HILLCREST HIGH SCHOOL

GRADE 10

NOVEMBER 2020

LIFE SCIENCES

PAPER 1

Time: **2 hours** ***Marks:*** **120**

EXAMINER: MRS L. PRIOR

MODERATORS: MRS R. HARMSE, MR A. MAHABEER.

N.B. This question paper consists of 3 Questions and 10 Pages.

INSTRUCTIONS TO CANDIDATES

READ THESE INSTRUCTIONS CAREFULLY BEFORE ANSWERING THE QUESTIONS.

1. Answer **ALL** the questions in the answer booklet provided.
2. Number the questions exactly as the questions are numbered.
3. Write neatly and legibly.
4. All drawings should be done in pencil and labelled in ink.
5. Use **ONLY** blue or black ink.
6. Non-programmable calculators, protractors and compasses may be used.

SECTION A:

QUESTION ONE:

1.1. Various possible options are provided as answers to the following questions/statements. Choose the correct answer and write **ONLY** the letter (A – D) next to the question number (1.1.1 – 1.1.9) in the answer book.

1.1.1. In which phase does DNA replication take place?

A. Metaphase
B. Prophase
C. Interphase
D. Telophase

1.1.2. The liquid part of blood is ...

A. platelets
B. red blood cells
C. white blood cells
D. plasma

1.1.3. The cells that have the largest number of mitochondria are:

A. Bone cells
B. Fat storage cells
C. Muscle cells
D. Skin cells

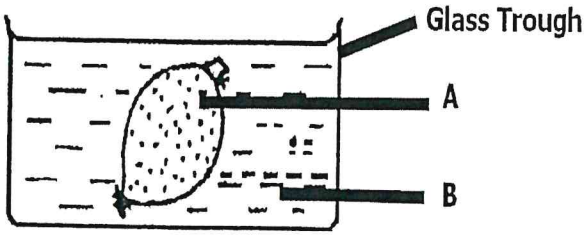
1.1.4. The element required for the formation of haemoglobin is ...

A. calcium
B. iodine
C. iron
D. phosphorus

1.1.5. The parts of the microscope that magnify a specimen are ...

A. mirror and diaphragm
B. eyepiece and objective lens
C. body tube and objective lens .
D. rotating nosepiece and stage

1.1.6. The diagram below shows a plastic bag filled with solution A which was placed into a glass trough containing solution B for 8 hours. After a while, the volume of the bag and its mass increased.



The liquid labelled B in the diagram above is most likely to have had a...

A. higher water potential than solution A.
B. lower water potential than solution A.
C. similar water potential to solution A.
D. higher solution concentration than solution A.

1.1.7. The plant tissue that is present in the cortex of young stems and provides strength and support.

A. parenchyma
B. chlorenchyma
C. collenchyma
D. sclerenchyma

1.1.8. Casparian strips are found in the ...

A. stele of the stem
B. endodermis of the root
C. pericycle of the root
D. epidermis of the root

1.1.9. Which one of the following combinations of organic compounds contain Carbon, Hydrogen and Oxygen only?

A. Carbohydrates and proteins
B. Lipids and proteins
C. Proteins and glucose
D. Glucose and starch

[9x 2 = 18]

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 – 1.2.8).

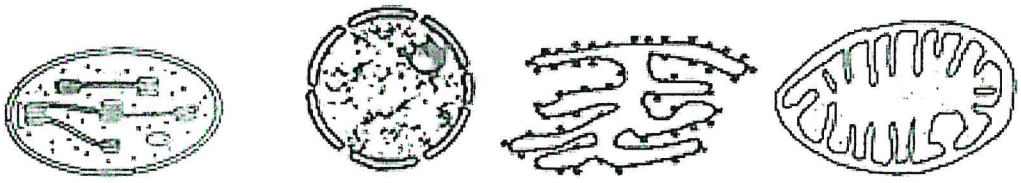
1.2.1. The plant tissue that actively divides by mitosis to form new cells.
1.2.2. The opening on the under surface of leaves that allow for gaseous exchange.
1.2.3. An organelle within the cell where proteins are synthesised.
1.2.4. Plant tissue that transports food.
1.2.5. The element which forms the central atom of the chlorophyll molecule.
1.2.6. The light trapping pigment found in leaves.
1.2.7. Part of the microscope that holds the slide in place.
1.2.8. The movement of particles from a region of high concentration to a region of low concentration. **[8]**

1.3. State whether for each of the phrases in COLUMN I, applies to **A only, B only, BOTH A and B** or **NONE** in COLUMN II.

