Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2014

NATURAL SCIENCES

MARKS: **100**

TIME: **2 hours**

9NASC

This question paper consists of 12 pages.

INSTRUCTIONS AND INFORMATION

1. Answer ALL questions in this paper.
2. This paper has THREE sections:

SECTION A:	(20 marks)
SECTION B:	(44 marks)
SECTION C:	(36 marks)

3. This question paper has NINE QUESTIONS with their sub-questions.
4. Start each question on a NEW page.
5. Answer each question according to its mark allocation.
6. Read and understand all the questions carefully before you answer.
7. Number all your answers correctly as per the questions on this paper.
8. You may use a calculator where necessary.
9. Use a lead pencil for all drawings, sketches and graphs.
10. It is important to write neatly and legibly for marking purposes.

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Each question has four possible answers. Choose the correct answer and write the corresponding letter next to the question number on your ANSWER BOOK, for example your answer might be, 1.11 E.

1.1 What type of force acts between an object and the earth?

A Magnetic force
B Gravitational force
C Electrostatic force
D Friction force (1)

1.2 The potential difference is measured in …

A ampere.
B volt.
C joule.
D ohm. (1)

1.3 The energy source in a nuclear power plant is …

A natural gas.
B uranium.
C coal.
D oil. (1)

1.4 ESKOM is the largest supplier of …

A water.
B coal.
C electricity.
D oil. (1)

1.5 The model of earth that helps us to understand its systems is called a …

A globe.
B map.
C compass.
D core. (1)

1.6 The spheres that the earth consists of are …

A the lithosphere, atmosphere and hydrosphere.
B water, nitrogen and oxygen.
C thermosphere, mesosphere and water.
D carbon dioxide, lithosphere and hydrogen. (1)

1.7 Which ONE of the following substances is a component of a star?

A Carbon
B Hydrogen
C Iron
D Nitrogen (1)

1.8 Which of the following substances protects living organisms from harmful ultraviolet radiations?

A Oxygen
B Carbon dioxide
C Ozone layer
D Nitrogen (1)

1.9 A star that does not allow light to escape is called a …

A red giant.
B black hole.
C neutron star.
D protostar. (1)

1.10 Which of the following is NOT a greenhouse gas?

A Methane
B Carbon dioxide
C Nitrous oxide
D Helium (1)

[10]

QUESTION 2: MISSING WORDS

Using the words from the list below, fill in the missing words in the paragraph below: Write only the correct answer: e.g. 2.6 Tension force.

Newtons; Frictional Force; Tension Force, Gravitational Force; Sir Isaac Newton; Gravity; Magnetic force

Force is measured in **(2.1)** and was named after **(2.2)** who contributed to the understanding of force and motion. A force that is transmitted through a string, rope or cable is called **(2.3)** and the force that is caused by the rubbing of two objects together is called **(2.4)**. **(2.5)** is defined as the force of attraction that objects have on one another due to their masses.

(5 x 1) **[5]**

QUESTION 3: MATCHING ITEMS

Each of the terms or concepts in COLUMN A matches a description in COLUMN B.
Choose the correct and suitable match for COLUMN A from COLUMN B.
Write only the correct letter (A–E) next to the number (3.1–3.5) of COLUMN A, for example, your answer might be 3.6 E.

COLUMN A		COLUMN B	
3.1	A resistor	A	Use wind energy to generate electricity
3.2	Wind turbines	B	An industrial facility to generate power
3.3	Hydroelectric power	C	Is a conducting material selected to control the current or to provide useful energy transfer
3.4	Power station	D	The layer of air around the earth
3.5	Atmosphere	E	Use falling water to turn turbine blades
		F	Responsible for the attraction and the repulsion of objects

(5 x 1) **[5]**

TOTAL SECTION A: 20

SECTION B: ENERGY AND CHANGE

QUESTION 4: MAGNETIC FORCES AND ELECTROSTATIC FORCE

When working with magnets, its various interesting behaviour can be observed in many ways. Magnets are very useful and important in our daily lives.

From what you have done in class and the scientific knowledge you have about magnets, answer the questions below.

