HILLCREST HIGH SCHOOL

NATURAL SCIENCE EXAMINATION

Grade 8 | November 2013

Time: 2 hours | Marks: 150

Instructions:

1. READ ALL INFORMATION CAREFULLY!
2. Answer ALL the questions.
3. Work neatly and clearly.

Question 1

Answer the following questions by choosing the most correct answer. Only write the number and the correct answer in your answer booklet. E.g. 1.1 D

1.1 Which of these is the smallest particle?
- A An atom
- B A molecule
- C A speck of dust
- D An electron

1.2 Which of the following is a general property of non-metals?
- A Shiny
- B Good conductor of heat
- C Poor conductor of heat
- D Sonorous

1.3 Light is a form of energy produced by a _____.
- A luminous object
- B transparent object
- C non-luminous object
- D opaque object

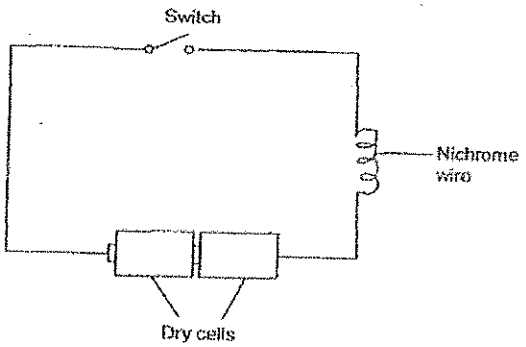
1.4 Which of the following is a general property of metals?
- A Brittle
- B Strong
- C Poor conductor of heat
- D Dull

1.5 An element sinks in water and makes a ringing sound when hit. It is most likely to be:
- A A metal
- B A non-metal
- C An alloy
- D A metalloid

1.6 Which one of the following materials is a non-metal and a good conductor of electricity?
- A copper
- B carbon
- C nichrome
- D porcelain

1.7 An example of non-luminous object is _____.
- A a candle
- B the sun
- C an electric bulb
- D the moon

1.8 Look at the circuit below. When the switch was closed, the nichrome wire turned hot and started to glow. Which one of the following shows the correct energy conversion?



- A Electrical energy → Potential energy → Heat energy → Light energy
- B Kinetic energy → Electrical energy → Heat energy → Light energy
- C Potential energy → Electrical energy → Heat energy
- D Potential energy → Electrical energy → Heat energy + Light energy

1.9 Which statement about carbon dioxide is **false**?
- A It is a gas like hydrogen or sulphur dioxide
- B It is colourless and odourless
- C It turns clear lime water milky
- D It readily ignites in the presence of oxygen

1.10 The image formed by a plane mirror is always _____.
- A real and erect
- B virtual and erect
- C real and inverted
- D virtual and inverted

1.11 Which of the following is **false**?
- A A battery is composed of two or more cells
- B Each cell has a positive and a negative terminal (pole)
- C A poor conductor of electricity is called an insulator
- D An electric current is caused by the motion of neutral particles

1.12 Which statement about hydrogen gas is **true**?
- A. It is ductile.
- B. It is needed for combustion.
- C. It turns clear lime water milky.
- D. It reacts with oxygen to form water.

1.13 Potential difference refers to the _____ in a circuit.
- A current strength
- B voltage
- C direction of the flow of current
- D amount of charge

1.14 A candle burns .....
A equally brightly in air and pure oxygen
B brighter in air than in pure oxygen
C brighter in pure oxygen than in air
D neither in oxygen or air

1.15 When light is incident on a polished surface _____ reflection takes place.
A regular
B irregular
C diffused
D normal

1.16 A characteristic of non-metals is that...
A they are malleable
B they are good electrical conductors
C they react with nitrogen to form nitrous oxide
D they are poor conductors of heat

1.17 Which statement about hydrogen gas is **true**?
A It is ductile
B It is needed for combustion
C It turns clear lime water milky
D It reacts with oxygen to form water

1.18 Which of the following is used to make a periscope?
A concave mirror
B convex mirror
C plane mirror
D lens

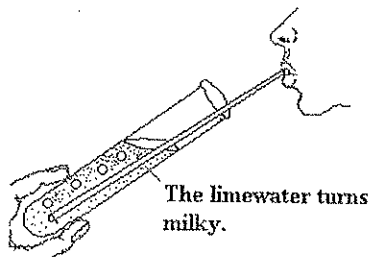
1.19 The particles that can be removed from an atom are the:
A Protons
B Electrons
C Neutrons
D Nucleus

1.20 What colour will a red rose appear to be if green light shines on it?
A white
B red
C green
D black

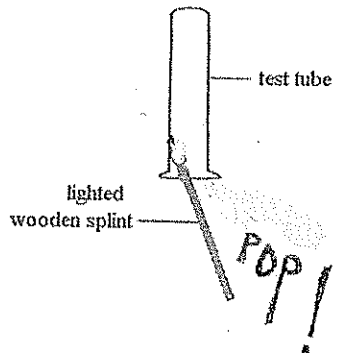
1.21 The flow of charge from positive to negative is known as _____.
A normal current
B positive current
C conventional current
D alternating current

3.3 It is impossible to tell the difference between oxygen, hydrogen and carbon dioxide by looking at them. The three diagrams below illustrate the tests for each of these gases. State which gas each method is used to test for. Write only the question number and your answer.

