HILLCREST HIGH SCHOOL

NATURAL SCIENCE EXAMINATION

Grade 8 **November 2014**

Time: 2 hours **Marks: 150**

Instructions:

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

SECTION A: ENERGY AND CHANGE

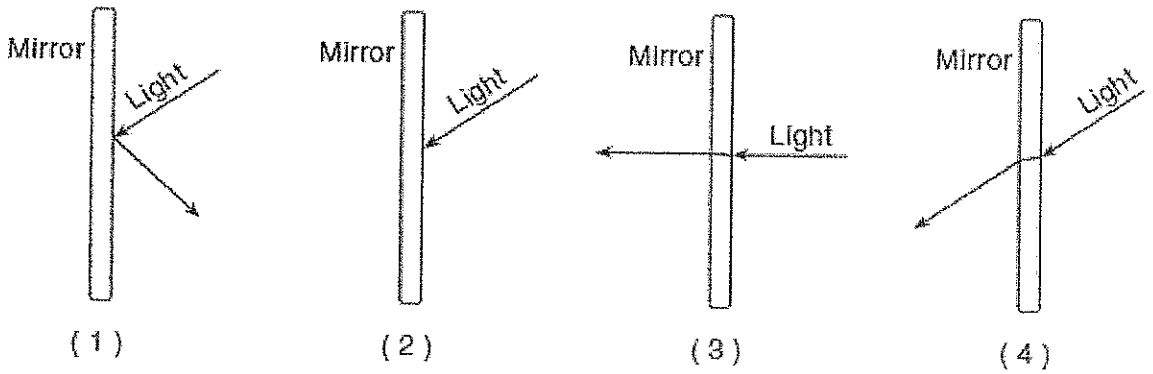
Question 1

Answer the following questions by choosing the most correct answer. Write only the number and the correct answer in your answer booklet. E.g. 1.11 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 diagram best represents light being reflected after hitting the flat surface of a mirror?



(1) (2) (3) (4)

A Diagram 1
B Diagram 2
C Diagram 3
D Diagram 4

1.3 The number of waves that move past a certain point in one second is referred to as the _____ of the wave.

A wavelength
B dispersion
C speed
D frequency

1.4 The resistant wire inside a light bulb that glows to produce light is called a _____

A conducting wire
B filament
C resistor
D magnetic field

1.5 When two polythene rods with the same charge are brought near each other, they ....

A repel
B attract
C point North
D point South

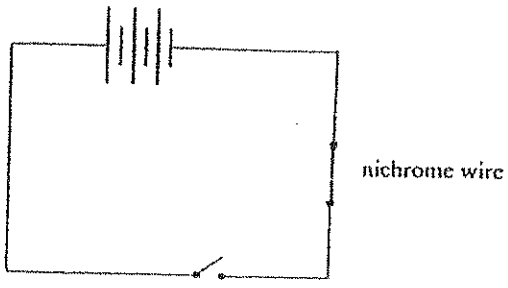
1.6 The sub-atomic particles that are free to leave the atom are the _____

A protons
B neutrons
C electrons
D nucleus

1.7 An example of a non-luminous object is _____.

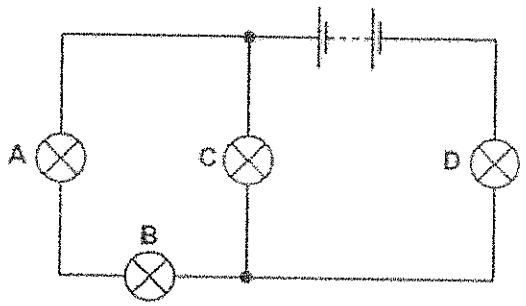
A a candle
B the sun
C an electric bulb
D the moon

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 In the circuit below, one lamp breaks, causing all the other lamps to go out. Which lamp breaks?



