BERGVLIET HIGH SCHOOL

Grade 10 **LIFE SCIENCES PAPER 1** **24 November 2023**

Time: 2hr 30min **150 Marks**

Examiner: G. O'Connor

Moderators: F. Earl, M. Wentworth, S. Lambrechts

Name: _____

Life Sciences Teacher: _____

SECTION A	**Q1**	**50**		
SECTION B	**Q2**	**50**		
	Q3	**50**		
TOTAL		**150**		**%**

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions. There are **12** numbered pages.
2. Write ALL the answers on your FOOLSCAP paper.
3. Start the answer to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Answer the questions according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Only draw diagrams or flow charts when asked to do so.
8. The diagrams in this question paper are NOT necessarily all draw to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator.
11. Write neatly and legibly.

DETACH THIS SHEET AND STAPLE IT TO THE FRONT OF YOUR FOOLSCAP

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10), for example 1.1.11 D.

1.1.1 A deficiency of iodine can cause…

A Rickets
B Beri-Beri
C Scurvy
D Goitres

1.1.2 An external skeleton such as the chitinous skeleton of insects is called a/an…

A Appendicular skeleton
B Hydrostatic skeleton
C Exoskeleton
D Endoskeleton

1.1.3 Which one of the following is NOT true about lipids?

A Phospholipids form part of the cell membrane
B They act as insulators
C The ratio of Hydrogen to Oxygen is 2:1
D They have a protective function

1.1.4 Which ONE of the following describes an increase in the nutrient levels in dams and lakes because of the excess use of fertilisers by farmers?

A Photosynthesis
B Eutrophication
C Respiration
D Metabolism

1.1.5 Material that is used to store genetic information in a cell is…

A Deoxyribonucleic acid
B Endoplasmic reticulum
C Centrioles
D Ribonucleic acid

1.1.6 Which of the following occurs in the stem, but not in the root of a dicotyledon?

A Vascular bundle
B Cortex
C Epidermis
D Stele

1.1.7 Which of the following is the correct definition of stem cells?

A Cells that have a definite nucleus enclosed by a membrane
B Cells that contain the three types of plastids
C Undifferentiated cells that have a potential to differentiate and form any tissue in the body
D Undifferentiated cells that are pre-determined to become specific tissues

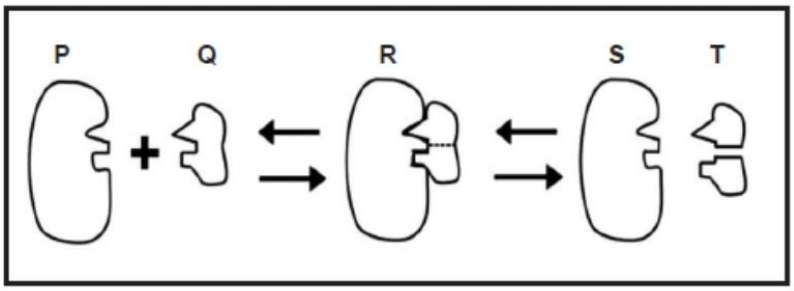
1.1.8 Epithelium lining the mouth and lungs is known as what type of tissue?

A Cuboidal
B Columnar
C Ciliated columnar
D Squamous

1.1.9 Maltose is an example of a…

A Disaccharide
B Monosaccharide
C Polysaccharide
D Enzyme

1.1.10 The diagram below shows enzyme action.



What does **Q** above represent?

A An enzyme
B Substrate
C Product
D Enzyme-substrate complex

(10 x 2 = 20)

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 1.2.8).

1.2.1 An organelle in a cell that is the site for protein synthesis.

1.2.2 A disease caused by a deficiency of protein.

1.2.3 Muscles that move in opposition to each other to bring about movement.

1.2.4 A fluid filled skeleton.

1.2.5 An opening in the skull which the spinal cord passes through.

1.2.6 The phase in the cell cycle in which DNA replication takes place.

1.2.7 The movement of particles of a gas or liquid down a concentration gradient until equilibrium is reached.

1.2.8 Apparatus to measure the rate of transpiration.

(8 x 1 = 8)

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 **A only, B only, both A and B,** or **none** next to the question number (1.3.1 to 1.3.4)

COLUMN I	COLUMN II
1.3.1 Involuntary muscle	A: Smooth muscle B: Cardiac muscle
1.3.2 Building blocks (monomers) of lipids	A: Amino acids B: Glycerol
1.3.3 Water Soluble	A: Vitamin A B: Vitamin D
1.3.4 Diploid cells	A: Somatic B: Gametes

