HILLCREST HIGH SCHOOL

NATURAL SCIENCE EXAMINATION

Grade 8 **June 2014**
Time: 2 hours **Marks: 150**

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

LIFE AND LIVING

Question 1

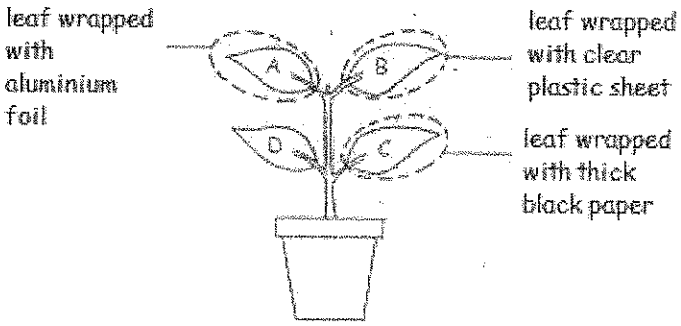
Answer the following questions by choosing the most correct answer. Only write the number and the correct answer in your answer booklet. E.g. 1.1 D

1.1 Sugar + Oxygen --> Carbon dioxide + Water vapour + Energy

The above equation shows a process that happens in living things. What process does it represent?

A Respiration
B Photosynthesis
C Fermentation
D Decomposition

1.2 A potted plant is put under sunlight and watered every day. Three leaves are wrapped with different materials. Holes are pierced in all of them for air to enter. Which leaf or leaves can make food?



A D only
B A and C only
C B and D only
D A and D only

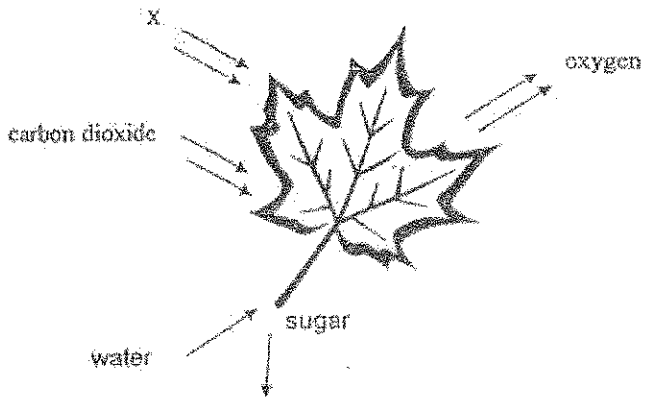
1.3 Organisms that get their energy through photosynthesis are called _____

A Autotrophs
B Chemotrophs
C Phototrophs
D Heterotrophs

1.4 In which part of a plant cell does photosynthesis take place?

A nucleus
B cell membrane
C chloroplast
D cell wall

1.5



During the process of photosynthesis, the green leaf shown above makes food. What does X refer to?

A starch
B sunlight
C chlorophyll
D mineral salts

[5]

Question 2

Read through each of the following statements carefully. State whether they are true or false. Write only the question number and the word true or false. If the statement is false, rewrite it correctly.

2.1 A herd of zebra living on a game farm is a community.

2.2 An ecosystem is made up of only living organisms.

2.3 The cats and the dogs living in your suburb form a population.

2.4 Temperature is an abiotic factor.

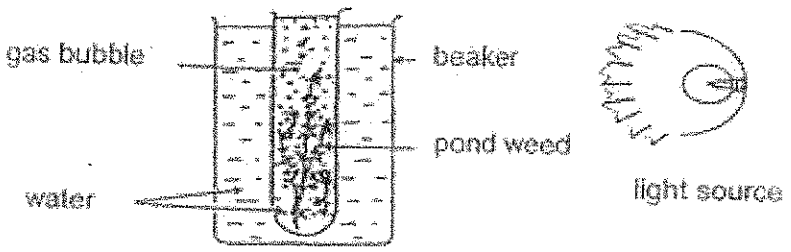
2.5 The oceans are not part of the biosphere.