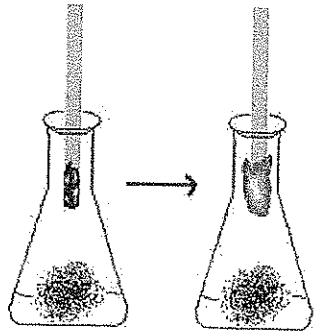
3.3.1



3.3.2



3.3.3



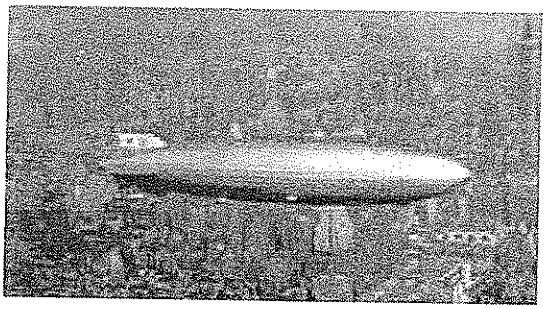
(6)

3.4 When we learnt about the gases carbon dioxide, oxygen and hydrogen, we found that they have different properties or characteristics.

3.4.1 Carbon dioxide is used in fire extinguishers. One reason for this is that it is heavier than air. Which other property or characteristic of carbon dioxide makes it useful for putting out fires?

(2)

3.4.2 The Hindenburg airship pictured below was filled with hydrogen. Airships are now filled with helium. Which property of hydrogen makes it dangerous to use in an airship?



(2)

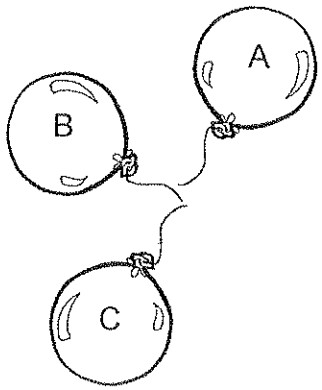
3.4.3 The three balloons shown below are filled with oxygen, hydrogen and carbon dioxide. Which gas do you think is in balloon:

A?

B?

C?

Give a reason for each of your answers.



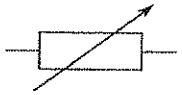
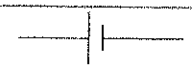
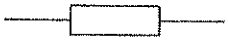
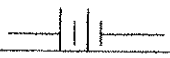
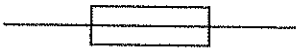
(6)

[30]

ENERGY AND CHANGE

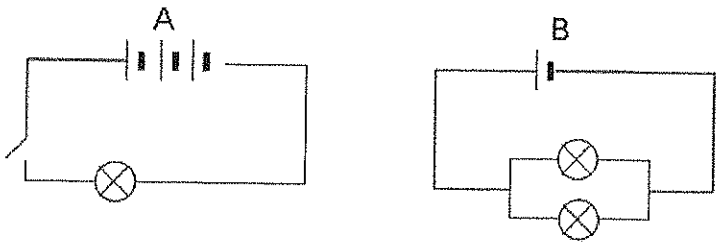
Question 4

4.1 Choose the correct name for each of the circuit symbols pictured below. Write only the question number and the letter of the correct name. E.g. 4.1.9 K

	Component	Name
4.1.1		A Battery
4.1.2		B Cell
4.1.3		C Rheostat
4.1.4		D Bulb
4.1.5		E Resistor
4.1.6		F Open switch
4.1.7		G Closed switch
4.1.8		H Fuse

(8)

4.2 Look at the two circuits below carefully and then complete the sentences below. Choose the word or words from the brackets that will complete the sentence correctly. Write only the question number and the word/s you have chosen. Do not rewrite the sentences.



