



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2023

GRADE 9

NATURAL SCIENCES

TIME: 2 hours

MARKS: 100

19 pages

NAME AND SURNAME OF LEARNER: _____

GRADE 9: _____

QUESTION	1	2	3	4	5	6	7	8	9	10	TOTAL
LEARNER'S MARK											
MARKS	9	6	5	16	14	14	15	10	7	4	100

INSTRUCTIONS AND INFORMATION

1. Write your name, surname and class on this question paper that serves as an answer sheet.
2. Answer ALL questions in the spaces provided in the question paper.
3. This question paper consists of SECTION A and SECTION B, based on the prescribed content framework in the CAPS document.
4. Allocation of marks:

SECTION A: 20
SECTION B: 80
5. This question paper consists of NINE questions.
6. ALL drawings should be done in pencil and labelled in blue ink only.
7. Write neatly and legibly.

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Various options are provided as possible answers to the following questions. Choose the correct option by writing the correct letter (A – D) in the block provided.

- 1.1 What happens to the moulding clay when a force is applied to it?



- A The clay remains unchanged.
- B The clay becomes softer.
- C The clay becomes harder.
- D The clay can be easily moulded and shaped.

(1)

- 1.2 The electrostatic force between two charged object is F . The distance between them is increased. How does the electrostatic force change?

- A It increases.
- B It decreases.
- C It remains the same.
- D Not enough information is provided.

(1)

- 1.3 Which of the following is a way to reduce the frictional force between two surfaces in contact?

- A Increasing the weight of an object
- B Lubricating the surfaces
- C Using materials that have a rough surface
- D Keeping the objects in contact for long

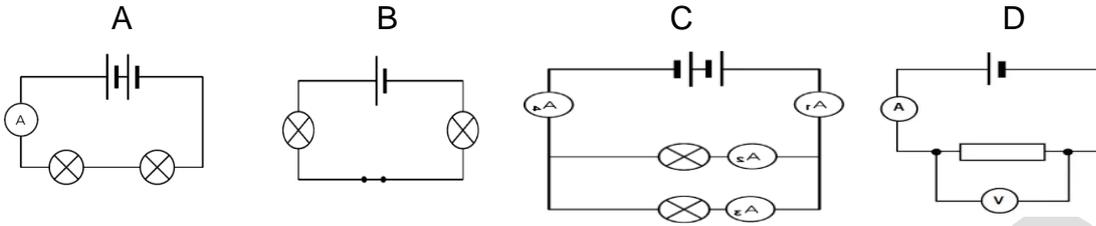
(1)

- 1.4 What type of energy is converted to electrical energy in a cell?

- A Mechanical energy
- B Chemical energy
- C Kinetic energy
- D Heat energy

(1)

1.5 Which of the following circuit diagrams represents a parallel circuit?



(1)

1.6 The more cells connected in parallel, the ...

- A greater the current in the circuit.
- B greater the ammeter reading in the circuit.
- C greater the voltmeter reading.
- D voltmeter reading across them remain the same as for one cell.

(1)

1.7 Generating electricity by means of radiant energy is called ...

- A nuclear power.
- B thermal electricity.
- C solar power.
- D hydroelectricity.

(1)

1.8 Which of the following is a characteristic of the lithosphere?

- A It moves as one solid.
- B It is a weak layer.
- C It is composed of molten rock.
- D It is the thickest layer of the earth.

(1)

1.9 Stars can be classified according to their colour or spectral class. Which of the following characteristics defines the younger star?

- A Blue is hotter
- B Blue and cold
- C Red and hot
- D Red and cold

(1)
[9]

QUESTION 2: TERMINOLOGY

Give the correct scientific term for each of the following descriptions. Write only the term in the spaces provided.

2.1 A conductor that opposes the flow of electric charge.

_____ (1)

2.2 An example of a non-contact force that acts perpendicular to the surface of an object.

_____ (1)

2.3 The wire connected to the metal casing of an appliance.

_____ (1)

2.4 Formed when magma wells up from the mantle, cools and hardens.

_____ (1)

2.5 A massive discharge or release of electrons between a thunder cloud and the ground.

_____ (1)

2.6 A mixture of gases held around the Earth by gravity.

_____ (1)
[6]

QUESTION 3: MATCHING ITEMS

Choose an item from COLUMN B that matches a statement in COLUMN A. Write only the letter (A – G) next to the question numbers (3.1 – 3.5) in the spaces provided.

