



HILLCREST HIGH SCHOOL
NATURAL SCIENCE
GRADE 9



DECEMBER 2014
TIME: 2 HRS

Total 150

Instructions

1. Answer ALL the questions.
2. This question paper consists of TWO sections:
3. SECTION A (20)
SECTION B (130)

Answer SECTIONS A and B in the ANSWER BOOK.
4. Non-programmable calculators may be used.
5. Appropriate mathematical instruments may be used.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Data sheets and a periodic table are attached for your use.
8. Give brief motivations, discussions, et cetera where required.
9. Numbers must be rounded off to **two decimal** places.

DATA SHEET	
$R = \frac{V}{I}$	$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$
$W = mg$	$g = 9.8m. s^{-2}$

SECTION A

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Write only the letter (A – D) next to the question number (1.1 -1.10) in the ANSWER BOOK.

1.1 Which one of the following is an example of a contact force?

- A. Frictional force
- B. Gravitational force
- C. Electrostatic force
- D. Magnetic force

1.2 An object that loses electrons becomes

- A. Positively charged
- B. Neutral
- C. Negatively charged
- D. Lighter in mass

1.3 Which of the following is **NOT** one of the atmosphere's layers?

- A. Thermosphere
- B. Hydrosphere
- C. Stratosphere
- D. Mesosphere

1.4 What is the unit in which current is measured?

- A. Ammeter
- B. Ampere
- C. Ohms
- D. Volts

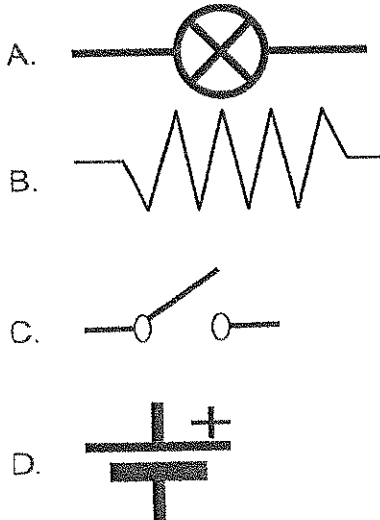
1.5 Which is an example of igneous rock?

- A. Sandstone
- B. Shale
- C. Marble
- D. Pumice stone

1.6 What is the average thickness of the lithosphere?

- A. 200m
- B. Hundreds of kilometres
- C. 55km
- D. 3m

1.7 Which image below is the correct image for a light bulb?



1.8 Which statement is **NOT** true?

- A. The longer the resistor the greater the resistance
- B. The thicker the resistor the greater the resistance
- C. The hotter the resistor the greater the resistance
- D. Nichrome wire has a greater resistance than copper wire

1.9 What is the symbol of the unit in which force is measured?

- A. N
- B. kg
- C. g
- D. $\text{N}\cdot\text{m}^{-1}$

1.10 What is the name of the special electric component that controls the flow of electric current?

- A. Conductor
- B. Diode
- C. Ammeter
- D. Transformer

[2 x 10 = 20]

SECTION B

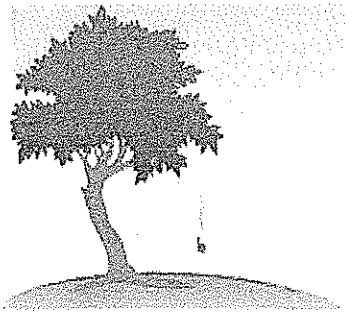
INSTRUCTIONS AND INFORMATION

1. Leave ONE line between two sub questions, for example between QUESTION 2.1 and QUESTION 2.2.
2. Show the formulae and substitutions in ALL calculations.
3. Round off your numerical answers to **TWO** decimal places.

Question 2

2.1 Define the term force. (1)

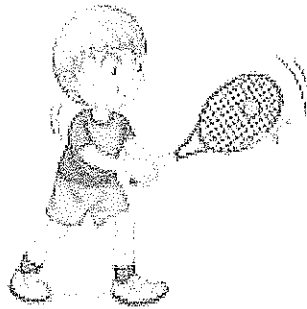
2.2 Study each of the pictures below and answer the following questions:



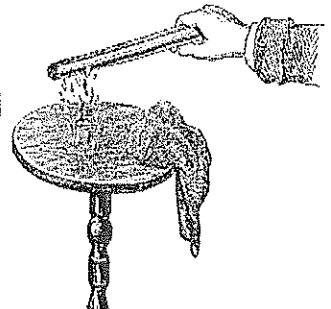
PICTURE A



PICTURE B



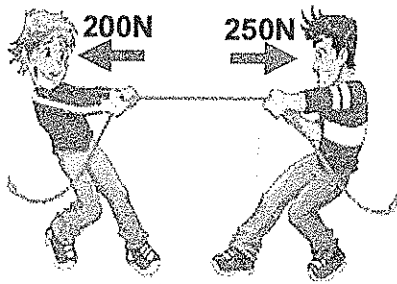
PICTURE C



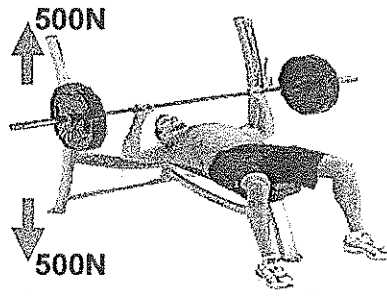
PICTURE D

- 2.2.1 Is the force in picture A a contact or non-contact force? (1)
- 2.2.2 Is the force in picture D a contact or non-contact force? (1)
- 2.2.3 Describe the effect of the force on the object in picture C. (1)
- 2.2.4 Describe the effect of the force by the man, on the object in picture B. (1)
- 2.2.5 Explain why the paper pieces are attracted to the rod in picture D. (2)
- 2.2.6 Give an example of static electricity in nature. (1)

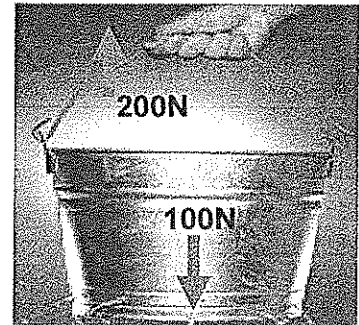
2.3 Use the pictures below to answer the following questions.



PICTURE 1



PICTURE 2



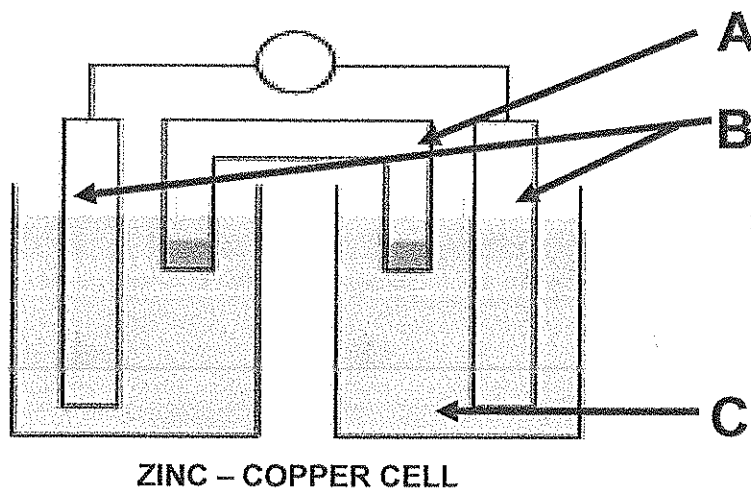
PICTURE 3

- 2.3.1 Which picture shows balanced forces? (1)
- 2.3.2 Which person in the pictures is exerting the greatest force? (1)
- 2.3.3 Give the number(s) of the picture(s) where one of the forces is the result of gravity. (2)
- 2.3.4 What will happen to the bucket of water in the picture? Explain your answer. (2)
- 2.3.5 In which direction will the boys in the tug of war picture move, left or right? Explain your answer. (2)
- 2.4 On which **TWO** factors does the weight of a person or an object depend? (2)
- 2.5 Calculate the weight of the following objects on Earth:
- 2.5.1 a person with a mass of 55kg (3)
- 2.5.2 a biscuit with a mass of 25g (3)

[24]

Question 3

3.1 Look at the diagram below and provide the missing labels. Write down only the letter and correct label.



(3)

3.2 Two grade 9 learners decide to carry out a practical to determine the relationship between current strength and potential difference between the ends of a given resistor while keeping the temperature constant. The results can be seen in the table below.