4.1 Categorise the following substances into magnetic and non-magnetic substances:

Iron; paper; plastic and steel (2)

4.2 Suggest a reason why the earth can be compared to a bar magnet. (2)

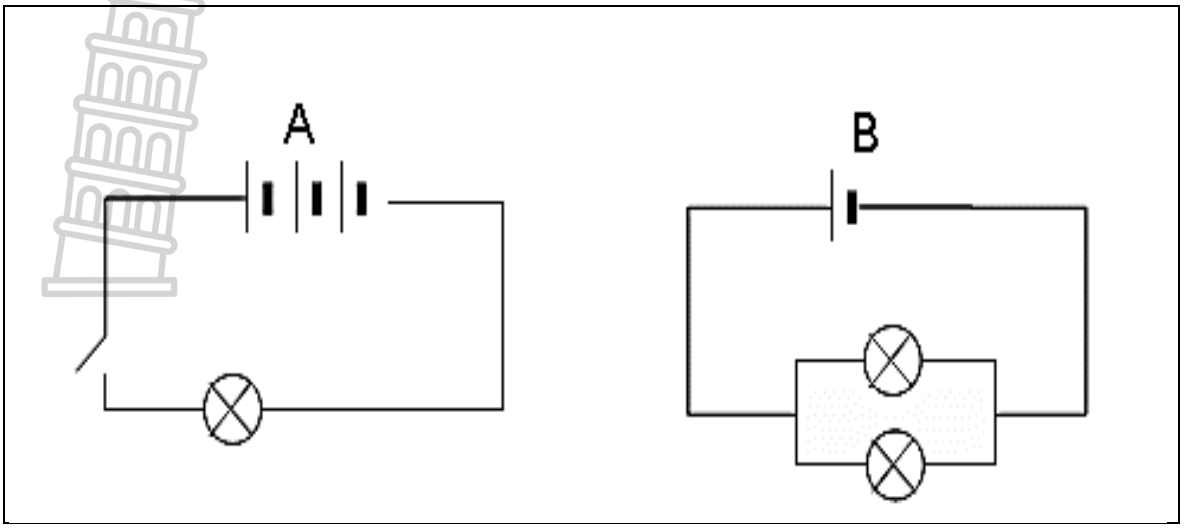
4.3 An electrostatic force occurs when certain materials are rubbed together. These materials acquire an electrostatic charge as a result of the loss or gain of (protons / electrons). (Choose the correct answer.) (1)

4.4 Metals can be attracted by a magnet while non-metals cannot. Using your scientific knowledge explain TWO properties of metals and TWO properties of non-metals. (4)

4.5 Static electricity is useful to human lives in many ways. Mention TWO ways in which static electricity is used in our daily lives. (2)

[11]

QUESTION 5: ELECTRIC CIRCUITS



Look at the two circuits above **A** and **B**, and answer the questions that follow.

5.1 Identify the symbols for the circuit components by redrawing them next to the name provided for each component in your answer book.

COMPONENT		SYMBOL	
5.1.1	Cell		(1)
5.1.2	Connector		(1)
5.1.3	Light bulb		(1)
5.1.4	Switch		(1)
5.1.5	Battery		(1)

5.2 Compare the two circuits and by using your knowledge of electrical circuits, answer the following questions.

5.2.1 In which one of the above circuits will its current flow, and why? (2)

5.2.2 Discuss TWO differences in the above two circuits. (2)

5.2.3 Mention FOUR factors that can influence the resistance of a metal conductor and say how each of these factors influences the resistance. (8)

[17]

QUESTION 6: PRACTICAL INVESTIGATION TASK

Energy power consumption

FAMILY 1	FAMILY 2	FAMILY 3	FAMILY 4
Rice cooker		Rice cooker	Rice cooker
Refrigerator	Refrigerator	Refrigerator	Refrigerator
Electric fan	Electric fan		Electric fan
Light bulb	Light bulb	Light bulb	Light bulb
Radio			Radio
TV	TV		

A Grade 9 learner has conducted an investigation in four households. The learner then decided to look at how each household is using the appliances above. It was found out that in these four households, different appliances are used for a period of 3 hours daily.