KOLOM A		KOLOM B		
3.1	Spheres of matter that are so dense that not even light can escape their gravity	A	Tension	3.1
3.2	A safety device in an electric circuit that melts if the current exceeds the safety level	B	Black hole	3.2
3.3	Type of force responsible for holding objects together	C	Planetary nebulae	3.3
3.4	The outer gases of a white dwarf that are ejected into space and form an expanding cloud	D	Rock cycle	3.4
3.5	A cycle in which rocks change from one form to another through various geological processes	E	Fuse	3.5
		F	Mining	
		G	Friction	

[5]

TOTAL SECTION A: 20

SECTION B

QUESTION 4: FORCES

4.1 Study the pictures below and describe what visible effect a force can have on each object illustrated.

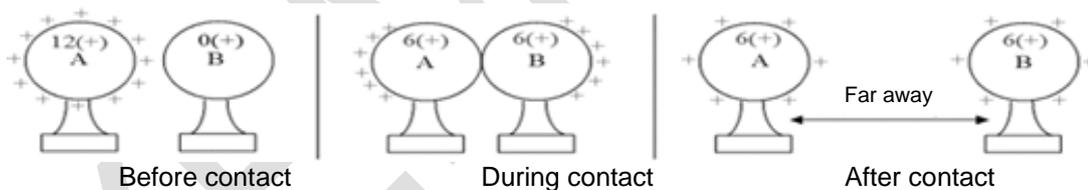


A _____ (1)



B _____ (1)

4.2 Students conduct an investigation to observe what happens to two charged objects before contact during contact and after contact, as shown below. One is positively charged and the other has no charge.



4.2.1 What is the name of the force that exists between the charged objects?
 _____ (1)

4.2.2 What is the dependent variable in the investigation?
 _____ (1)

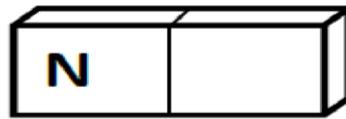
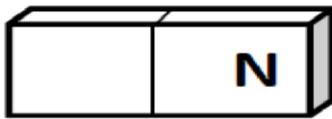
4.2.3 Which particles will be transferred from one sphere to another sphere when they make contact? Write only PROTONS, NEUTRONS or ELECTRONS.
 _____ (1)

4.2.4 Sphere B was neutral before contact. Did it have charged particles? Write down only YES or NO.
 _____ (1)

- 4.2.5 Notice how the position of the spheres changed after contact. Suggest a reason why the distance between the spheres is so much bigger than before.

(2)

- 4.3 Two magnets are placed so that their north poles are facing each other.



- 4.3.1 Is the force that the two magnets exert on each other, a FIELD FORCE or a CONTACT FORCE?

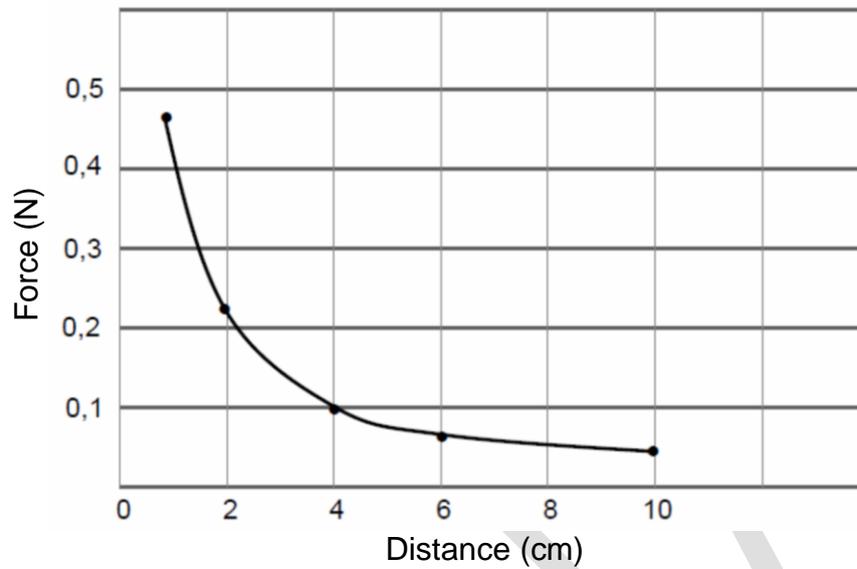
(1)

- 4.3.2 Draw the magnetic field line pattern that can be observed between the two north poles of these magnets in the space below.



