2.2 Give one reason for your answer. (1)

5.2.3 Would an image formed in diagram **A** be clear or distorted? (1)

5.3 A ray of light passes from air into a transparent glass block, as represented in the diagram below. Redraw the diagram in your answer book and complete the path of the light as it passes through the block.
Label the normals at both surfaces of the block, incident ray, the refracted ray and emergent ray. (5)



5.4 John is driving his car when suddenly a car with a very bright light drives close up behind him. The light from his rear view mirror reflects into his eyes.



Copy and complete the diagram above showing the process described above. On your diagram clearly label:

i) the incident ray

ii) the reflected ray

iii) the normal

iv) the angle of incidence

v) the angle of reflection (5)

5.5.1 Look at your school shirt. Explain why it appears white. (2)

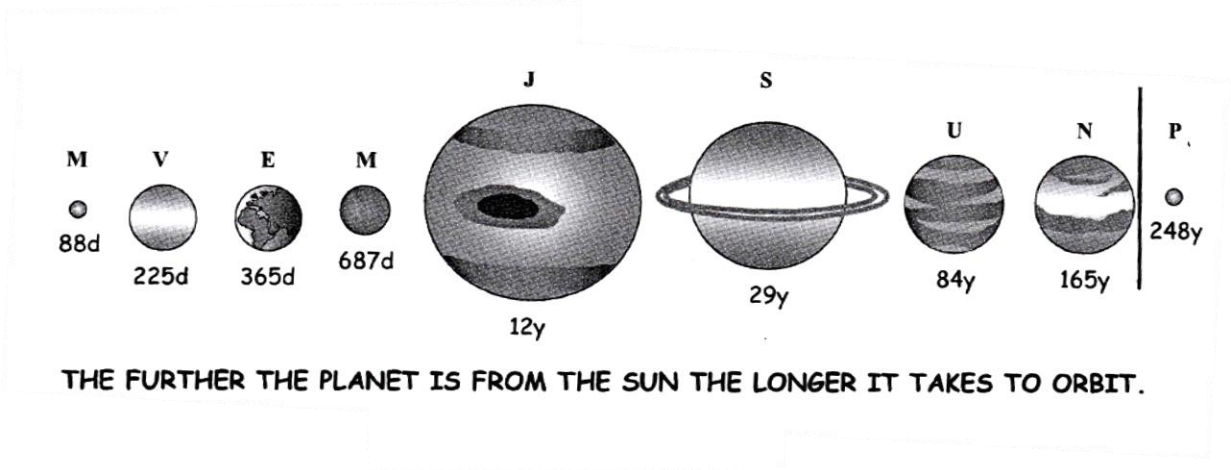
5.5.2 Look at your school shoes. Explain why they appear black. (2)

SECTION C : EARTH AND BEYOND

QUESTION 6 [12]

The diagram below shows how the planets compare in size. The length of each planet's year (orbit time) is also given underneath each planet (d = days; y = years).

Study the diagram below and answer the questions that follow:



6.1 What is meant by orbit time? (1)

6.2 Name the gas giants in the system. (2)

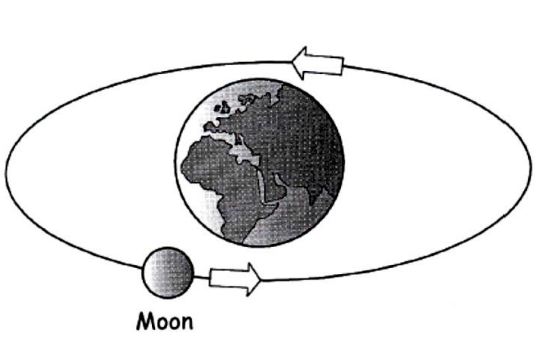
6.3 Between which planets do we find the asteroid belt. (2)

6.4 Draw a bar graph showing the orbit times of the planets that have orbit times measured in days only. Give your graph a suitable heading. (5)

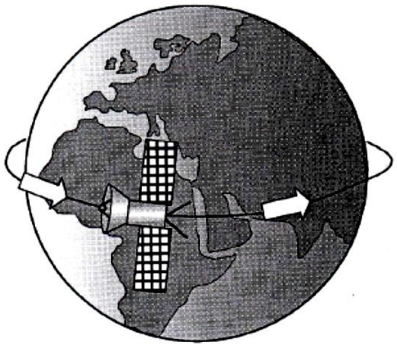
6.5 Compare the atmospheres of Earth and Venus. (2)

QUESTION 7 [4]

Study the diagram below and answer the questions that follow.



A



B

7.1 Which diagram (**A** or **B**) represents a natural satellite? (1)

7.2 Give two ways in which artificial satellites are useful to us. (2)

7.3 Name one well-known artificial satellite that is orbiting earth (1)

QUESTION 8 [6]

8.1 Give the name of the force that keeps all the planets orbiting around the Sun. (1)

8.2 Galaxies have different shapes. What is the shape of the Milky Way? (1)

8.3 Choose one of the following terms to classify Alpha Centauri:
satellite / moon / asteroid / star system / comet / constellation (1)

8.4.1 Where do scientists think comets come from? (1)

8.4.2 Name two substance that scientists know comet tails to be made of. (2)

QUESTION 9 [12]

Study the table of planets in our solar system below and answer all the questions that follow:

PLANET	SIZE DIAMETER (in km)	DISTANCE FROM THE SUN (in km)	ORBITAL TIME (days)	ATMOSPHERIC COMPOSITION	NUMBER OF MOONS	AVERAGE SURFACE TEMP (^{0}C)
Mercury	4879	57 900 000	88	none	0	- 180 to 430
Venus	12 103	108 200 000	224, 7	CO_2	0	465
Earth	12 756	149 600 000	365, 2	N_2 , O_2	1	- 89 to 58
A	6 793	227 900 000	687	CO_2	2	- 82 to 0
Jupiter	143 000	778 300 000	4 331	H_2 , He	63	- 150
Saturn	120 531	1 427 000 000	10 747	H_2 , He	62	- 170
Uranus	51 113	2 872 500 000	30 589	H_2 , He	27	- 200
B	49 532	4 495 000 000	59 800	H_2 , He	13	- 210

9.1 Supply names for planets:

9.1.1 **A** (1)

9.1.2 **B** (1)

9.2 Which planet is the hottest? (1)

9.3 Which planet has the largest diameter? (1)

9.4 Which planet is the smallest? (1)

9.5 Which planet is closest to Uranus? (2)

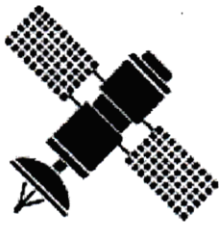
9.6 Why do you think Pluto has been left off the table? (1)

9.7 Which planet is closest in size to Earth? (1)

9.8 Calculate the age (in Mercury years) of a 14 year old human teenager if they had been living on Mercury. Round your answer off to the nearest whole number. (3)

QUESTION 10 [6]

Refer to the diagrams of telescopes below.

Diagram 1	Diagram 2	Space telescope
		

10.1 Give the correct name of the type of telescope shown in:

10.1.1 Diagram **1** (1)

10.1.2 Diagram **2** (1)

10.2 Describe <u>two</u> favourable conditions that are needed at observatories with telescopes of the type shown in Diagram **1** when astronomers look into space? (2)

10.3 The telescope in Diagram **1** is known as SALT.

10.3.1 What do the letters SALT stand for? (1)

10.3.2 In which area of our country is SALT situated? (1)