The appliances are: light bulb (100 W), refrigerator (170 W), rice cooker (550 W), TV (700 W), an electric fan (120 W) and a radio (150 W).

6.1 From the above investigation, what would you say is the scientific aim? (1)

6.2 Calculate the total power consumption for family 2 and family 3.

Hint: Calculate the power rating first for each family and change your units into kW = (Kilowatts). (6)

6.3 Which household will pay the highest electricity bill? Give a reason for your answer. (2)

6.4 Draw a bar graph comparing the energy consumption of the above-mentioned four households.

NOTE: When drawing this bar graph use the same colour or the same key for each electrical appliance in all four families. (7)

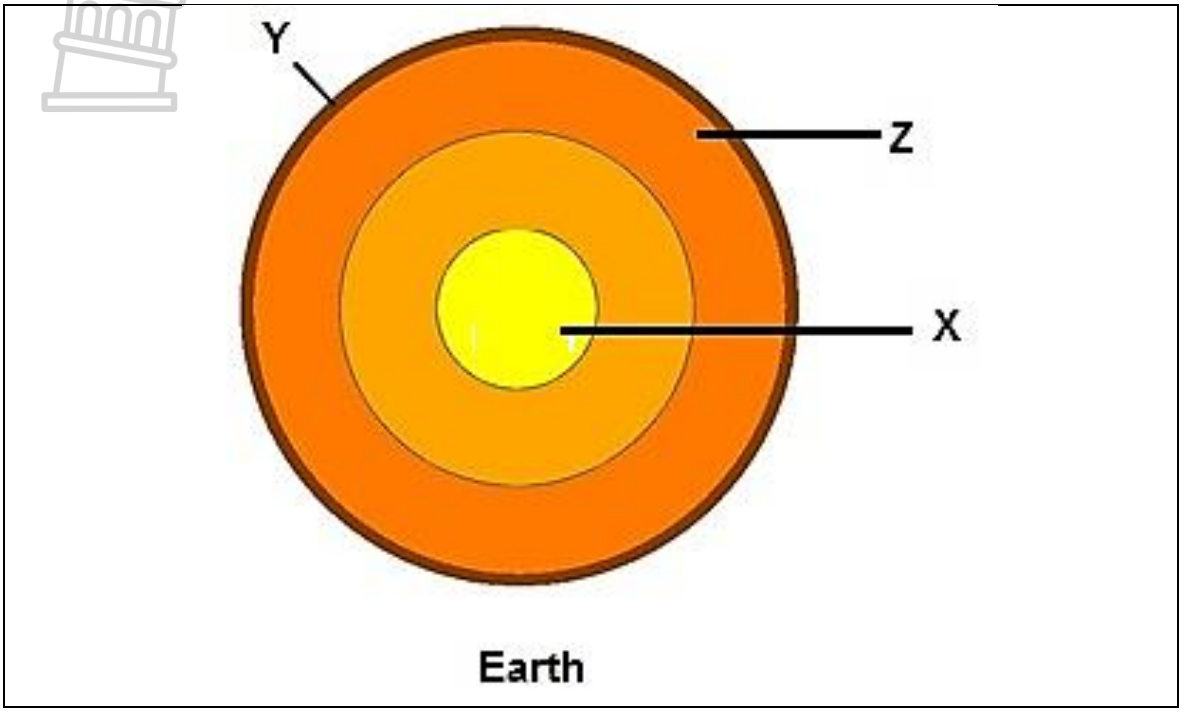
[16]

TOTAL SECTION B: 44

SECTION C: PLANET EARTH AND BEYOND

QUESTION 7: THE EARTH AS A SYSTEM

The diagram below represents the structure of the earth. Use this diagram to answer the following questions based on the earth's structure.