NUMBER OF CELLS IN SERIES	POTENTIAL DIFFERENCE (V)	CURRENT STRENGTH (A)
1	1.0	0.5
2	2.0	1.0
3	3.0	1.5
4	4.0	2.0

3.2.1 Write a possible investigative question for the experiment above. (2)

3.2.2 Using the information from the table above draw a line graph of potential difference against current strength. (5)

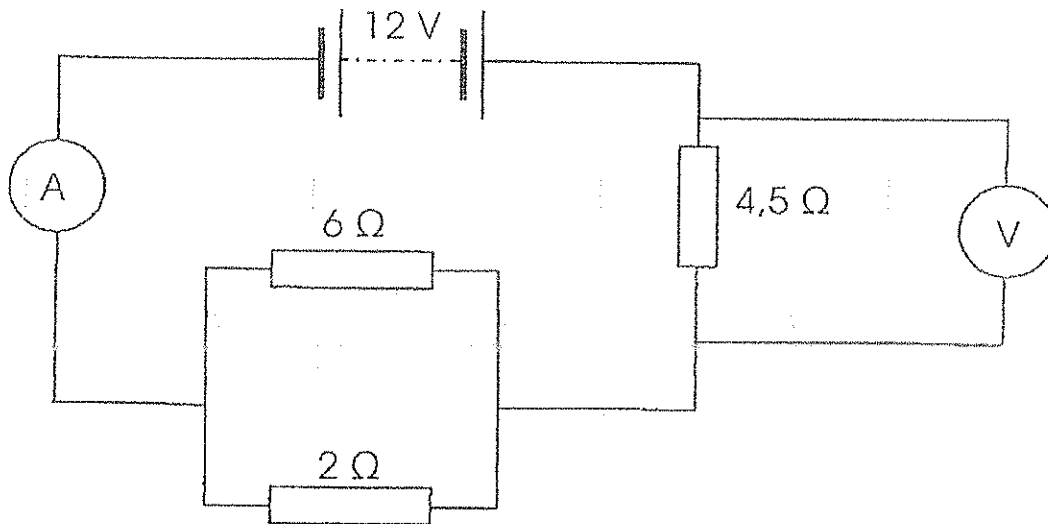
3.2.3 What must remain constant during this practical to ensure it is conducted fairly? (1)

3.2.4 Using the graph, what can you conclude about the relationship between the current strength and the potential difference? (1)

3.2.5 Using the table of information above, calculate the resistance of the resistor used in the experiment. (3)

3.2.6 Draw the circuit that the learners would have set up when using 4 cells. Ensure to include an ammeter, a switch and a voltmeter over the resistor in the circuit. (5)

3.3 Look at the circuit diagram below and answer the questions that follow:



- 3.3.1 What is the total voltage in the circuit? (1)
- 3.3.2 Calculate the resistance of the parallel combination. (3)
- 3.3.3 Calculate the total resistance in the circuit. (3)
- 3.3.4 Calculate the reading on the ammeter. (3)
- 3.3.5 Calculate the reading on the voltmeter. (3)
- 3.3.6 Calculate the voltage over the parallel combination. (2)
- 3.3.7 Calculate the current in the 2Ω resistor. (3)

[38]

Question 4

- 4.1 Define the term power. (2)
- 4.2 Look at the table below and convert the power ratings from watts to kilowatts. Your answer must include the correct units.

	APPLIANCE	POWER RATING IN WATTS
4.2.1	Tumble dryer	2500W
4.2.2	Light bulb	60W
4.2.3	Geyser	5000W
4.2.4	Air conditioner	16 000W

(4)

4.3 Look at the electricity bill below and answer the questions that follow.

ELECTRICITY	VAT NO. 4719198211	SUBTOTAL	TOTAL AMOUNT
(Reading period – 2014/10/01 to 2014/11/15 = 46 days)			
Energy meter readings and consumption: Meter no. #00886141			
Start reading: 97,348.000			
End reading: 98,980.220 = 1,632.220kWh			
Daily average consumption 35.483kWh			
Charges for 1,632.220kWh are based on a sliding scale for a 46 day period			
Step 1 744.073kWh @ R0.7983			
Step 2 544.073kWh @ R0.8165			
Step 3 344.073kWh @ R0.8513			
Extended Social Package Grant		0.00	
Service charge		253.41	
Network charge		68.98	
Demand side management levy		41.54	
VAT:14%		237.31	1,932.38

- 4.3.1 Write down the meter number. (1)
- 4.3.2 What is the number of kilowatthours recorded by the meter for the billing period? (1)
- 4.3.3 What is the cost per kilowatt for step 2? (1)
- 4.3.4 Using the information on the bill calculate the total cost of electricity for that month. Show all your working out. (4)

4.4 The following appliances are used in a household:

- 5 light bulbs of 100W each for 10 hours
- An iron of 1kW for 3 hours
- A kettle of 2000W for 30 minutes

Calculate the cost of the electricity for the household if the price of electricity per kilowatthour is R0.15. Show all your working out. (5)

[18]

Question 5

Read the following letter written to the local municipality by a grade 9 learner living in a rural area.