(4 × 2 = 8)

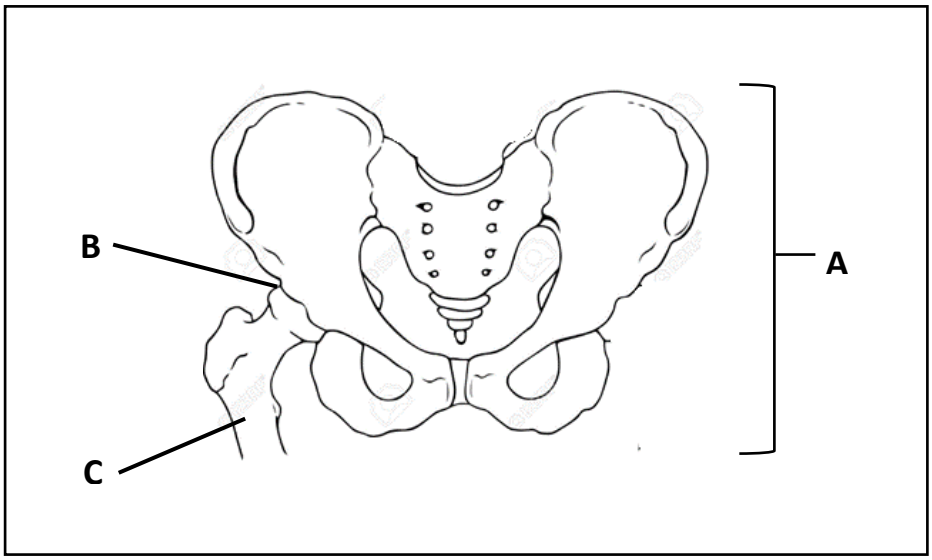
1.4 Complete the table below that is based on chemical tests for organic compounds.

Write the correct answer next to the question number 1.4.1 – 1.4.7 on your answer sheet.

ORGANIC COMPOUNDS	CHEMICAL REAGENT	POSITIVE RESULT
Starch	1.4.1	Blue-black
Proteins	1.4.2	1.4.3
1.4.4	Ethanol	1.4.5
1.4.6	1.4.7	Orange-red colour

(7)

1.5 Study the diagram of a section of the human skeleton and answer the questions that follow.



1.5.1 Give the name for the part labelled **A**. (1)

1.5.2 Is the above part of the AXIAL or APPENDICULAR skeleton? (1)

1.5.3 Give one disease that would cause: (2)
a) Inflammation at joint **B**
b) Bone **C** to become brittle

1.5.4 State TWO disadvantages of having the type of skeleton pictured above. (2)

1.5.5 The above part differs between males and females. Explain why this is. (1)

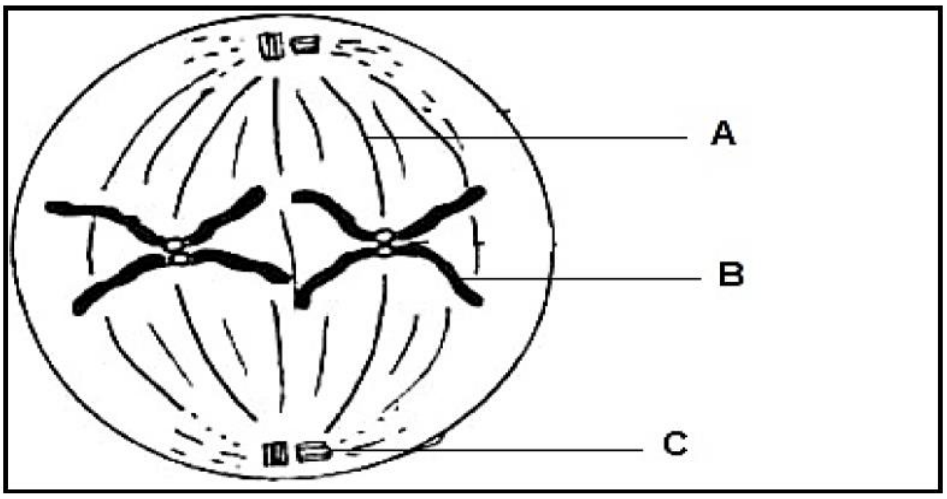
(7)

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1 The diagram below represents a phase of cell division in animal cells.



