



Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2016

NATURAL SCIENCES

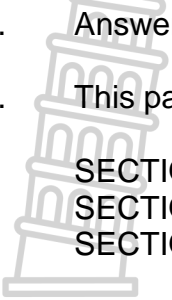
MARKS: 100

TIME: 2 hours



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: (50 marks)
SECTION C: (30 marks)
 3. This question paper has ELEVEN 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 non-programmable calculator where necessary.
 9. Use a lead pencil for all drawings, sketches and graphs.
 10. It is important to write neatly and clearly 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 Which of the following factors does not affect the resistance of a conducting wire?
- A Potential difference
 - B Thickness
 - C Length
 - D Type of a material used (1)
- 1.2 The potential difference is measured in ...
- A ampere.
 - B volt.
 - C joule.
 - D ohm. (1)
- 1.3 Field forces are also called ...
- A gravitational force.
 - B tension force.
 - C non-contact forces.
 - D contact forces. (1)
- 1.4 The law of attraction and repulsion between charged particles states that ...
- A like charges attracts each other.
 - B unlike charges attracts each other.
 - C like charges promote friction.
 - D unlike charges repel each other. (1)
- 1.5 Illegal connections to the ESCOM mains supply can be ...
- A dangerous and regarded as energy theft.
 - B help all South Africans.
 - C can assist poor people.
 - D useful to ESCOM. (1)



1.6 The lithosphere has three layers:

- A The mantle, crust and the soil
 - B Water, nitrogen and oxygen
 - C Thermosphere, mesosphere and water
 - D Carbon dioxide, lithosphere and hydrogen
- (1)

1.7 There are three rock types, which are ...

- A carbon, hydrogen and granite.
 - B magma, igneous and crust.
 - C sedimentary, igneous and metamorphic.
 - D lithosphere, hydrosphere and sedimentary.
- (1)

1.8 A black hole is the phase of the star when it is ...

- A very dense and has high gravity.
 - B less dense and has low gravity.
 - C very dark.
 - D very hot and dark.
- (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 sun.
- (1)

1.10 Which reactions take place in stars?

- A Nuclear fission
 - B Combination
 - C Decomposition
 - D Nuclear fusion
- (1)

[10]



QUESTION 2: MISSING WORDS

Give the correct term for each of the following descriptions. Write only the term next to the question number (2.1–2.5) on the ANSWER BOOK.

- 2.1 Negative particles in an atom (1)
 - 2.2 A rock that contains valuable minerals for mining (1)
 - 2.3 The layer of the earth below the crust (1)
 - 2.4 A natural compound formed through geological processes (1)
 - 2.5 Electricity generated from falling water (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, 3.6 E.

COLUMN A	COLUMN B
3.1 It is a conducting material selected to control the current or to provide useful energy transfer	A Atmosphere
3.2 A material that does not allow electric current to easily pass through it	B Global warming
3.3 The layer of gases that surrounds the earth	C Fourth position away from the sun
3.4 A position of the earth from the sun	D A resistor
3.5 An overall increase of temperature in the atmosphere	E Second position away from the sun
	F An insulator
	G Third position away from the sun

(5 x 1)

[5]

TOTAL SECTION A: 20

SECTION B: ENERGY AND CHANGE**QUESTION 4: FORCES**

- 4.1 What is the unit of force called? (1)
- 4.2 All magnets have two ends or poles called ... (2)
- 4.3 Explain the concept of *force*. (1)
- 4.4 A scientist that contributed to the understanding of forces and motion. (1)
- 4.5 Mention TWO types of forces. (2)
- 4.6 A force that objects have due to their body mass is known as ... (1)
- 4.7 What do we call a force that is caused by rubbing two objects together? (2)

[10]

QUESTION 5: ELECTRIC CIRCUITS

5.1 Draw a diagram of an electric circuit with the following electric components one bulb connected in series with one cell, two bulbs connected in parallel, and a closed switch. (5)

5.2 Identify the symbols for the circuit components by redrawing them next to name provided for each component in your ANSWER BOOK.