COLUMN I	COLUMN II
1.3.1. Organic compound which make up chromosomes.	A. RNA
	B. DNA
1.3.2. The compound found in cell walls of plant cells.	A. Glucose
	B. Cellulose
1.3.3. Epithelium lining the trachea	A. Columnar epithelium
	B. Squamous epithelium

(3 X 2 =6)

1.4. Diagrams **W, X, Y** and **Z** below represent different cell organelles.



W X Y Z

Give the **LETTER** and the **NAME** of the organelle that:

1.4.1. Contains cristae (2)
1.4.2. Controls cell activities (2)
1.4.3. Act as a communication system (2)
1.4.4. Is a plastid (2)
[8]

SECTION A - 40

SECTION B:

QUESTION TWO:

2.1. Four samples of food were tested for the various organic nutrient contained in each. The results were presented in the table below. The positive results are indicated by (+) and the negative results are indicated by (-).

Study the table below and answer the questions that follow.

Food	Nutrients			
	Protein	Fats	Glucose	Starch
Potatoes	-	-	-	+
Beans	+	-	-	-
Raisins	-	-	+	-
Bacon	-	+	-	-

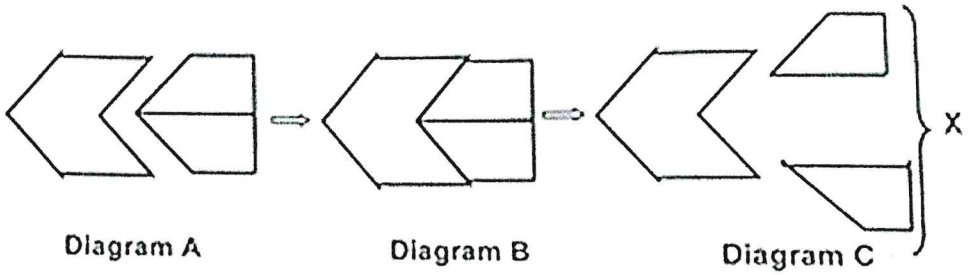
2.1.1. Name the reagents used to test for the presence of the following nutrients.
a) starch (1)
b) fats (1)

2.1.2. Name the building blocks of proteins. (2)

2.1.3. Which food sample tested positive for...
a) proteins? (1)
b) polysaccharides? (1)

2.1.4. Describe the positive result for the presence of fats. (2)
[8]

2.2. Diagram **A, B** and **C** below represents a property of enzymes.



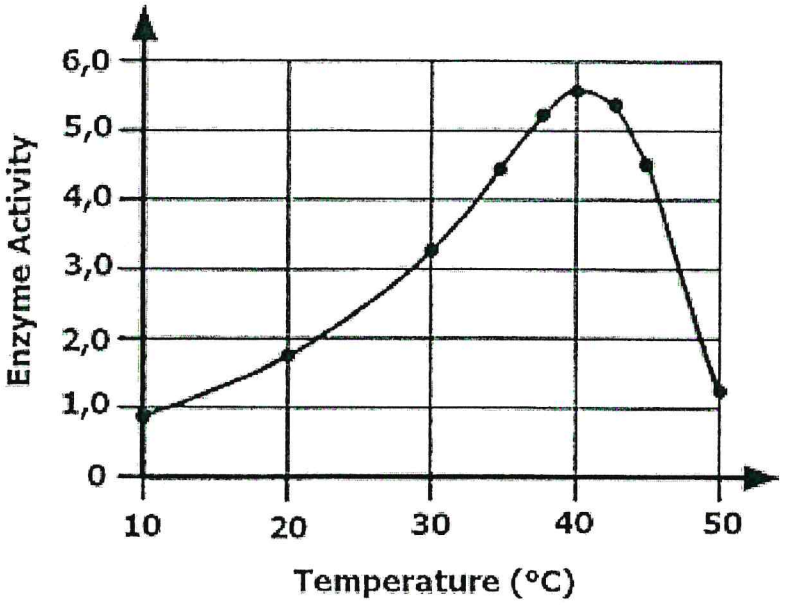
2.2.1. State **TWO** properties of an enzyme. (2)