(2)

- 4.4 The graph below shows how the magnetic force changes with the distance between two magnets.



- 4.4.1 What is the magnitude of the magnetic force exerted by one magnet on another when the distance between the magnets is 4 cm?

_____ (1)

- 4.4.2 What conclusion can be reached based on the results on the graph?

_____ (2)

- 4.5 Define *weight*.

_____ (2)
[16]

QUESTION 5: CELLS AND ENERGY, RESISTANCE

- 5.1 The Grade 9 learners investigated the effect of the length of a conductor on its resistance. Study the information below and answer the questions that follow.

The Grade 9 learners conducted the following experiment. They wanted to investigate the effect of the length of a conductor on its resistance. They used a cell, a light bulb, an ammeter and four pieces of copper wire of the same thickness but of different lengths (0,1 m, 0,2 m, 0,3 m and 0,4 m and 0,5 m).

Procedure: • Set up the above components in a circuit using one conductor at a time. • Close the switch. • Use the ammeter to measure the current for each connected conductor.

The following table shows the results of their investigation:

Length of a conductor (m)	Current (A)
0,1	0,43
0,2	0,36
0,3	0,30
0,4	0,24
0,5	0,18

- 5.1.1 Write down the investigative question for the above experiment.

(2)

- 5.1.2 Write down the hypothesis for the above investigation.

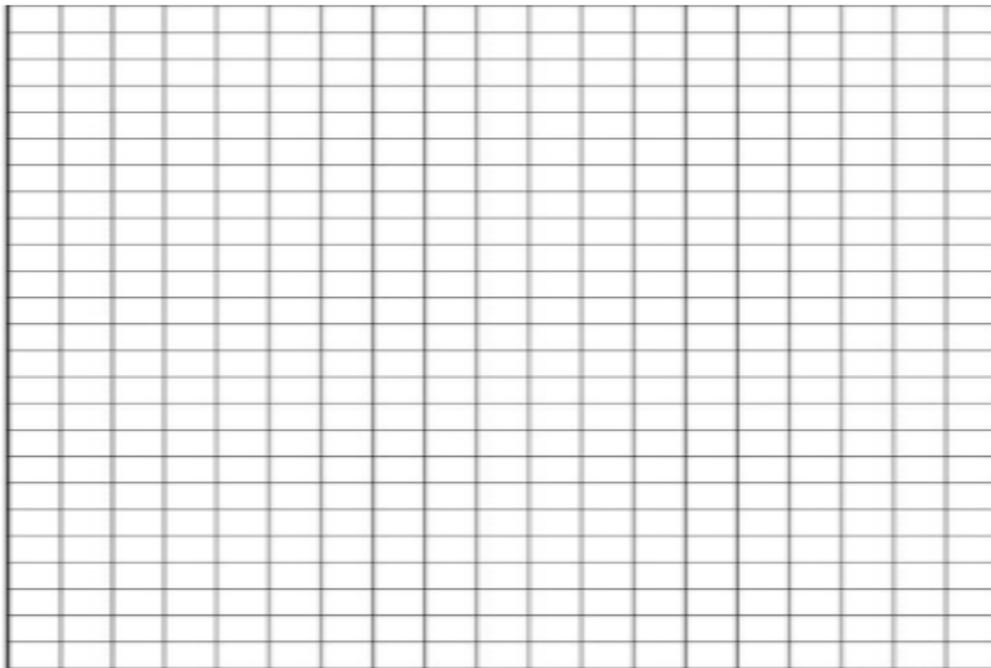
(2)

- 5.1.3 Identify the dependent variable.

(1)

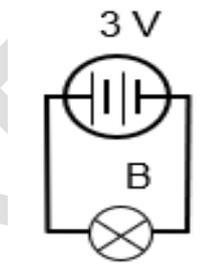
5.1.4 Use the graph paper below and plot the graph of current against the length of the conductor.