2.6 A forest is an example of an ecosystem.

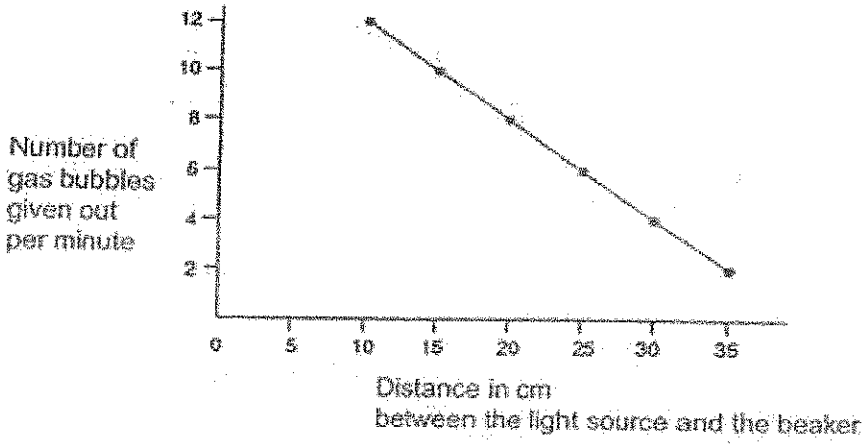
[10]

Question 3

Roshan set up an experiment as shown below.



He recorded the distance between the light source and the beaker and the number of gas bubbles given out by the pond weed. He plotted the graph as shown below.



3.1 Name the process taking place in the pond weed. (1)

3.2 State a possible hypothesis for the experiment. (2)

3.3 What is the independent variable in this experiment? (1)

3.4 What is the dependent variable in this experiment? (1)

3.5 Name one controlled variable in this experiment. (1)

3.6 Is this experiment a **fair test**? Give a reason for your answer. (2)

3.7 From the graph, what conclusion can you draw about the relationship between the number of gas bubbles given out per minute and the distance between the light source and the beaker? (2)

[10]

Question 4

There are **bulrushes** and **water lilies** growing in a dam. **Snails** and **worms** feed on these plants. The **snails** and **worms** are eaten by **carp** (a type of fish). There are also **leeches** that eat the snails. The **carp** are eaten by **bass** (another type of fish).

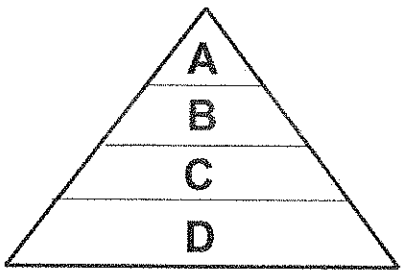
4.1 Using the information provided above, draw and label a food web to include all seven of the organisms. (Do not draw the pictures, just write the words.) (8)

4.2 What do the arrows in the food web indicate? (2)

[10]

Question 5

The diagram below represents the ecological pyramid of a certain food chain in nature.



5.1 Which letter represents the producers? (1)

5.2 What are the functions of the producers in the food chain? (2)

5.3 What type of consumer is represented by C? (1)

5.4 Which two letters represent carnivores? (2)

5.5 What would happen to the organisms at A if all the organisms at B were removed? (1)

5.6 Which important organism is not represented in the diagram? (1)

5.7 What is shown by the pyramid shape in the ecological pyramid? (2)

[10]

Question 6

Answer the following questions by choosing the most correct answer. Write only the question number and the letter of the correct answer in your answer booklet.

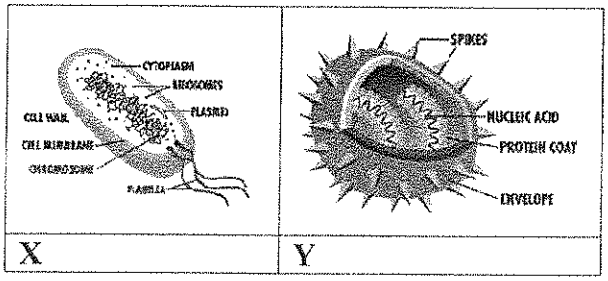
6.1 Two different types of micro-organisms are
- A plants and fungi
- B crustaceans and viruses
- C viruses and bacteria
- D viruses and pollen grains

6.2 Which of these lists the micro-organisms in the correct size order, starting with the smallest?
- A viruses, bacteria, fungi
- B fungi, bacteria, viruses
- C bacteria, viruses, fungi
- D fungi, bacteria, viruses

6.3 Why are viruses not classified as living things?
- A They cannot carry out all seven of the life processes.
- B They can give people diseases.
- C They do not have lungs and so cannot breathe.
- D They are too small to see.