2.2.2. Identify:

a) Diagram **B** (1)
b) Part **X** (1)

2.2.3. Give **TWO** ways in which enzymes are biologically important in industry. (2)
[6]

2.3. The graph below shows the effect of temperature on enzyme activity in an alkaline medium. Study the graph below and then answer the questions that follow.



2.3.1. Provide a suitable **AIM** for this investigation. (1)

2.3.2. At which temperature does this enzyme work best at? (2)

2.3.3. Why does enzyme activity decrease above 40°C? (1)

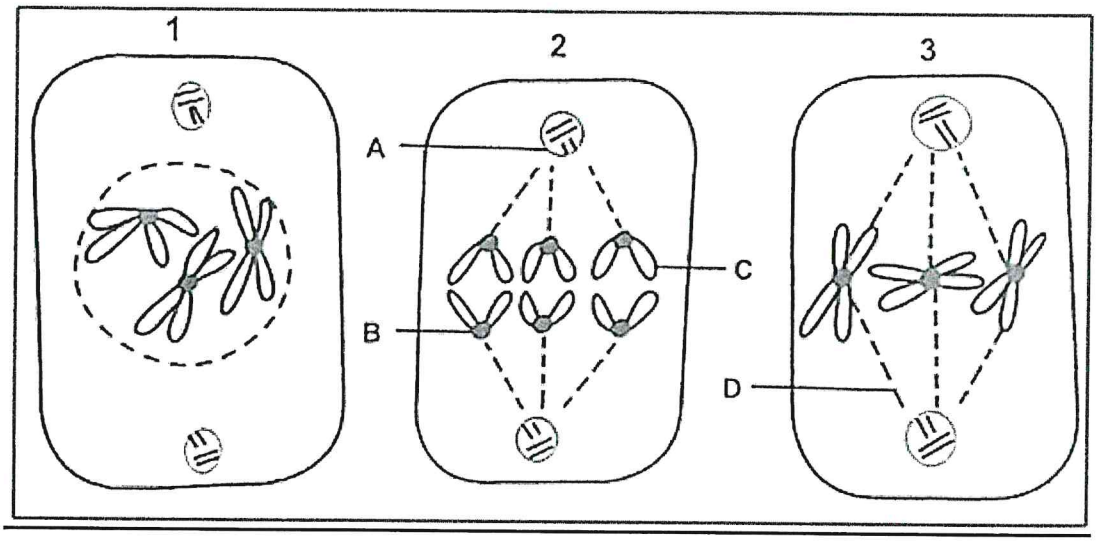
2.3.4. Identify the:

a) Dependent variable

b) Independent variable (2)

[6]

2.4. The diagrams below represent different phases of mitosis.



2.3.1. Identify part **A.** (1)

2.3.2. Rearrange the numbers **1**, **2** and **3** to show the correct sequence in which the phases of mitosis occur. (2)