Remember to A: provide a suitable heading for your graph,
 B: label the y- axis;
 C: label the x-axis;



(5)

5.2 Study the circuit below and answer the questions that follow.



5.2.1 What is the purpose of the component circled in the diagram above?

(1)

5.2.2 What is the value of the voltage of each cell in the circuit ?

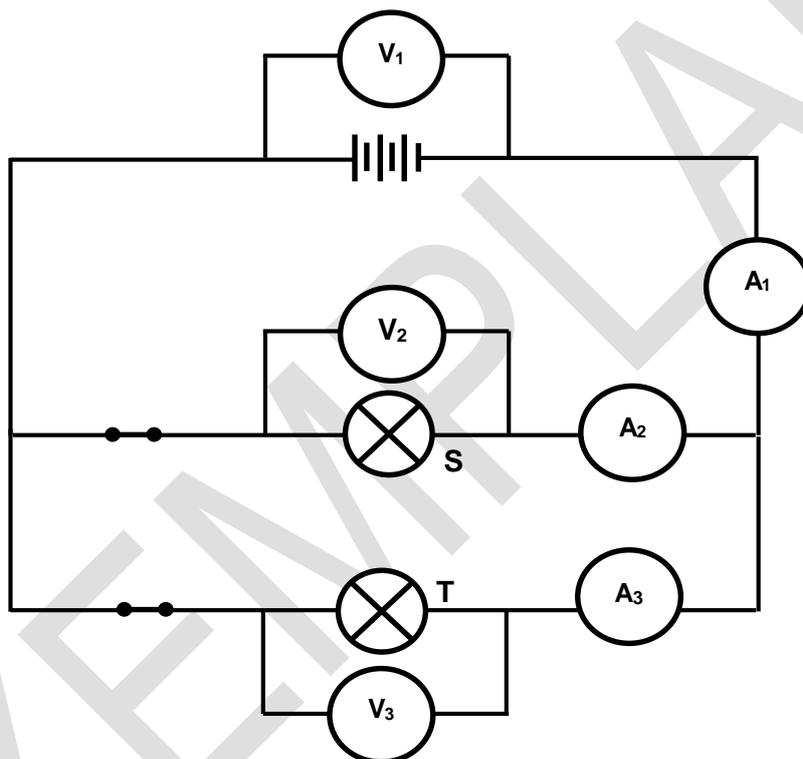
(2)

5.2.3 State an example of a safety device that can be used in our homes in the case of an electrical overload.

(1)
[14]

QUESTION 6: CURRENT ELECTRICITY

6.1 Study the circuit diagram below and answer the questions that follow. Each cell has a potential difference of 1,5 V. The resistance of bulb **S** is **R** and the resistance bulb **T** is **4R**.



6.1.1 In which way are bulbs **S** and **T** connected?

(1)

6.1.2 What is the reading on voltmeter **V₁**?

(2)

6.1.3 What is the reading on voltmeter **V₃**?

(1)

6.1.4 Which bulb will glow the brightest? **S** or **T**

(1)