Dear Sir / Madam

Many people in the area in which I live do not have electricity. This makes it difficult for the learners to do their homework and to study in the evenings. People spend a lot of money each month on paraffin, coal and batteries. The burning of wood, coal and paraffin results in pollution and also causes fires in people's houses.

At school we learnt that electricity can be made from energy in wind and sunlight. We have plenty of wind and sunshine here. Wind energy and the energy of the sun are free and replaceable. Can the municipality and ESKOM not supply electricity, which is made from sources like wind and sunlight, to everyone? To protect our environment we should be using as much replaceable energy as possible.

Yours sincerely
Leoni Gerber

- 5.1 What is another term for replaceable energy? (1)
- 5.2 What sources of energy mentioned above in the letter are replaceable? (2)
- 5.3 What energy resources mentioned in the above letter are non-renewable? (3)
- 5.4 Name **TWO** advantages of using fuels such as coal and paraffin. (2)
- 5.5 Name **TWO** disadvantages of using fuels such as coal and paraffin. (2)
- 5.6 In order to generate electricity from wind, a wind farm must be built. Name **THREE** disadvantages related to wind farms and wind turbines. (3)
- 5.7 What are solar panels fitted with to ensure that even when there is very little sunlight enough energy is available to heat water in your home? (1)
- 5.8 What is the name for type of energy that comes from the heat of rock deep beneath the Earth's surface? (1)

[15]

Question 6

- 6.1 Name the **FOUR** spheres of the Earth. (4)
- 6.2 The atmosphere's different layers all play a role in supporting life on Earth. Match the layers in column A with their role in column B. Write down only the numbers and their corresponding letter in your answer book

COLUMN A		COLUMN B	
LAYERS OF THE ATMOSPHERE		ROLE IN SUPPORTING LIFE ON EARTH	
6.2.1	Thermosphere	A	Layer where small rocks burn up instead of reaching Earth
6.2.2	Stratosphere	B	Provides oxygen and carbon dioxide for life processes
6.2.3	Mesosphere	C	Absorbs dangerous x-rays from the sun
6.2.4	Lithosphere	D	Contains the ozone layer which protects life from harmful ultraviolet radiation
		E	Layer that does not help to keep the Earth warm

(4)

- 6.3 List the **FOUR** potentially threatening problems on the Earth that are caused by global warming. (4)
- 6.4 Draw a diagram to clearly show the rock cycle. Make sure to include what process takes place to form each type of rock in the cycle. (6)

[18]

Question 7

- 7.1 Read the extract below and answer the question that follow:

CONFLICT OVER PROPOSED MINE

A large mining company plans to open a new opencast copper mine near the Kruger National Park. The area in which the mine will be is a dry area mostly used for cattle rearing, but in which some crops are also grown. There are many villages in the area but not much work. The mine will be very close to a main road leading to a busy tourist entrance to the park. Environmental action groups are opposed to the opening of the mine. They are planning to write a letter urging the minister not to allow the mine to be opened.

- 7.1.1 Briefly explain what an opencast mine is. (2)
- 7.1.2 Is copper an element or a compound? (1)

- 7.1.3 In which layer of the Earth is copper ore found? (1)
- 7.1.4 Suggest **TWO** reasons the environmentalists could use in their letter to support their opposition to the mine. (4)
- 7.1.5 Suggest **ONE** reason from the extract above, why the government might want to support the opening of the mine. (2)
- 7.2 Gold found in alluvial deposits are extracted by physical processes.
- 7.2.1 Define the term physical process. (1)
- 7.2.2 Name the **TWO** physical processes used to extract gold. (2)
- 7.2.3 Explain how the two physical processes (you named in question 7.2.2) are used. (4)

[17]

TOTAL 150