6.4 Which microbe is used to make bread rise?
- A bacteria
- B yeast
- C plants
- D sodium bicarbonate

6.5 Look at the two diagrams below. Which organisms do they show?



X	Y

A X is a fungus and Y is a bacteria.
B X is a pollen grain and Y is a virus.
C X is a crustacean and Y is a plant.
D Y is a virus and X is a bacteria.

6.6 Colds, flu, chickenpox and AIDS are all caused by:
A viruses
B fungi
C polluted air
D bacteria

6.7 David has a cold. He may have caught this by:
A standing in a cold place for too long
B not eating enough fruits and vegetables
C breathing in air containing a microbe
D staying up too late and getting very tired

6.8 An antibiotic is a medicine that:
A kills bacteria and viruses
B kills only viruses
C kills only bacteria
D is dangerous and so is no longer used

6.9 Vaccines make your body:
A produce antibodies against a disease
B stop working to allow an operation to be done
C cool down when you get a temperature
D produce extra cells to mend broken bones.

6.10 If a person is immune to a disease, they:
A keep getting it over and over again
B can never get the disease
C need to be taken special care of because the disease might kill them
D can only get the disease two or three times during their lives

[10]

Question 7

Read the following text carefully before answering the questions that follow.

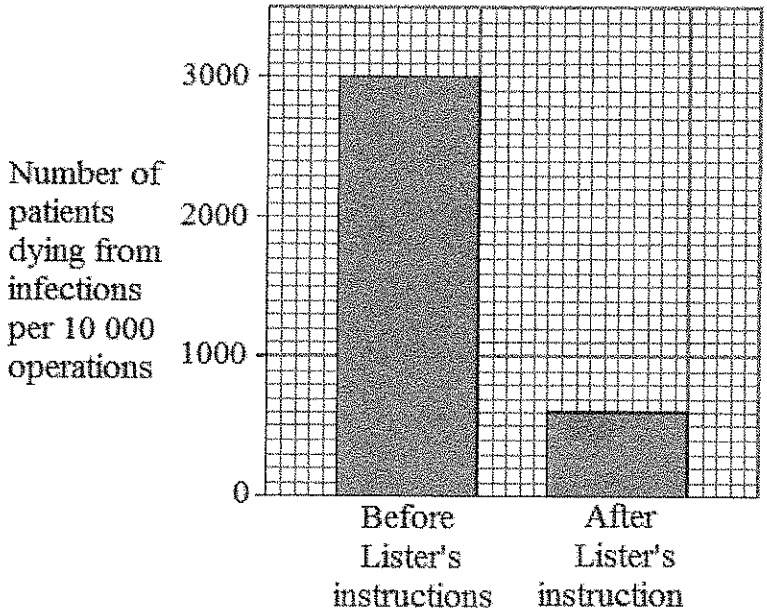
Joseph Lister was a surgeon in England in the 1800s. He helped to prove the importance of sanitation and cleanliness in hospitals.

Most people at the time thought that dirty air caused sickness. This led many doctors to believe that proper sanitation wasn't necessary for keeping their patients healthy. Hospitals at the time did not have stations for washing hands. Surgeons often operated in dirty, stained clothing and seldom cleaned their work stations.

Lister wondered what caused the "dirty air." After reading a report by Louis Pasteur that said that food rotted because of micro-organisms, he developed the "germ theory" of disease – the idea that tiny germs carried from person to person was what caused illness, not the air itself.

Lister began spraying carbolic acid, an antiseptic solution, into the air during surgery to kill the germs. He encouraged his staff to wash their hands before surgery and clean their tools in between operations as well. Other doctors slowly began to realize that he was right, and by the 1870s, survival rates in hospitals increased dramatically.

The graph below shows the effect that using Lister's instructions had on the number of patients who died from infections after surgery.