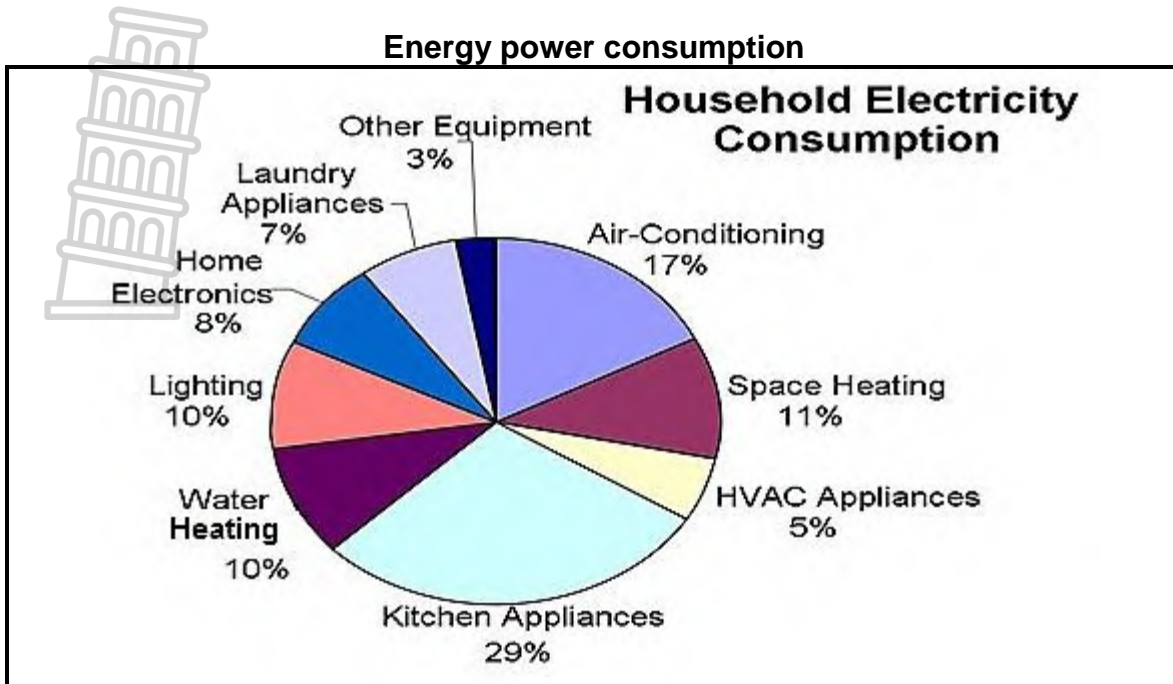
COMPONENT	SYMBOL
5.2.1 Open switch	
5.2.2 Voltmeter	
5.2.3 Resistor	
5.2.4 Conductor/Connector	
5.2.5 Ammeter	

(5)

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

[18]



QUESTION 6: PRACTICAL INVESTIGATION

During winter time most people use a lot of electricity. One household example has been shown above. The above graph shows how a particular household used electrical appliances during winter. Using the above graph, answer the questions below.

- 6.1 Which of the above electrical appliances consume most electricity and why? (1)
- 6.2 Mention TWO examples of electrical appliances that can be found in the kitchen. (1)
- 6.3 Mention TWO ways in which you can advise this family to save their electricity. (2)
- 6.4 What is the total electricity consumption for air-conditioning and kitchen appliances in this house? (1)
- 6.5 If the above household is using 7% of its electricity for laundry appliances, determine much of their electricity is spent if they buy R200 electricity per month. (2)

[7]

QUESTION 7: SERIES AND PARALLEL CIRCUIT CALCULATIONS

7.1 Calculate the total resistance and current of the following circuits:
Three $20\ \Omega$ resistors are connected in series across a $120\ \text{V}$ generator.

7.1.1 What is the total resistance of the circuit? (3)

7.1.2 What is the current in the circuit? (3)

7.2 According to ohms law, write down the formula for calculating current. (3)

7.3 In a parallel circuit, if two bulbs are connected to a $3\ \text{V}$ battery, what would be the voltage reading shown by each bulb? (2)

7.4 What are the differences between the voltage and resistance of a series and a parallel circuit? (4)

[15]

TOTAL SECTION B: 50



SECTION C: PLANET EARTH AND BEYOND**QUESTION 8: THE EARTH AS A SYSTEM**

The earth can be understood as a complex system where all the parts interact with each other. Four spheres interact on or near the surface of the earth.

Following from this statement answer the questions below.

8.1 Explain the interaction between the biosphere, lithosphere, hydrosphere and the atmosphere. (4)

8.2 The atmosphere is the mixture of gases held around the Earth by gravity. This mixture is known as air and consists of different gases like nitrogen, oxygen, and carbon dioxide.

