HILLCREST HIGH SCHOOL

GRADE 11

NOVEMBER 2019

LIFE SCIENCES

PAPER 1

Time: 2½ hours *Marks:* 150

INSTRUCTIONS TO CANDIDATES

READ THESE INSTRUCTIONS CAREFULLY BEFORE ANSWERING THE QUESTIONS.

1. Answer **ALL** the questions in the answer booklet provided.
2. Answer each section on a new page.
3. All diagrams must be drawn in pencil.
4. Use double margins.
5. Number every answer fully.
6. Write legibly.
7. Leave a line between answers.
8. Non-programmable calculators, protractors may be used.
9. Use Blue or Black ink only.

1.1.5. Several features are listed below.

1. Large surface area
2. Thin surface
3. Moist surface
4. Many capillaries

Which of the above are features of an efficient gaseous exchange surface?

A. 1, 2, 3 and 4
B. 1, 2 and 4
C. 1, 3 and 4
D. 2, 3 and 4

5 x 2 = [10]

1.2. Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.5) in the ANSWER BOOK:
e.g. 1.2.6 oxygen

1.2.1. The hunting of elephants in order to regulate their population size.

1.2.2. A protective membrane surrounding the lungs.

1.2.3. The process in plants during which radiant energy is converted into chemical energy.

1.2.4. The inherent ability of a population to increase in size.

1.2.5. The process of filtering the accumulated waste products of metabolism from the blood of a patient whose kidneys are not functioning properly.

[5]

1.3. Indicate whether each of the statements in **COLUMN I** applies to **A ONLY, B ONLY, BOTH A AND B** or **NONE** of the items in **COLUMN II**. Write only **A only, B only, Both A and B** or **none** next to the question number (1.3.1 to 1.3.6) in the ANSWER BOOK: e.g. 1.3.7 B only

COLUMN I		COLUMN II
1.3.1.	Mouth-to-mouth respiration.	A. Artificial respiration B. Resuscitation
1.3.2.	The maximum number of individuals in a population that can be supported by the environment.	A. Carry capacity (carrying) B. Limiting factor
1.3.3.	A product of cellular respiration, which supplies energy needed for metabolic reactions in cells.	A. Oxygen B. ATP
1.3.4.	Breathing muscles.	A. Intercostal muscles B. Diaphragm muscle
1.3.5.	The series of changes in an ecosystem community from bare rock to a forest.	A. Succession B. Resource partitioning
1.3.6.	An example of social organisation that increases the chances of survival.	A. Division of labour in bees B. A herd of zebras

6 x 2 = [12]

1.6. A tomato farmer was able to produce crops in greenhouses, which were heated to between 15°C and 22 °C. In addition, the carbon dioxide level was increased from the normal 0.03% to 0.1%.

1.6.1. What is the purpose of a greenhouse? (2)

1.6.2. State **ONE** way in which the farmer could have enriched the air inside the greenhouse with carbon dioxide, without burning any fuel. (1)

1.6.3. Explain how increasing the carbon dioxide levels up to 0.1% can lead to an increased production of tomatoes. (3)

1.6.4. Predict what would happen if the carbon dioxide concentration within the greenhouse is increased to 0.5% for between 10 to 15 days if all other factors are kept constant. (2)

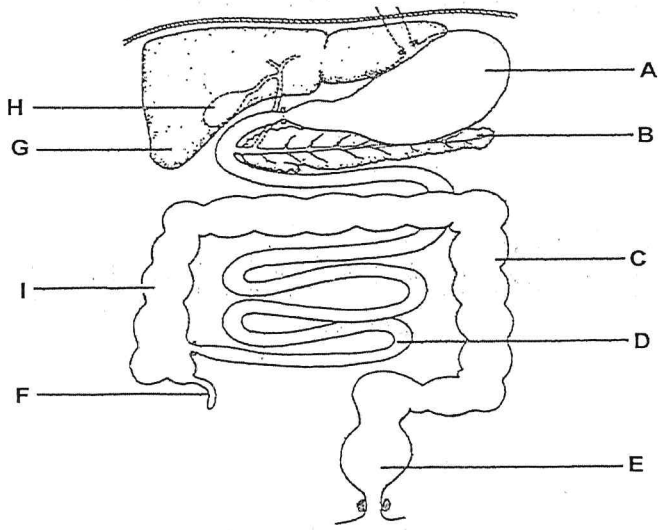
[8]

SECTION A - Question 1: [50]

SECTION B:

Question Two:

2.1. Study the diagram below and answer the questions that follow.



Part of the human digestive system

2.1.1. Label organs **B**, **C**, **E**, **F** and **H**. (5)

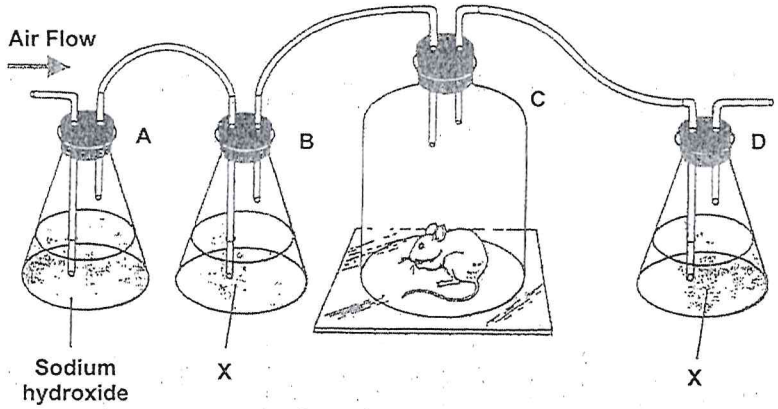
2.1.2. Name:

(i) **TWO** substances that can be stored in **G**. (2)
(ii) The organ where protein digestion begins. (1)
(iii) The chemical substance, which creates an acidic pH in **A**. (1)
(iv) The organ where most water and mineral salts are absorbed. (1)

2.1.3. State **TWO** functions of the organ labelled **G** in nutrition. (2)

[12]

2.3. Study the diagram below and answer the questions that follow.



Apparatus used to investigate a biochemical process in a rat

2.3.1. Which biochemical process is being investigated in this experiment? (1)

2.3.2. Name the indicator that is represented by **X** in flask **B**. (1)

2.3.3. State the purpose of the:

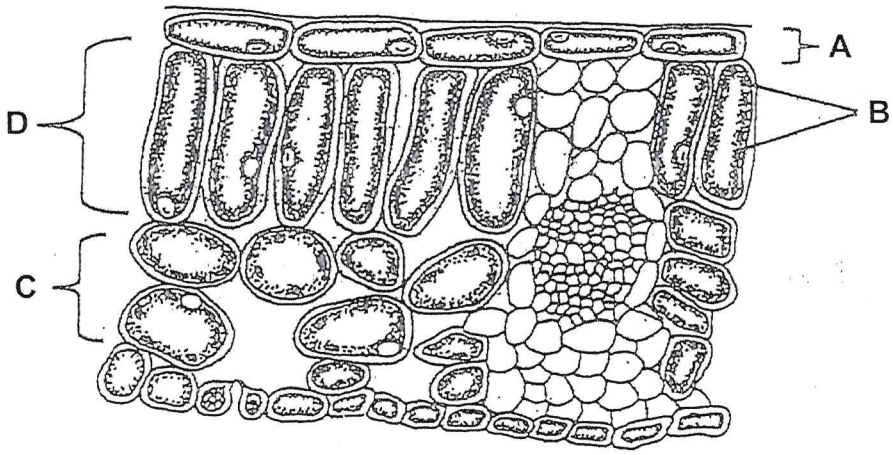
a) Sodium hydroxide in flask **A**. (2)

b) Indicator **X** in flask **B**. (2)

2.3.4. Describe a control for this investigation. (3)

[9]

2.4. Study the diagram below and then answer the questions that follow.



Transverse section through a dicotyledonous leaf

2.4.1. State the names of the tissues labelled **A**, **C** and **D** and the organelles labelled **B**. (4)

2.4.2. Explain **THREE** ways that are visible in the diagram, in which the leaf is structurally suited for the process of photosynthesis. (6)

[10]

Question 2: [40]

3.3. In a study on the population of bee-eating birds done in a nature reserve, the birds were trapped on **TWO** different days. On the first day, 22 birds were caught, ringed and released. The following day, 42 were caught and it was found that 6 of these were ringed.

Estimate the size of the population of bee-eating birds in this nature reserve.
(Show all working).

[4]

3.4. Study the table below and answer the questions that follow.

Year	Human Population in millions
1650	500
1750	750
1850	1 000
1950	2 010
2050	8 000

3.4.1. Use the information in the table to draw a line graph. (8)

3.4.2. It is important for any country to understand how the population will grow in the future.

3.4.2.1. How was the human population for 2050 determined? (1)

3.4.2.2. List **TWO** reasons why determining such figures is important. (2)

3.4.2.3. Name **TWO** current world issues that could change the above figure. (2)

3.4.2.4. State **TWO** strategies that this population will need to apply to ensure its survival. (2)

[15]

Question 3: [40]

SECTION B – [80]

SECTION C:

Question Four:

The sun is the ultimate source of energy for all living things. It provides energy in the form of light and heat. In an essay describe the chemical process by which radiant energy of the sun is converted and stored as glucose by green plants.

Content (17)
Synthesis (3)

NOTE: No marks will be awarded for answers in the form of flow charts or diagrams.

SECTION C - Question 4: [20]

GRAND TOTAL: 150