A A
B B
C C
D D

1.10 The flow of electric charge in a circuit is called the _____

A electric current
B electric voltage
C resistance
D wattage

[10]

Question 2

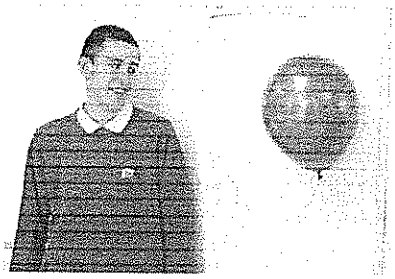
Write down the letter of the item in Column B that best suits or describes the item in Column A. Write only the question number and the letter of the correct answer.

Column A		Column B	
2.1	Proton	A	Repel each other
2.2	Unlike charges	B	No charge
2.3	Charges are created by	C	No effect
2.4	Like charges	D	Obtains a negative charge
2.5	Neutron	E	Friction
		F	Attract each other

[5]

Question 3

A grade 8 class used a balloon to investigate static electricity. They found that if they rubbed a ballon with a neutral charge on their hair, they could then get the balloon to 'stick' on a wall.



3.1 How does the neutrally charged balloon became negatively charged after being rubbed on someone's hair? (3)

3.2 Why is the balloon able to stick to the wall once it has been negatively charged? (3)

3.3 Why does the balloon eventually start to slide down the wall? (2)

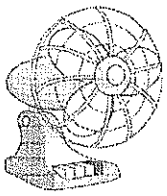
3.4 After rubbing the balloon on their hair, some of the girls noticed that their hair was standing up. Give a clear explanation of why this happened. (4)

[12]

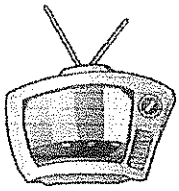
Question 4

For each of the output devices pictured below, describe the energy conversion that is taking place.

4.1



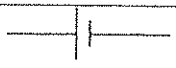
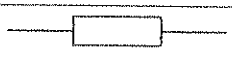
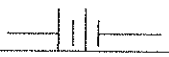
4.2



[5]

Question 5

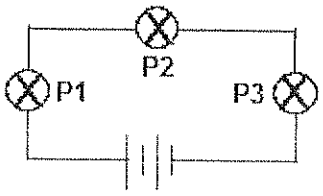
Choose the correct name for each of the circuit symbols pictured below. Write only the question number and the letter of the correct name. E.g. 5.1.9 K

	Component	Name
5.1		A Battery
5.2		B Cell
5.3		C Conducting wire
5.4		D Bulb
5.5		E Resistor
5.6		F Open switch
5.7		G Closed switch
5.8		H Buzzer

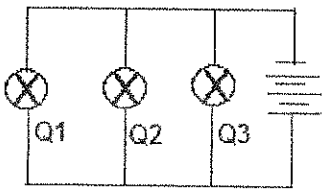
[8]

Question 6

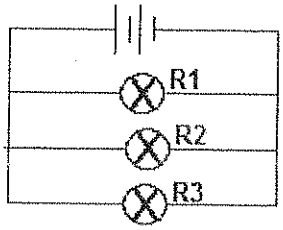
Jane set up some circuits as shown below using similar types of bulbs, cells and wires.



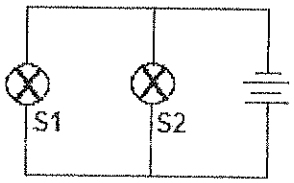
Circuit P



Circuit Q



Circuit R



Circuit S

6.1 In which of the four circuits (P, Q, R or S) will the bulbs be the dimmest? Give a reason for your answer. (2)

6.2 In which of the circuits P, Q or R will the bulbs be the brightest? Give a reason for your answer. (2)

6.3 Look at Circuit P. What would happen to bulbs P2 and P3 if P1 fused? Give a reason for your answer. (3)

6.4 Look at Circuit Q. What would happen to bulbs Q1 and Q2 if bulb Q3 fused? Give a reason for your answer. (3)

6.5 Which <u>two</u> circuits out of P, Q, R, and S should Jane use if she wants to find out if the number of bulbs connected in parallel affects the brightness of the bulbs? Explain your answer. (3)