What is the percentage of each of the above-mentioned gases? (3)

8.3 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 9: MINING OF MINERAL RESOURCES

There is large-scale mining activity in South Africa and this activity has a significant impact on our environment. It is very important that we look after our environment.

- 9.1 Mention FOUR examples of environmental impact that are caused by mining in our country. (4)
- 9.2 Some minerals can be used in their natural form. Give ONE example of such a mineral. (1)
- 9.3 Give the full name of the following minerals:
- 9.3.1 Al
- 9.3.2 Au
- 9.3.3 Cu (3)
- 9.4 Minerals have been important to humans throughout history. Mention TWO uses of minerals that you might know. (2)

[10]

QUESTION 10: BIRTH, LIFE AND DEATH OF STARS

Complete the following statements, using the words in the box below:

Blue; Hydrogen; Red giant; Red; Nebulae; Nuclear; White dwarf;
Star; Planetary nebulae

- 10.1 ... exist for a finite period of time (1)
- 10.2 Stars that look (10.2.1) ... are hotter and usually younger than stars that appear (10.2.2) ... (2)
- 10.3 Stars form inside huge clouds of gas and dust called ... (1)
- 10.4 At some point the ... reaction runs out of fuel. (2)
- 10.5 ... are lit up by their central white dwarf star and are beautiful objects to observe. (2)
- 10.6 ... is a very dense stellar remnant composed mostly of electron degenerated matter. (2)

[10]

TOTAL SECTION C: 30
GRAND TOTAL: 100





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EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2016

**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	Potential difference	A	√ (1)
1.2	volt	B	√ (1)
1.3	non-contact forces	C	√ (1)
1.4	Unlike charges attract each other	B	√ (1)
1.5	is dangerous and regarded as energy theft	A	√ (1)
1.6	The mantle, crust and the soil	A	√ (1)
1.7	sedimentary, igneous and metamorphic	C	√ (1)
1.8	very dense and has high gravity.	A	√ (1)
1.9	black hole	B	√ (1)
1.10	Nuclear fusion	D	√ (1)

[10]

QUESTION 2: CORRECT WORDS/TERMS

NO.	EXPECTED ANSWER	MARK
2.1	Electrons	√ (1)
2.2	An ore	√ (1)
2.3	The mantle	√ (1)
2.4	A mineral	√ (1)
2.5	Hydro-electricity	√ (1)

(5 x 1)

[5]

QUESTION 3: MATCHING ITEMS

NO.	EXPECTED ANSWER	LETTER	MARK
3.1	A resistor	D	√ (1)
3.2	An insulator	F	√ (1)
3.3	Atmosphere	A	√ (1)
3.4	Third position away from the sun	G	√ (1)
3.5	Global warming	B	√ (1)

(5 x 1)

[5]

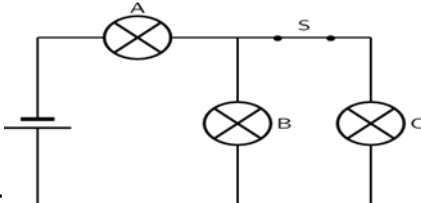




TOTAL SECTION A: 20

SECTION B: ENERGY AND CHANGE**QUESTION 4: FORCES**

NO.	EXPECTED ANSWERS	MARK	
4.1	Newton/s	√	(1)
4.2	North and South Pole	√√	(2)
4.3	Force is a push or a pull.	√	(1)
4.4	Sir Isaac Newton	√	(1)
4.5	Contact and non-contact forces	√√	(2)
4.6	Gravitational force	√	(1)
4.7	Frictional forces	√√	(2)
			[10]



QUESTION 5: ELECTRICITY AND ELECTRIC CIRCUITS

NO.	EXPECTED ANSWERS	MARK
5.1	<p>An electric circuit:</p> 	<p>√√√√√ (5)</p>
5.2	5.2.1	
	<p>Open switch: </p>	<p>√ (1)</p>
	5.2.2	
	<p>Voltmeter: </p>	<p>√ (1)</p>
	5.2.3	
	<p>Resistor: </p>	<p>√ (1)</p>
	5.2.4	
	<p>Conductor/Connector: _____</p>	<p>√ (1)</p>
	5.2.5	
	<p>Ammeter: </p>	<p>√ (1)</p>
5.3	<ul style="list-style-type: none"> The material of which the conductor is made. Different materials offer different degrees of resistance to the passing of the current. 	<p>√√ (2)</p>
	<ul style="list-style-type: none"> The length of the conductor. The longer the conductor, the greater is the resistance. 	<p>√√ (2)</p>
	<ul style="list-style-type: none"> The thickness of the conductor. The thicker the conductor, the smaller the resistance. 	<p>√√ (2)</p>
	<ul style="list-style-type: none"> The temperature of the conductor. The higher the temperature, the greater is the resistance. 	<p>√√ (2)</p>
		[18]