7.1 Suggest two ways that patients could have been infected before Joseph Lister suggested the changes in his hospital. (2)

7.2 Which theory explained how diseases are spread? (1)

7.3 Why did Lister start spraying carbolic acid in the air before operations? (1)

7.4 Name two things that Lister asked doctors to do to reduce the spread of infection. (2)

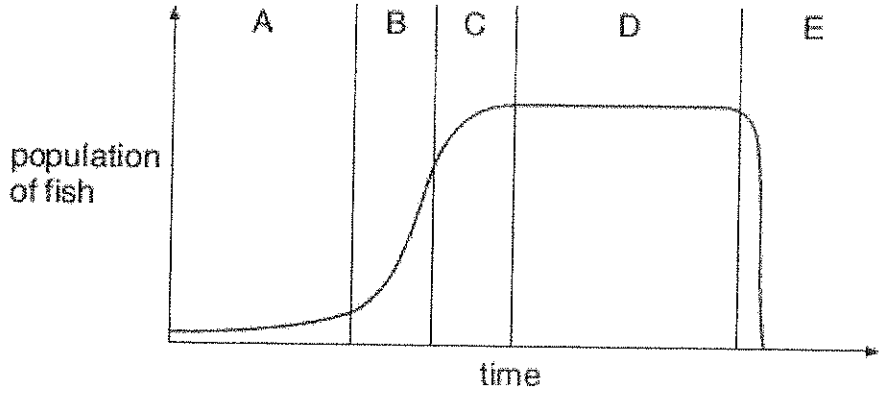
7.5 Describe how Lister's instructions affected the number of patients dying from infections after surgery. (2)

7.6 Describe two <u>other</u> ways that we can prevent or reduce the spread of infection in our daily lives. (2)

[10]

Question 8

The graph below shows how a population of fish in a lake changed over a period of time.



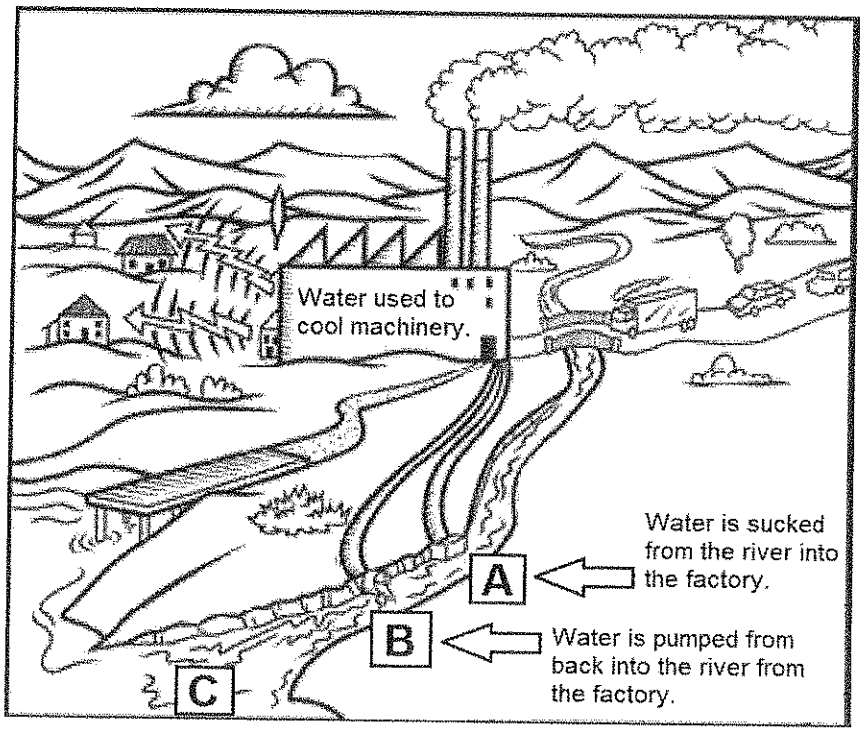
8.1.1 In which time interval (A, B, C, D or E, did the population of fish increase most quickly? (1)

8.1.2 How can you tell this from the graph? (1)

8.2.1 What does part D of the graph show about the birth rate and the death rate of the fish? (1)

8.2.2 How can you tell this from the graph? (1)

8.3 Part E of the graph shows a population crash when all the fish died. This could have been caused by thermal pollution. The process of thermal pollution is illustrated in the diagram below.