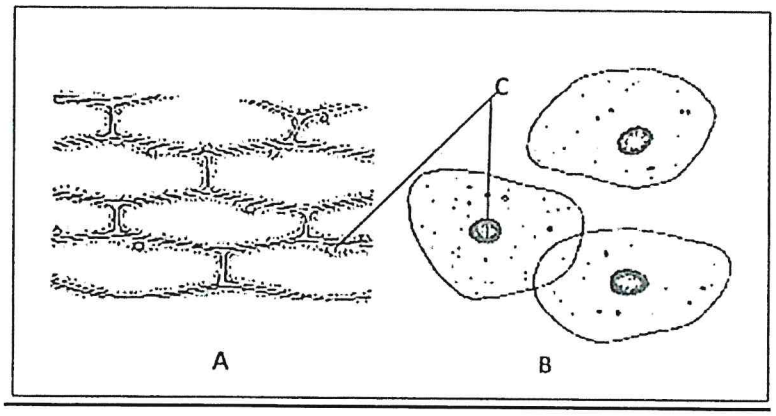
2.3.3. Give the **LETTER** and the **NAME** of the part that:

a) Pulls chromatids to opposite poles. (2)
b) Is produced through replication of genetic material. (2)
c) Joins chromatids together. (2)

2.3.4. How many chromosomes will be present in each cell at the end of the process of mitosis represented in the diagram? (1)

[10]

2.4. The diagram below represents plant and animal cells.



2.4.1. Which of the drawings (**A** or **B**) represent animal cells? Give a reason for your answer. (2)

2.4.2. List **TWO** similarities between plant and animal cells that are visible in the diagram. (2)

2.4.3. List **TWO** functions of part **C**. (2)

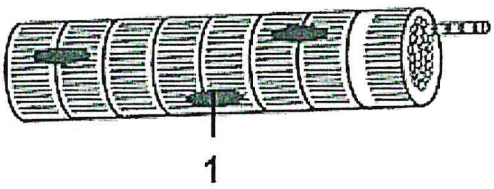
2.4.3. Draw a fully labelled diagram of a mitochondrion. (4)

[10]

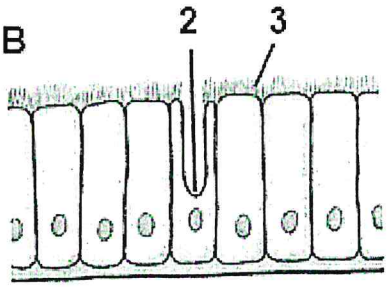
QUESTION THREE:

3.1. Study the diagrams below and answer the questions that follow.

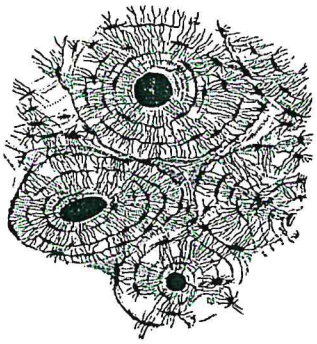
A



B



C



3.1.1. Identify the **specific tissue types** represented in **A, B** and **C.** (3)

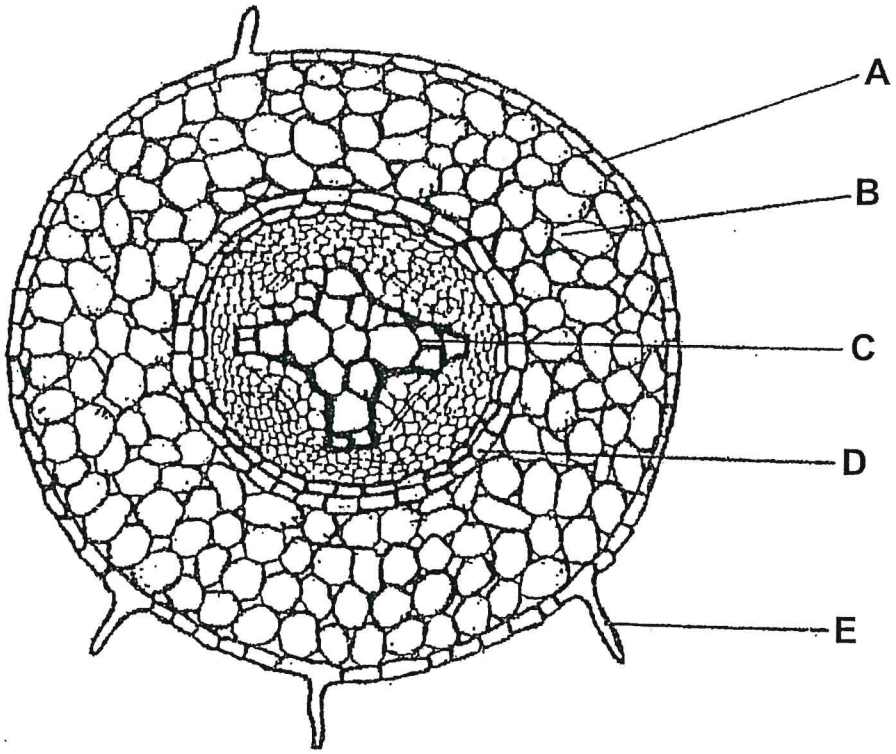
3.1.2. a) Name the cell numbered **2** and the part numbered **3** as found in tissue **B.** (2)