2.1.1 Identify the **phase** represented above. (1)

2.1.2 Give one VISIBLE reason for your answer in Q2.1.1 above. (1)

2.1.3 Label structures **A**, **B** and **C**. (3)

2.1.4 Draw the **phase** which follows the phase represented above. Provide TWO labels. (5)

2.1.5 How many chromosomes will be present in the daughter cells of the cell represented above? (1)

2.1.6 What name is given to the condition caused by abnormal and uncontrollable division of cells? (1)

2.1.7 Give TWO ways in which mitosis is of biological importance. (2)

2.1.8 Describe how telophase in plant cells differs from that of animal cells. (2)

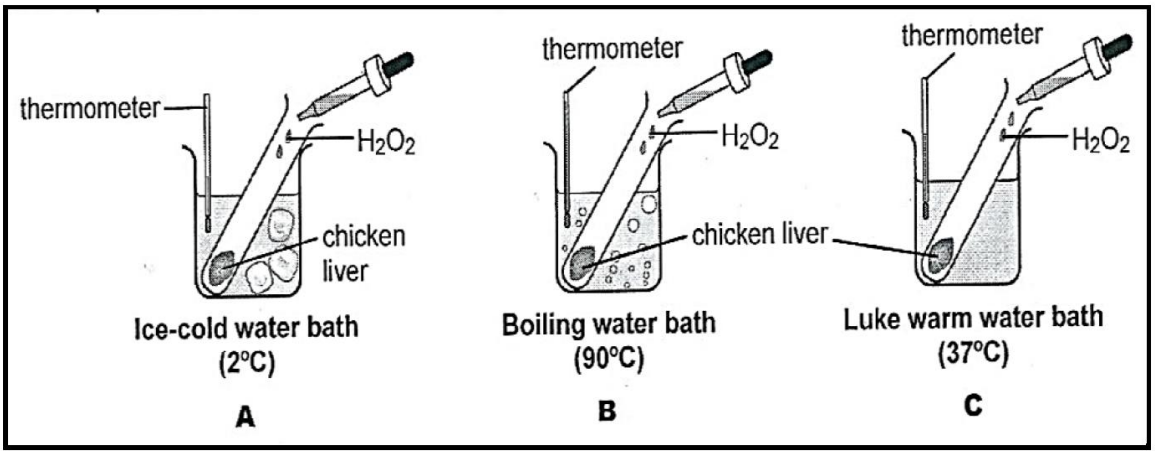
(16)

2.2 An investigation was carried out to determine the effects of different temperatures on the action of the enzyme catalase, which is found in the liver. It's purpose is to break down hydrogen peroxide which is poisonous to the body. It breaks down the hydrogen peroxide as indicated by the following reaction:

$$2H_2O_2 \xrightarrow{\text{catalase}} 2H_2O + O_2$$

The oxygen that is released is visible as bubbles. The amount of bubbles released is an indication of the effectiveness of the catalase enzyme.

The apparatus was set up as shown below:



2.2.1 What is an enzyme? (2)

2.2.2 Identify the:

a) Independent variable (2)
b) Dependent variable

2.2.3 Predict what they will observe as a result in test tube:

a) **B**
b) **C** (2)

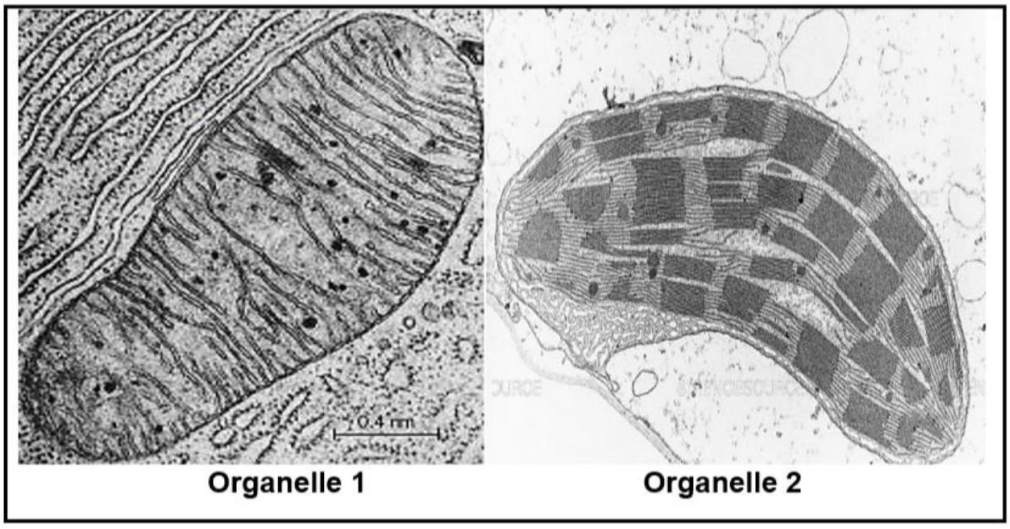
2.2.4 Briefly explain your answer to QUESTION 2.2.3 (a). (3)