6.1.5 What will happen to the reading on ammeter A_1 if bulb **T** is switched off?

_____ (1)

6.1.6 Explain your answer in QUESTION 6.1.5.

_____ (2)

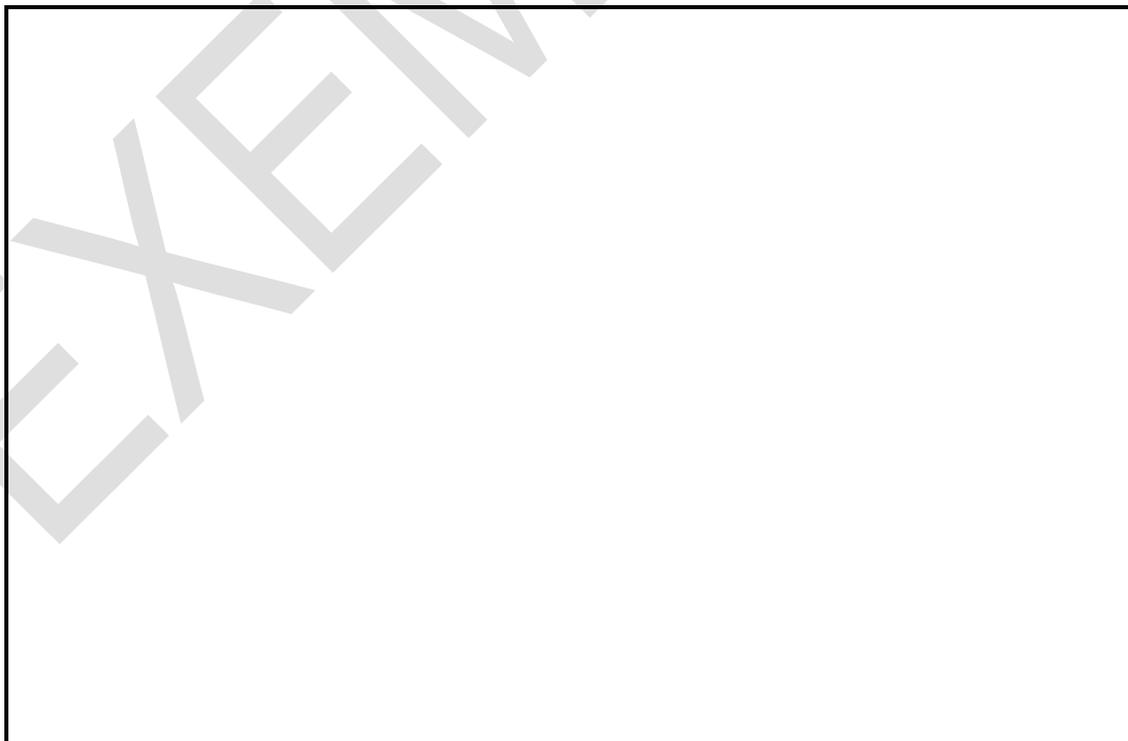
6.1.7 What is the device that is used to measure current called?

_____ (1)

6.2 Draw a diagram of a series circuit that includes two light bulbs and 2 cells connected in series and a voltmeter connected to the battery. Label the components and indicate the direction of current flow.

Components:

- 2 cells
- 2 light bulbs
- Wires connecting to the components
- A switch
- A voltmeter



(5)
[14]

QUESTION 7: COST OF POWER CONSUMPTION; ENERGY AND THE ELECTRICITY GRID

7.1 Use the information in the table below to answer the questions that follow. Use the cost per unit of electricity of 90 cents/kWh in ALL your calculations.

Remember: Cost = Power x Time x Unit price

Appliance Power rating:

Vacuum cleaner	Fluorescent bulb	Incandescent bulb	Geyser	Conventional oven	Microwave oven
1 600 W	40 W	100 W	4 800 W	6 000 W	1 360 W

7.1.1 Your family has used 320 kWh of electricity this month. Calculate the cost of the 320 kWh of electricity.

(3)

7.1.2 A whole chicken takes about 1 hour to cook in a conventional oven. In a microwave oven it takes approximately 12 minutes. Show by calculations which appliance is cheaper to use.

(7)

7.2 Study Eskom's power alert advertisement below.



[<https://blog.sap.com/2013/07/28>]

7.2.1 What seems to be the problem in the national electricity grid when this alert is shown?

(1)

7.2.2 If users are not following the alert, what will Eskom do?

(1)

7.2.3 Name ONE way in which consumers can reduce their electricity bill.

(1)

7.2.4 Name ONE advantage of solar power.

(1)