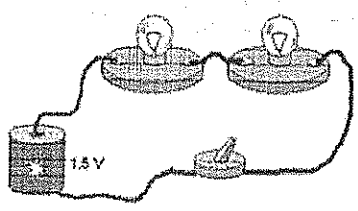
6.6 What changes should be made to circuit Q if she wants to find out if the number of cells affects the brightness of bulbs using circuits P and Q? (2)

[15]

Question 7

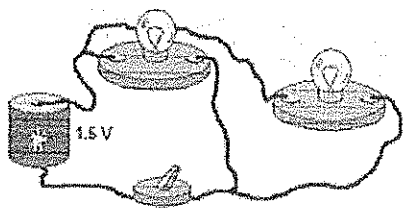
Draw a circuit diagram for each of the circuits pictured below.

7.1



(6)

7.2

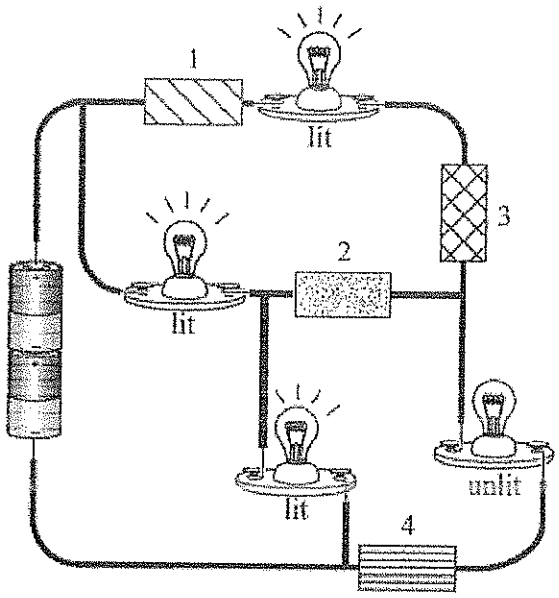


(6)

[12]

Question 8

The circuit diagram below shows cells connected to four light bulbs and four different materials labeled 1, 2, 3, and 4. Study the diagram carefully before answering the questions that follow.



8.1 Is the material labelled 1 a conductor or an insulator? (2)

8.2 Is the material labelled 2 a conductor or an insulator? (2)

8.3 Is the material labelled 3 a conductor or an insulator? (2)

8.4 Is the material labelled 4 a conductor or an insulator? (2)

[8]

Question 9

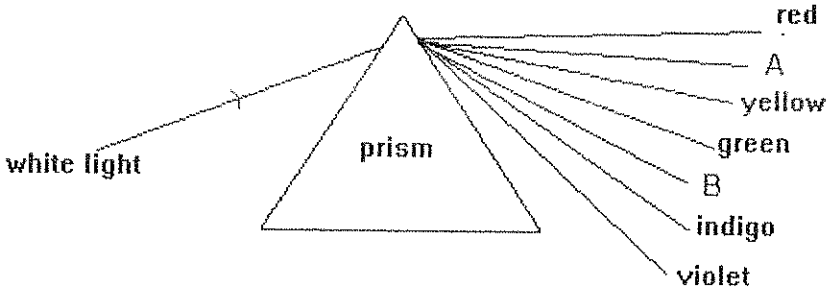
Choose from column B the description that best suits the item in column A. Write down only the letter of your choice next to the number of the question. For example, 9.9 J

Column A		Column B	
9.1	Transparent	A	Light rays diverge away from each other
9.2	Opaque	B	Gives off light
9.3	Refraction	C	Light can move through
9.4	Reflection	D	Light falling on a shiny object bounces back
9.5	Concave lens	E	Direction of light ray changes from one medium to another
9.6	Convex lens	F	Lighted by another object
9.7	Illuminated object	G	Stops light from moving through
9.8	Luminous object	H	Will concentrate light rays at one point

[8]

Question 10

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.