b) State the function of cell **2** in tissue **B** (1)

3.1.3. State the location of tissue **A** in the human body. (1)

[7]

3.2. The diagram below shows a transverse section through a plant organ. Study the diagram and then answer the questions that follow.



3.2.1. Name the plant organ from which this section is taken from and state its function. (2)

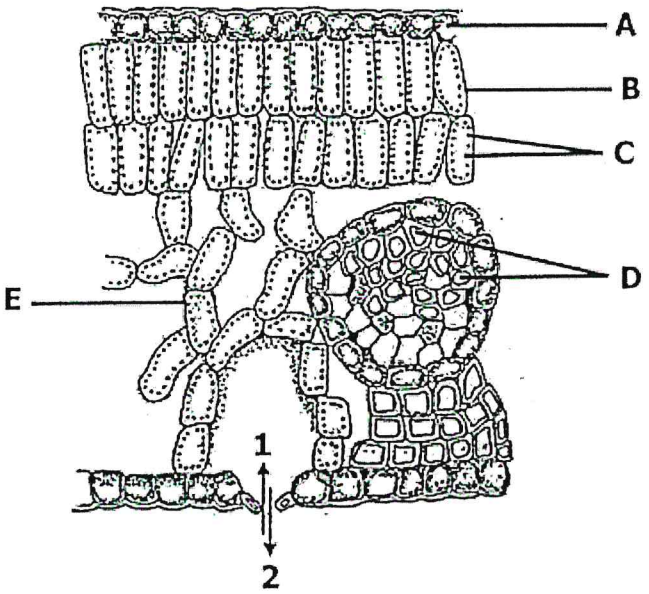
3.2.2. Identify the parts labelled **A**, **B**, and **C.** (3)

3.2.3. Explain how tissue labelled **C** is structurally suited to its function. (2)

3.2.4. Name the part labelled **E** and discuss **TWO** ways in which this cell is structurally suited to its function. (3)

[10]

3.3. The diagram below shows a transverse section of a leaf.



3.3.1. Provide labels for parts **A** and **D.** (2)

3.3.2. Identify the organelles labelled **C** and state their function in the leaf. (2)

3.3.3. Name the cells that control the movement of gases **1** and **2** into and out of the leaf. (1)

3.3.4. Draw a table showing **TWO** differences between cells labelled **B** and cells labelled **E**. (5)
[10]

3.4. Study the table below that shows the results of the effect of wind on the rate of transpiration in plants over 60 minutes.

Time (minutes)	Rate of Transpiration (mL per hour)
10	0,5
20	2
30	3,5
40	5,5
50	4
60	0,9

3.4.1. Draw a line graph showing the effect of wind on the rate of transpiration over one hour. (5)

3.4.2. Provide a suitable conclusion for the above results. (2)

3.4.3. Name and explain **TWO** other factors that affect the rate of transpiration in plants. (6)
[13]

SECTION B - 80