7.1 Provide labels for the sections marked, **X**, **Y** and **Z**. (3)

7.2 Earth can be understood as a complex system where all the parts (called spheres) interact with each other. Describe the four spheres of the earth by giving a short description of each. (4)

7.3 The rock cycle is a natural continuous process, in which rocks are formed, broken down and reformed over a period of time. Due to this process different types of rocks are formed. Name THREE types of rocks that you know. (3)
[10]

QUESTION 8: MINING OF MINERAL RESOURCES IN SOUTH AFRICA

Rocks are made up of minerals. Some rocks contain minerals which are metals. Gold, copper and iron are examples of metals that can be found mixed in with rock. These metals can be mined from the rock in which they are found. Other minerals can be found as crystals within the rock itself, or in veins in the rock. Minerals have been important to human history as they are used to make different substances that are of value to humankind.

The above mentioned elements are the types of minerals called native elements. Most of the minerals are compounds and quartz is an example of such compounds. It is made from silicon and oxygen.

8.1 Copy the names of the following elements listed below and give their symbols:

8.1.1 Gold (1)

8.1.2 Iron (1)

8.1.3 Aluminium (1)

8.1.4 Copper (1)

8.1.5 Lead (1)

8.2 Mention any THREE uses of minerals that you know. (3)

8.3 Name any TWO methods of mining that you might know. (2)

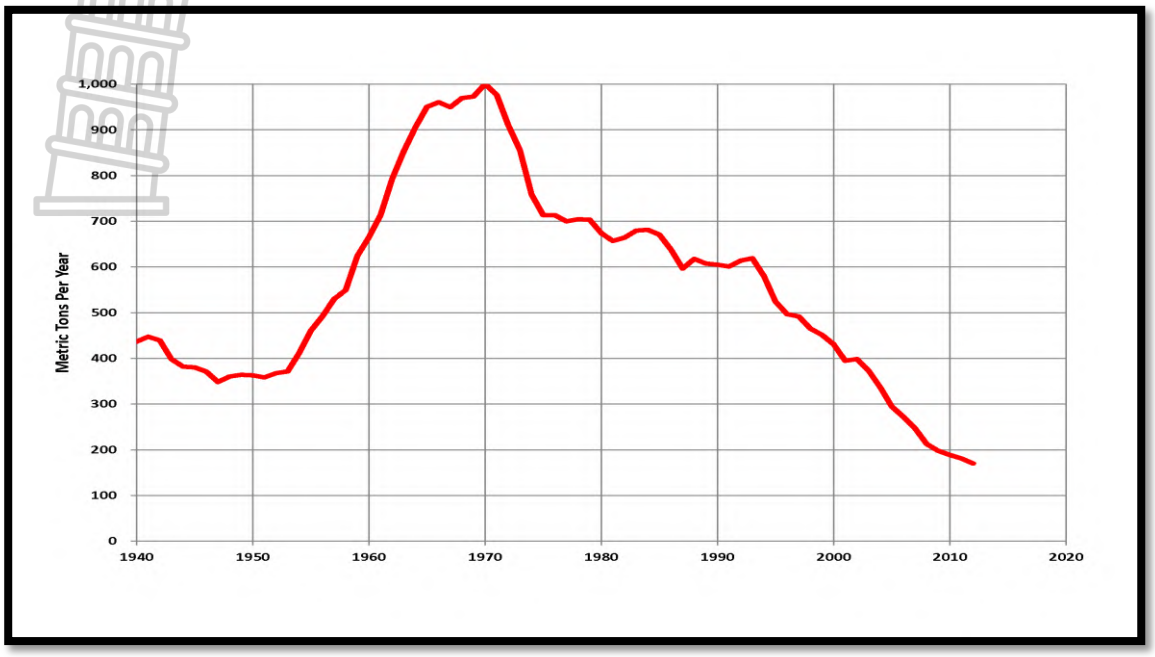
8.4 Briefly describe THREE steps involved in extraction of metals from their ores. (3)

8.5 Using a table, compare carbon dioxide gas with oxygen gas by writing TWO properties of each of these gases. (4)

[17]

QUESTION 9: THE PRODUCTION OF MINERALS IN SOUTH AFRICA

Study the following graph and then answer the questions that follow.