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

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

10.3 Which colour is refracted the most? (1)

10.4 Which colour is refracted the least? (1)

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

[6]

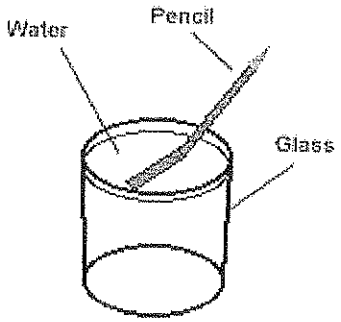
Question 11

Draw a simple line drawing showing how light is reflected off a shiny surface when it hits the surface at an angle of 30^0 between the incoming light ray and the surface. Be sure to include all labels.

[8]

Question 12

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.

12.1 What do they observe? (1)

12.2 What is this phenomenon called? (1)

12.3 Briefly explain how this happens. (3)

[5]

EARTH AND BEYOND

Answer the following questions by choosing the most correct answer. Write only the number and the correct answer in your answer booklet. E.g. 13.11 D

13.1 The inner planets are called terrestrial planets because:

A They are very dense and rocky

B They have massive gas atmospheres

C They can support life

D They are very hot

13.2 Which of the following is a body that reaches Earth's surface?

A A meteorite

B A meteoroid

C An asteroid

D A comet

13.3 What causes a high surface temperature on Venus?

A The acid content of its atmosphere

B It's fast period of rotation

C It's retrograde spin on its axis

D The density of its atmosphere

13.4 Between which two planets is the asteroid belt located?

A Jupiter and Saturn

B Uranus and Neptune

C Mercury and Venus

D Mars and Jupiter

13.5 From the Earth, the Moon looks bigger than the Sun. Which of the following is the reason?

A The Sun is very small

B The Sun is nearer to the Earth

C The Moon is nearer to the Earth

D The Sunlight is brighter than the Moon

[10]

Question 14

Give the correct word/s for each of the following. Write only the question number and your answer.

14.1 What is the name given to natural or artificial bodies that orbit larger celestial bodies such as planets?

14.2 What is the name given when meteoroids can be seen burning up in the Earth's atmosphere?

14.3 Earth takes 365 days to circle the Sun. What is the proper name for this circle?

14.4 What do we call areas on the Sun's surface that appear dark and are cooler than the surrounding areas?

14.5 What is the name used for a planet that is not able to keep its path clear of other objects?

[5]

Question 15

Match the words in Column A with the correct descriptions in Column B. Write only the question number and the correct letter e.g. 3.1 F

Column A		Column B	
15.1	Galaxy	A	An infinite mass of nothingness that is able to suck up everything in its way
15.2	Black hole	B	Spiral shaped galaxy
15.3	Constellation	C	A collection of stars held together by their mutual gravity
15.4	The Milky Way	D	Our closest neighbouring star system
15.5	Alpha Centauri	E	A grouping of stars with a specific name

[5]

Question 16

Use the table below to answer the questions that follow.

Unit	Equivalent distance in kilometres (figures rounded off)	
Light year	10 000 000 000 000	Ten trillion
Light hour	1 080 000 000 000	One billion eighty thousand million
Light minute	18 000 000	Eighteen million
Light second	300 000	Three hundred thousand

16.1 The Milky Way is 2000 light years thick, how many kilometres would that be? Show your working out. (2)

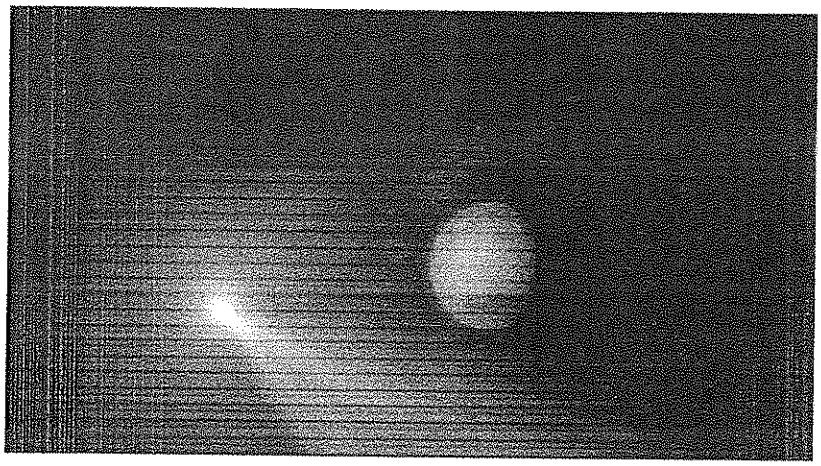
16.2 Earth is 27 000 light years from the centre of the Milky Way. Work out how far that is in kilometres? Show your working out. (2)

16.3 When we see the Andromeda Galaxy (M31), we actually see it as it was two million years ago. Why is this? (1)

[5]

Question 17

Read the case study below and answer the questions that follow.