4.2.1 In a cell (chemical potential energy / kinetic energy) is converted to (light energy / electrical energy).

4.2.2 The positive terminal of the cell is represented by the (long / short) line.

4.2.3 Connectors used in the circuit are made from (conductors / insulators).

4.2.4 An example of a good conductor of electricity is (copper wire / paper).

4.2.5 In circuit A, the light bulb (will / will not) shine.

4.2.6 In circuit A the light bulbs are connected in (series / parallel).

4.2.7 In circuit B the light bulbs are connected in (series / parallel).

4.2.8 In circuit A, before current will flow the (switch needs to be closed / more cells need to be added).

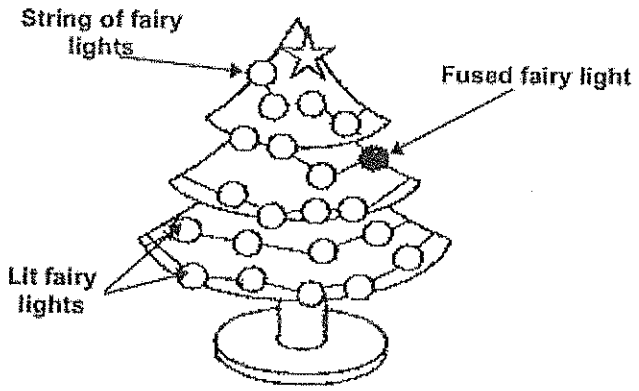
4.2.9 In the light bulb, (chemical potential energy / electrical energy) is converted into (light energy / kinetic energy).

4.2.10 If the cell is reversed the light bulbs in circuit B (will / will not) shine. (12)

[20]

Question 5

Ginaand Vuyo were looking at a Christmas tree that was beautifully lit by a string of fairy lights. Vuyo then discovered that one of the light bulbs in the string of fairy lights did not light up.



He commented that the bulbs of the fairy lights must have been connected in series. Gina disagreed with him and said that it has been connected in parallel.

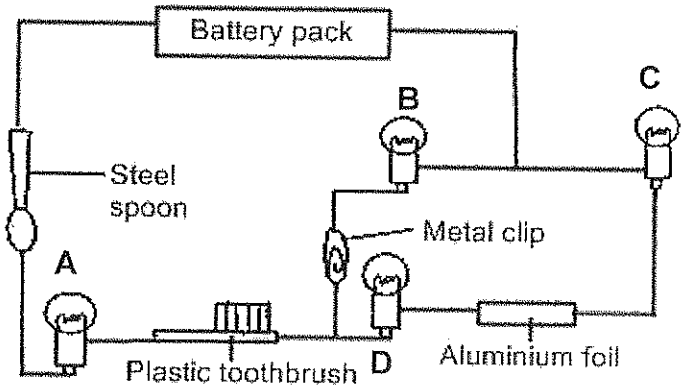
5. 1 Who do you agree with? Explain your choice clearly. (2)

5.2 Draw a circuit diagram to show how you think the string of fairy lights is connected. Include 3 fairy lights (bulbs), two cell(s) and a switch in your diagram. Remember to use the correct method for drawing a circuit. (6)

[8]

Question 6

Study Circuit A before answering the questions that follow.



6.1 Is this a series or a parallel circuit? (1)

6.2 Which of the bulbs A to D will light up? Give a reason for your answer. (3)

6.3 If you removed bulb B, which bulbs (if any) would continue to shine? (2)

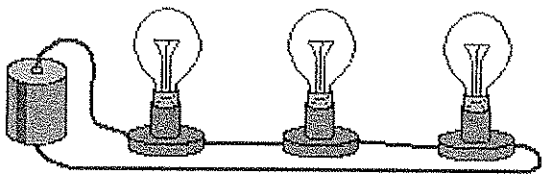
6.4 If you removed bulb C, which bulbs (if any) would continue to shine? (2)

6.5 What would you need to do to make all four bulbs shine? (2)

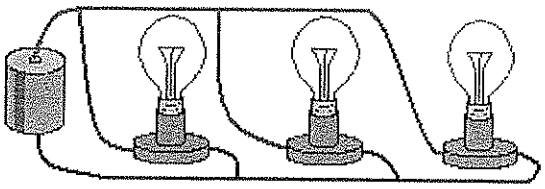
[10]

Question 7

Two circuits are connected as shown. The cells and light bulbs are identical.