PRODUCTION OF GOLD IN SOUTH AFICA

9.1 The graph shown above demonstrates the production of gold in South Africa (between the years 1940 and 2010).

9.1.1 From the graph, which year had the highest production? (2)

9.1.2 Calculate the difference between number of tons produced in 1970 and 2010. (2)

9.1.3 Mining can impact the country in various ways. Bearing that in mind discuss THREE positive impacts of mining. (3)

9.1.4 Over the past two years there has been major challenges facing mining industries in this country. This has led to many debates and confusion about the state of South Africa's economy. With this view, discuss TWO negative impacts of mining on the environment. (2)
[9]

TOTAL SECTION C: 36
GRAND TOTAL: 100

Province of the
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EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2014

NATURAL SCIENCES MEMORANDUM

MARKS: **100**

This memorandum consists of 9 pages.

INSTRUCTIONS AND INFORMATION

1. Mark allocation in this paper is based on the level of answers required from learners.

2. Some expected answers have various or multiple answers. Only the required number of answers or facts will be considered.

3. Where applicable, an answer that has more than one mark or point, marks can be deducted where there are missing facts.

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

NO.	EXPECTED ANSWER	LETTER	MARK	
1.1	Gravitational force	**B**	✓	(1)
1.2	volt	**B**	✓	(1)
1.3	uranium	**B**	✓	(1)
1.4	electricity	**C**	✓	(1)
1.5	globe	**A**	✓	(1)
1.6	the lithosphere, atmosphere and hydrosphere.	**A**	✓	(1)
1.7	Hydrogen	**B**	✓	(1)
1.8	Ozone layer	**C**	✓	(1)
1.9	black hole	**B**	✓	(1)
1.10	Helium	**D**	✓	(1)

[10]

QUESTION 2: MISSING WORDS

NO.	EXPECTED ANSWER	MARK	
2.1	Newtons	✓	(1)
2.2	Sir Isaac Newton	✓	(1)
2.3	Tension force	✓	(1)
2.4	Frictional force	✓	(1)
2.5	Gravitational force	✓	(1)

(5 x 1) **[5]**

QUESTION 3: MATCHING ITEMS

NO.	EXPECTED ANSWER	LETTER	MARK	
3.1	Is a conducting material selected to control the current or to provide the useful energy transfer.	**C**	✓	(1)
3.2	Use wind energy to generate electricity.	**A**	✓	(1)
3.3	Use falling water to turn turbine blades.	**E**	✓	(1)
3.4	An industrial facility to generate power.	**B**	✓	(1)
3.5	The layer of air around the earth.	**D**	✓	(1)

(5 x 1) **[5]**

TOTAL SECTION A: 20

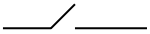
SECTION B: ENERGY AND CHANGE

QUESTION 4: MAGNETIC FORCES AND ELECTROSTATIC FORCE

NO.	EXPECTED ANSWERS	MARK
4.1	**MAGNETIC SUBSTANCES:** / **NON-MAGNETIC:** Iron / Plastic Steel / Paper	✓ ✓ (2)
4.2	The earth, just like a bar magnet, has a north pole and south pole.	✓✓ (2)
4.3	Loss or gain of electrons.	✓ (1)
4.4	**Metals:** • Can be attracted by a magnet. • Good conductors of heat. • Ductile and malleable. • Have a ring sound and they are shiny. (Any two of the above)	✓✓ (2)
	Non-metals: • Can be used as insulators. • Break easily. • Have different colours. • Cannot be attracted by a magnet. (Any two of the above)	✓✓ (2)
4.5	• In painting cars (spray painting). • In photocopying machines. • In micro-waves (Any two related and correct answers.)	✓✓ (2)

[11]