Alleyes were focused on Mars on Sunday 19 October 2014. A comet the size of a small mountain whizzed past Mars in a one in a million year encounter. The comet known as Siding Spring made its closest encounter with Mars at 5.30am, racing past at a dazzling 203 000.00 km/h from Mars (less than half the distance between Earth and the Moon).

Before the comet passed, it could be seen in space racing towards the bright planet trailed by a tailof debris. The ball of ice, dust and rocks is believed to have originated billions of years ago in the Oort Cloud.

The comet is about 1.6km wide and is only about as solid as a pile of talcum powder. The comet was discovered by Robert McNaught at Australia's Siding Spring Observatory in January 2013. "The comet has never been this close to the Sun, we think it has only come as far as Jupiter or Saturn before" says astrophysicist Carey Lisse from the University in Laurel, Maryland. "This is its first passage into what we call the 'water-ice line' where it's really starting to blow its water off".

NASA was concerned the comet's dusty tail could pose a threat to orbiting spacecraft as it brushes past Mars so decided to change their satellites orbits so that the satellites would be behind Mars during the most risky part of the fly-by.

Mars will also pass directly through the comet's coma providing an unprecedented opportunity to study it.

17.1 Name the comet that recently passed by Mars. (1)

17.2 When will this occurrence happen again? (1)

17.3 What is another name for Mars? (1)

17.4. Name the person who discovered the comet, and give the date and place of the discovery. (3)

17.5 Give the term from the passage that describes the ice melting and moving away from the comet. (1)

17.6 Is this comet a solid object? (1)

17.7 What did N.A.S.A do with their spacecraft during this time? Explain why. (2)

17.8 What is the comet's 'coma'? (1)

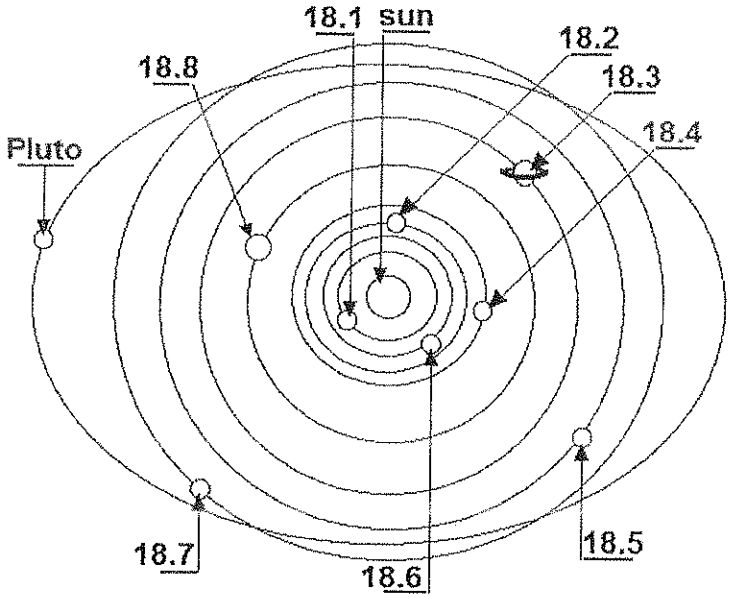
17.9 What is South Africa's optical telescope called and where can it be found? (2)

17.10 Name two conditions that are required when deciding to build an optical telescope. (2)

[15]

Question 18

Study the diagram below carefully. Give labels for the planets numbered 18.1 – 18.8.



[8]