Circuit 1



Circuit 2

7.1 What type of circuit is represented by circuit 1? (1)

7.2 What type of circuit is represented by circuit 2? (1)

7.3 Will the light bulbs glow more brightly in circuit 1 or circuit 2? Explain your answer. (3)

7.4 In which circuit will the battery not last as long? Explain your answer. (3)

7.5 If more light bulbs are added to circuit 1, what will happen to:

7.5.1 the strength of the current? (1)

7.5.2 the resistance of the circuit? (1)

7.6 If more light bulbs are added in parallel to circuit 2, what will happen to:

7.6.1 the strength of the current? (1)

7.6.2 the resistance of the circuit? (1)

[12]

Question 8

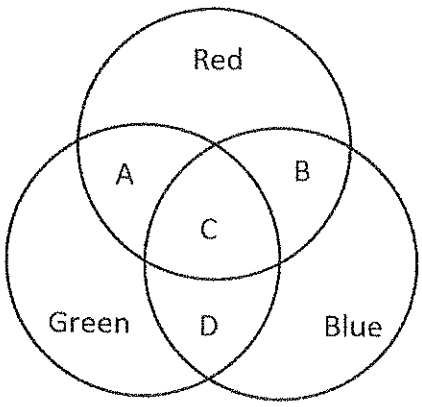
8.1 This diagram shows the primary colours. When mixed, which colours are represented by:

8.1.1 A

8.1.2 B

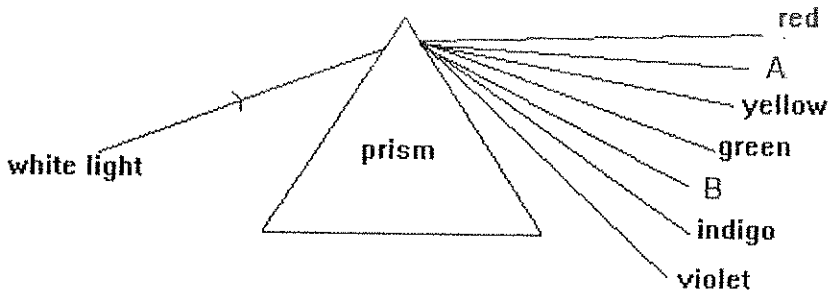
8.1.3 C

8.1.4 D



(4)

8.2 When white light travels through a triangular prism, it separates into a number of colours. Study the diagram below and answer the questions that follow.



8.2.1 What is the name of this process? (1)

8.2.2 What do we call this band of colours? (1)

8.2.3 Which colour is refracted the most? (1)

8.2.4 Which colour is refracted the least? (1)

8.2.5 Name the missing colours of the spectrum labelled **A** and **B.** (2)

[10]

Question 9

9.1 Draw simple, neat pencil diagrams to show rays of light that are

9.1.1 divergent (1)

9.1.2 convergent (1)

9.1.3 parallel (1)

[3]

Question 10

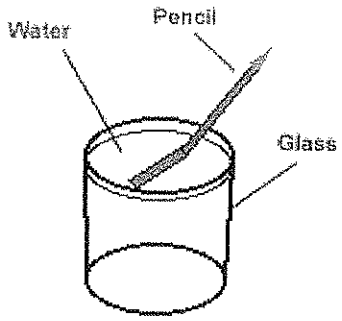
Match each of the terms in column A with the item from column B that best suits it. Write only the question number and the letter of the correct answer.

	Column A		Column B
10.1	Dispersion	A	Inverted
10.2	Refraction of light	B	Reflecting light
10.3	Luminescent	C	Band of colours
10.4	Image in pinhole camera	D	Blue
10.5	Spectrum	E	Rough surface
10.6	Illuminated object	F	Change of direction of light
10.7	Primary colour	G	Virtual
10.8	Diffuse reflection	H	Emitting light
10.9	Image in a plane mirror	I	Frosted glass
10.10	Translucent	J	Splitting of light into its colours

[10]

Question 11

A grade 8 class did an experiment to observe how water affects rays of light. They set up the following equipment.



They then looked carefully at the pencil from the side of the glass and from above.

11.1 What do they observe? (1)

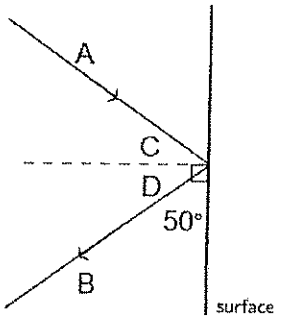
11.2 What is this phenomenon called? (1)

11.3 Briefly explain how this happens. (3)

[5]

Question 12

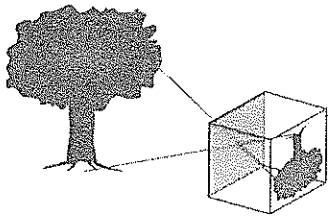
The diagram below shows a ray of light being reflected off a shiny surface.



12.1 What is the angle of incidence? (1)

12.2 What is the angle of reflection? (1)

The diagram shows how a basic pinhole camera works.



12.3 Name two properties of the image that is formed. (2)

12.4 How does the image of the tree that is observed on the screen change if the camera is moved closer to the tree? (2)

12.5 What property of light is demonstrated by the pinhole camera? (1)

[7]