QUESTION 5: ELECTRIC CIRCUITS

NO.		EXPECTED ANSWERS		MARK	
5.1	5.1.1	Cell		✓	(1)
	5.1.2	Connector		✓	(1)
	5.1.3	Light bulb		✓	(1)
	5.1.4	Switch		✓	(1)
	5.1.5	Battery		✓	(1)
5.2	5.2.1	Circuit B, because it is a closed circuit and connectors or wires are all connected to the cell.		✓✓	(2)
	5.2.2	• Circuit A has one light bulb, while circuit B has two light bulbs. • Circuit A has a battery (3 cells), while circuit B has one cell. • Circuit A has an open switch, while circuit B has a closed switch. • Circuit A has a single light bulb connected in series, while circuit B has two light bulbs connected in parallel. • In circuit A an electric wire is not connected to a negative terminal of a battery, while in circuit B all electric wires are connected. (Any two of the above)		✓✓	(2)
	5.2.3	• The material of which the conductor is made. Different materials offer different degrees of resistance to the passing of the current. • The length of the conductor. The longer the conductor, the greater is the resistance. • The thickness of the conductor. The thicker the conductor the smaller the resistance. • The temperature of the conductor. The higher the temperature, the greater is the resistance.		✓✓ ✓✓ ✓✓ ✓✓	(8)

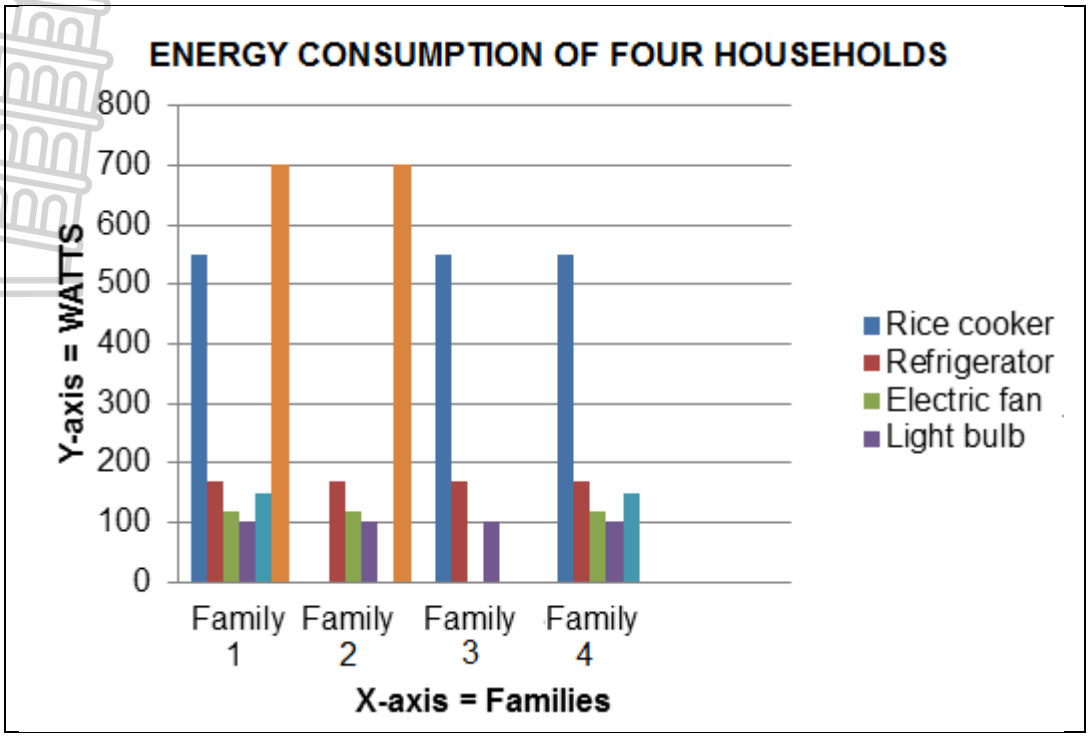
[17]