QUESTION 6: PRACTICAL INVESTIGATION

NO.	EXPECTED ANSWERS	MARK
6.1	Kitchen appliances consume most electricity, because it has the highest percentage (29%) in comparison to all other appliances. (½ mark for giving the correct answer and the explanation.)	√ (1)
6.2	There are many of these appliances if the student is correct, give him/her a mark. Electrical stove, kettle, Iron, microwave etc. (½ mark for each example.)	√ (1)
6.3	<ul style="list-style-type: none"> • Switching off unnecessary lights. • Can use gas stoves and kettles. • Wash light clothes by hands. (All related answers are correct.)	√√ (2)
6.4	29% of kitchen appliances and 17% of air-conditioning. Answer: 46%	√ (1)
6.5	Calculation is only one mark, since these are grade nines. Basic calculation. 7% of R200 $7 \div 100 = 0,07$ $0,07 \times 200 = R14$ This family spends R14 of their electricity bill on laundry appliances.	√√ (2)
		[7]



QUESTION 7: SERIES AND PARALLEL CIRCUITS CALCULATIONS

NO.	EXPECTED ANSWERS		MARK
7.1	Calculation: Three resistors in series		
	7.1.1	Total resistance = $R_1 + R_2 + R_3$ = $20 \Omega + 20 \Omega + 20 \Omega = 60 \Omega$	√√√ (3)
	7.1.2	Current = $\frac{V}{R}$ = $\frac{120 \text{ volt}}{60 \Omega}$ = 2 A	√√√ (3)
7.2	Current = Voltage ÷ Resistance ($I = V \div R$)		√√√ (3)
7.3	The voltage shown by each bulb will be 3 V. (Voltage is the same, not shared.)		√√ (2)
7.4	Series circuit	Parallel circuit	
	<ul style="list-style-type: none"> • Voltage is shared. • Resistance is the same throughout. 	<ul style="list-style-type: none"> • Voltage is not shared. • Resistance is different throughout. 	√√√√ (4)
			[15]

TOTAL SECTION B: 50



SECTION C: PLANET EARTH AND BEYOND**QUESTION 8: EARTH AS A SYSTEM**

NO.	EXPECTED ANSWERS	MARK
8.1	<ul style="list-style-type: none"> The biosphere consists of all living organisms (animals and plants) which survive because of their interaction with the lithosphere (solid rock and soil), and these need water and gas (hydrosphere and the atmosphere) in order to survive. Therefore, one can only survive with the support of the other. (If the learner explains the interaction correctly full marks must be awarded.) 	√√√√ (4)
8.2	<ul style="list-style-type: none"> Nitrogen – 78% Oxygen – 21% Carbon dioxide – less than 1% 	√ √ √ (3)
8.3	<ul style="list-style-type: none"> Igneous rocks Sedimentary rocks Metamorphic rocks 	√ √ √ (3)

[10]**QUESTION 9: MINING OF MINERAL RESOURCES**

NO.	EXPECTED ANSWERS	MARK
9.1	<ul style="list-style-type: none"> 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 four related answers)	√√√√ (4)
9.2	Sand, potash and diamonds. (Any 1 x 1)	√ (1)
9.3	9.3.1 Al – Aluminium	√
	9.3.2 Au – Gold	√
	9.3.3 Cu – Copper	√ (3)
9.4	To make: <ul style="list-style-type: none"> Jewellery Tools Weapons Machinery and decorations (Any two of these and other related answers.)	√√ (2)

[10]

QUESTION 10: BIRTH, LIFE AND DEATH OF STARS

NO.	EXPECTED ANSWERS	MARK	
10.1	Stars	√	(1)
10.2	10.2.1 Blue	√	(1)
	10.2.2 Red	√	(1)
10.3	Nebulae	√	(1)
10.4	Nuclear	√√	(2)
10.5	Planetary nebulae	√√	(2)
10.6	White dwarf	√√	(2)
			[10]

TOTAL SECTION C: 30
GRAND TOTAL: 100