8.3.1 Using the diagram to help you, explain how thermal pollution takes place and how it affects the organisms in the river. You must be specific. Refer to the letters A, B and C in the diagram and use these letters in your explanation. (4)

8.3.2 Suggest **two** other types of pollution that may cause the population to crash in this way. (2)

[10]

MATTER AND MATERIALS

Question 9

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

9.1 Look at the chemical reaction below. Which substance(s) is/are called the product(s)?

$$\mathbf{HCl + NaOH \rightarrow NaCl + H_2O}$$

A HCl only
B NaCl only
C HCl and NaOH
D NaCl and H_2O

9.2 Which one of the following is an example of a pure substance?
A Sulphur and iron in a bowl
B Oil and water
C Iron
D Sugar dissolved in water

9.3 Which of the molecules below is an example of a diatomic molecule?
A Iodine
B Carbon dioxide
C Water
D Helium

9.4 Which scientist was responsible for the first atomic theory which said that atoms are solid spheres?
A James Chadwick
B John Dalton
C Ernest Rutherford
D Neils Bohr

9.5 The nucleus of the atom is
A found at the centre of the atom and is positively charged
B found on the outside of the atom and positively charged
C found at the centre of the atom and is negatively charged
D found at the centre of the atom and is neutral

9.6 Fermentation is the reaction between
A octane and oxygen
B an acid and a base
C iron and oxygen
D sugar and yeast

9.7 What is kinetic energy?
A Energy that an object has due to its position
B Energy that an object has due to its motion
C Energy that an object has due to its mass
D Energy that an object has due to its phase

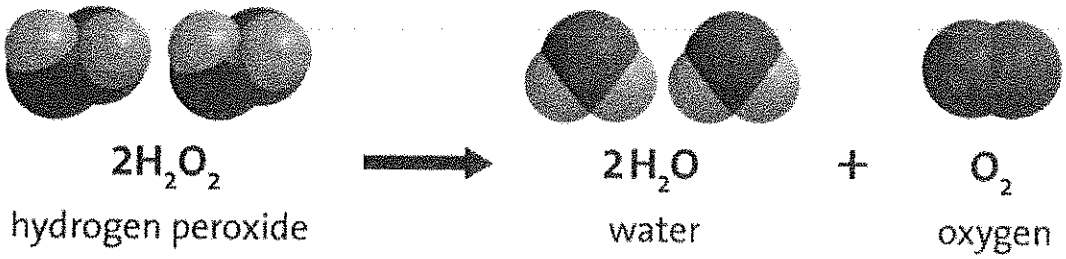
9.8 Look at the periodic table given at the end of this exam. What is the atomic number of Beryllium?

A 9
B 13
C 4
D 5

9.9 What is electrolysis?

A a chemical reaction in which a compound is broken down into simpler compounds or elements
B a chemical reaction where heat is used to decompose a compound
C a chemical reaction in which an electrical current is used to decompose a compound
D a chemical reaction in which two substance bond to form a new substance

9.10 The chemical equation below is an example of which type of chemical reaction?



A Synthesis
B Decomposition
C Neutralisation
D Redox

[10]

Question 10

10.1 Name the three phases in which matter can occur. (3)

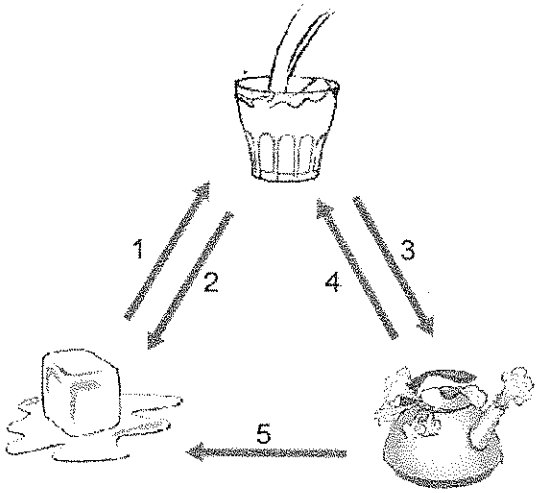
10.2 Look at the table below and answer the questions that follow:

SUBSTANCE	MELTING POINT IN ^{O}C	BOILING POINT IN ^{O}C
Water	0	100
Chlorine	-101	-35
Mercury	-39	357

10.2.1 At what temperature does water change from solid to liquid? (1)
10.2.2 At what temperature does mercury change from solid to liquid? (1)
10.2.3 Which substance listed in the table above has the lowest melting point? (1)
10.2.4 At what temperature does water change from a liquid to a gas? (1)
10.2.5 What is the phase of chlorine at room temperature? (1)
10.2.6 Draw a simple diagram to show the arrangement of the particles of chlorine at room temperature. (2)

10.3 Explain how the particles in a solid are arranged by referring to the following:
10.3.1 The arrangement of the particles (1)
10.3.2 The movement of the particles (1)
10.3.3 The effect of the attractive forces between the particles (1)
10.3.4 The spaces between the particles (1)

10.4 Study the diagram below:



10.4.1 What are the names given to the different phase changes numbered 1 to 5 above? Write only the number 1 - 5 and the correct word next to each number. (5)

10.4.2 Your teacher walks into the classroom wearing a strong smelling perfume. Immediately you start to smell the perfume.

10.4.3 What is the name of the process which causes the perfume smell to spread around the classroom? (1)

10.4.4 Explain how this process takes place. (2)

[22]

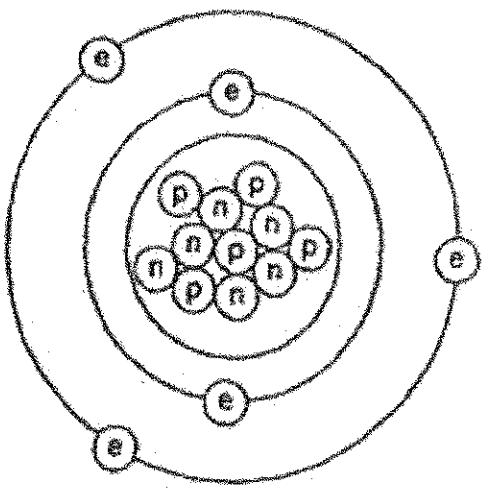
Question 11

11.1 Define the term atom. (2)

11.2 Name the three subatomic particles and their charges. (6)

11.3 Which subatomic particle(s) is/are found in the nucleus? (2)

11.4 Look at the atomic model shown below and answer the question that follow:



11.4.1 How many protons can be found in the atom shown above? (1)

11.4.2 How many neutrons can be found in the atom shown above? (1)

11.4.3 How many electrons can be found in the atom shown above? (1)

11.4.4 What is the mass number (atomic number) of the atom shown above? (1)

11.4.5 What is the name of the element that the atom shown above represents? (1)

11.4.6 Give the symbol of the element represented by the atom shown above. (1)

11.5 Define the term element. (2)

11.6 State whether the following substances are elements or compounds. Write only the number and the word ELEMENT or COMPOUND.

11.6.1 Iron (1)

11.6.2 Carbon (1)

11.6.3 Water (1)

11.6.4 Sodium chloride (1)

11.6.5 Ammonia (1)

11.7 Look at the compounds below.
Write down how many atoms of each element is found in one molecule of the compound.
Draw a model of one molecule of the compound.

11.7.1 Lithium chloride (LiCl) (3)

11.7.2 Carbon dioxide (CO_2) (3)

11.8 Define the term mixture. (2)

11.9 Look at the methods of separating mixtures provided in the box below. Choose the appropriate method to be used to separate the following mixtures. Write only the number and the correct separating method.

hand sorting	**sieving**	**using a magnet**	**filtration**
evaporation	**distillation**		**chromatography**

11.9.1 Alcohol and water (1)

11.9.2 Sand and iron filings (1)

11.9.3 Red mosaic tiles and blue mosaic tiles (1)

[34]

Question 12

12.1 Define the term density. (1)

12.2 What two things affect density? (2)

12.3 Which is heavier, 10kg sponge block or a 10kg lead block? (1)

12.4 Which is more dense?

12.4.1 Ice or water (1)

12.4.2 Lead or sponge (1)

12.5 Calculate the density of a 16g block which has a volume of $2cm^3$ (3)

[9]