QUESTION 6: PRACTICAL INVESTIGATION TASK – ENERGY CONSUMPTION

NO.	EXPECTED ANSWERS	MARK	
6.1	The scientific aim is to investigate the energy consumption in four different households or to investigate the use of electricity in four different households.	✓	(1)
6.2	**Family 2**: Refrigerator (170 W) + Electric fan (120 W) + Light Bulb (100 W) + TV (700 W) = 1 090 W= 1,09 kW **Family 3**: Rice cooker (550 W) + Refrigerator(170 W) + Light Bulb (100 W) = 820 W = 0,82 kW *(1 mark for addition, 1 mark for the total and 1 mark for the conversion to kW.)*	✓✓✓ ✓✓✓	(3) (3)
6.3	**Family 1** will pay the highest electricity bill because they are using more appliances compared to the other families.	✓✓	(2)
6.4	Learners will need to show the following in their bar graph: • The heading • Y-axis showing the units (watts) of the appliances used in each family. • X-axis showing the families and their appliances. • Different keys or colours for electrical appliances (with the same key or same colour for each appliance in all families). • Correct measurements or units in the Y-axis. • Correct key of the graph. • The graph should be neat and clearly drawn.	✓ ✓ ✓ ✓ ✓ ✓ ✓	(7)

[16]

6.4 THE BAR GRAPH PRESENTATION



TOTAL SECTION B: 44

SECTION C: PLANET EARTH AND BEYOND

QUESTION 7: THE EARTH AS A SYSTEM

NO.	EXPECTED ANSWERS	MARK	
7.1	X = The core Y = The crust Z = The mantle	✓ ✓ ✓	(3)
7.2	• Lithosphere: The outer rockiest part of the earth (or the hard part of the earth with soil and rocks. • Atmosphere: the layer of the air around the earth. • Hydrosphere: the water bodies on the earth (oceans, rivers, dams etc.). • Biosphere: the part of the earth where life exists (where animals and plants exist).	✓ ✓ ✓ ✓	(4)
7.3	• Igneous rock • Sedimentary rock • Metamorphic rock	✓ ✓ ✓	(3)

[10]

QUESTION 8: MINING OF MINERAL RESOURCES IN SOUTH AFRICA

NO.		EXPECTED ANSWERS	MARK	
8.1	8.1.1	Gold – Au	✓	(1)
	8.1.2	Iron – Fe	✓	(1)
	8.1.3	Aluminium – Al	✓	(1)
	8.1.4	Copper – Cu	✓	(1)
	8.1.5	Lead – Pb	✓	(1)
8.2	Minerals are used to make: • Jewellery • Tools • Weapons • Machinery and decorations (Any three of these and other related answers)		✓ ✓ ✓	(3)
8.3	• Surface mining • Strip mining • Underground mining • Solution mining (Any two will be correct)		✓ ✓	(2)

8.4	• Concentration of ores: Refers to getting rid of as much unwanted rocky material as possible before the ore is converted into a metal. • Froth Floatation: Is a process by which ore is concentrated and treated with substances that bind metal particles with them. • Reduction of metal oxide to metal: Refers to the removal of oxygen from the ores by chemical reaction.	✓✓✓	(3)
8.5	**CARBON DIOXIDE** • It is composed of one carbon atom and two oxygen atoms. • Carbon dioxide does not support combustion.	**OXYGEN** • Oxygen is composed of two oxygen atoms, hence it is a diatomic molecule (O_2). • Oxygen supports combustion.	✓✓ ✓✓ (4)

[17]

QUESTION 9: PRODUCTION OF MINERALS IN SOUTH AFRICA

NO.	EXPECTED ANSWERS	MARK	
9.1	9.1.1 In 1970	✓✓	(2)
	9.1.2 1000 – 200 = 800 tons more in 1970.	✓✓	(2)
	9.1.3 • Mining increases job opportunities. • Mining activities can make the country's economy grow. • Mining can bring business opportunities from other countries. (Any three related answers.)	✓ ✓ ✓	(3)
	9.1.4 • Mining leads to loss of farming and wild life environments. • Processing the gold ore leaves solid waste behind. • Mining activities often encroach on protected areas. • Mining threatens biodiversity in the operational areas. • Mining can result in acid formation and global warming. • Mining leads to the creation of mine dumps that damage • Places with high tourist or cultural heritage value. (Any two related answers.)	✓ ✓	(2)

[9]

TOTAL SECTION C: 36
GRAND TOTAL: 100