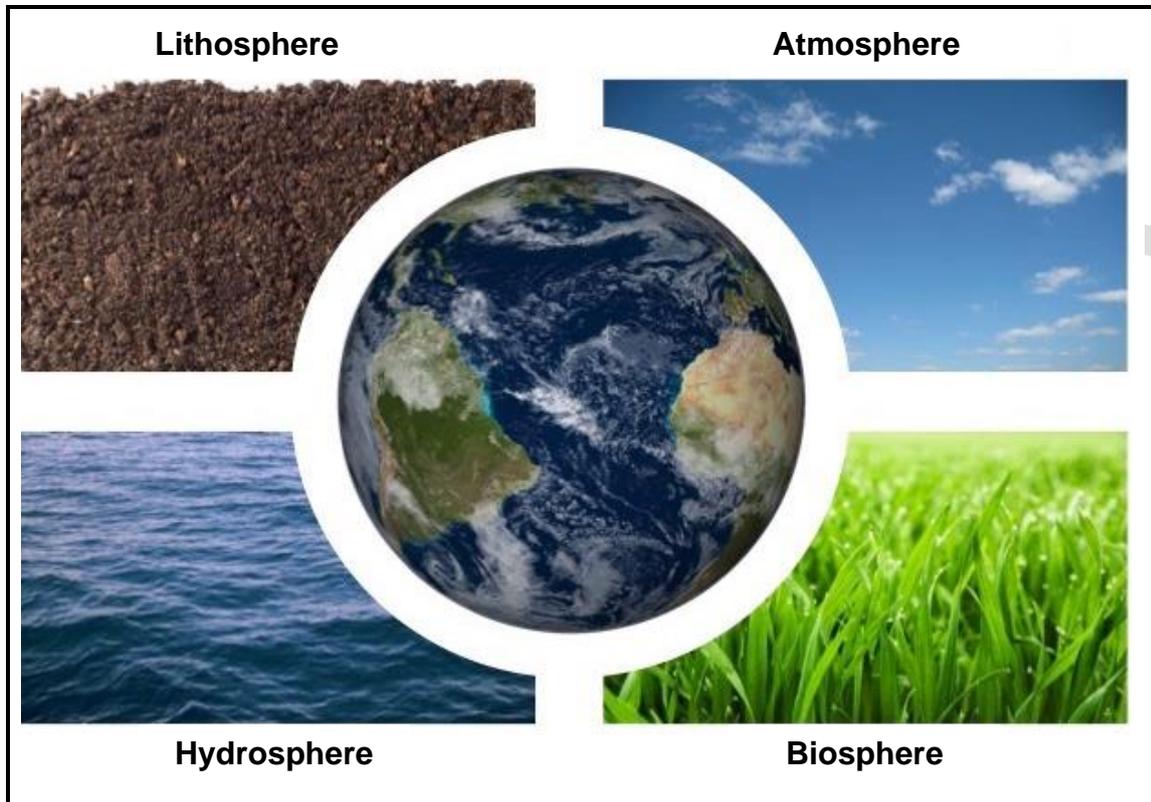
7.2.5 Name ONE disadvantage of solar power.

(1)

[15]

QUESTION 8: SPHERES OF THE EARTH

The diagram below illustrates the interaction between the spheres of the Earth as a complex system.



[https://image.app.goo.gl/hD9eCo]

8.1 Describe the interaction between the different spheres of the Earth involved in each of the interactions described.

8.1.1 Caves form in limestone rock when the rock is dissolved by rain water that has become a weak acid.

_____ (1)

8.1.2 Rain water becomes a weak acid when it absorbs carbon dioxide from the air while falling through it.

_____ (1)

8.1.3 Plants only grow in the light near the cave entrance.

_____ (1)

8.2 How do layers of the Earth and their composition affect the occurrence of natural resources such as minerals, oil and gas?

(3)

8.3 Rocks on the surface of the Earth are weathered to form smaller particles. Mention any TWO important factors that influence the process of weathering.

(2)

8.4 Which natural process produces the gas found in the atmosphere that absorbs and re-emits the energy radiated by the sun.

(1)

8.5 What is the advantage of this natural process for life on Earth?

(1)

[10]

QUESTION 9: MINING AND MINERAL RESOURCES

Read the article from the IOL newspaper following the incident where eight women who were shooting a music video at a mine dump were allegedly raped by illegal miners.

“For mining companies to take responsibility and for us as government, we need to now expropriate all those deserted mines. Expropriate that land without compensation for the good of the public. Make sure (the land is) revitalised and creates jobs for our own communities,” said the former premier of Gauteng.

“The absent mine owners have left these workers, the illegal immigrants there without taking them back to their countries of origin. It is the exploitation that has been going on here. We are here to say we cannot live under a reign of terror.”

Earlier, the ANC said it would be protesting outside the Krugersdorp Magistrate’s Court on Wednesday morning as the arrested illegal miners appear.

[<https://www.iol.co.za> (Published: Augustus 3, 2022)]

- 9.1 Where does mining take place in an open cast mine? (1)
-
- 9.2 Discuss any TWO effects of illegal mining. (2)
-
-
- 9.3 What encourages illegal mining in South Africa? (2)
-
-
- 9.4 In which way is illegal mining dangerous in South Africa? (2)
-
-
-
- [7]**

QUESTION 10: BIRTH, LIFE AND DEATH OF STARS

10.1 How does the process of nuclear fusion in stars produce energy?

(2)

10.2 Explain the cycle of how a star dies?

(2)

[4]

TOTAL SECTION B: 80**TOTAL: 100****END**