2.2.5 Identify the TWO factors that would need to be kept constant in this investigation. (2)

2.2.6 State one way in which the *reliability* of this experiment could be improved. (1)

(12)

2.3 Study the micrographs below showing two organelles.



2.3.1 Identify organelles **1** and **2** respectively. (2)

2.3.2 For each organelle, state whether it would be found in a PLANT CELL ONLY or ANIMAL CELL ONLY or BOTH:

a) Organelle 1
b) Organelle 2 (2)

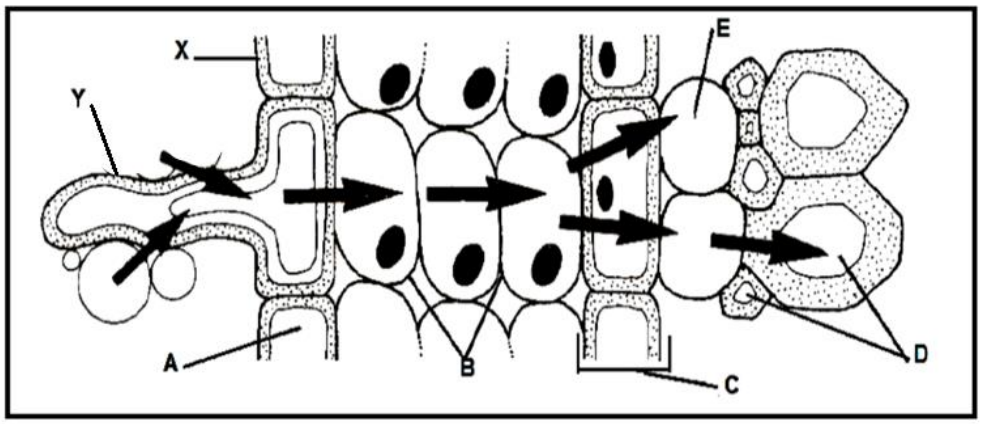
2.3.3 DRAW and LABEL a diagram of organelle **1**. Provide TWO labels. (5)

2.3.4 Name the organic compound produced by Organelle **2** and used by Organelle **1**. (1)

2.3.5 Between a muscle cell and a skin cell, which would have more of Organelle 1? (1)

(11)

2.4 The following diagram represents the pathway of water through the root. Study the diagram below and answer the questions that follow.



2.4.1 Name the process by which water molecules enter the root? (1)

2.4.2 Explain why plants will die if you water them with sea water. (3)

2.4.3 Which LETTER in the diagram refers to the endodermis? (1)

2.4.4 Name the type of tissue represented by Part **Y** (1)

2.4.5 Which special feature is present in the endodermis to control the pathway of water to the part labelled **D**? (1)

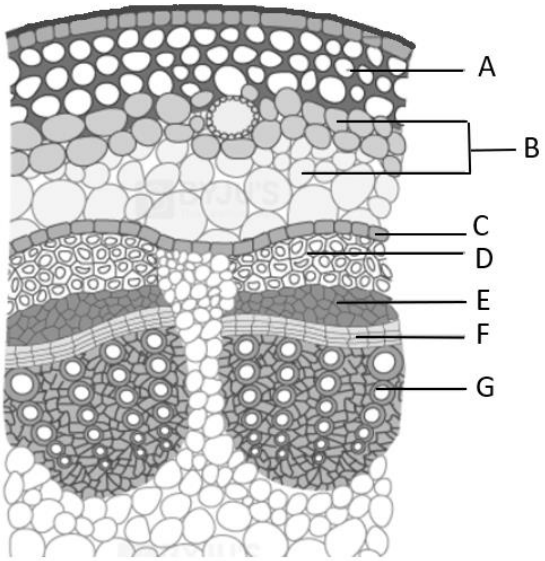
2.4.6 Name the **main** route by which water moves from Part **Y** to Part **D**. (1)

2.4.7 Name THREE forces responsible for the upward movement of water through tissue **D**. (3)

(11)
[50]

QUESTION 3

3.1 Study the diagram below and answer the questions that follow:



3.1.1 Identify the plant organ pictured above. (1)

3.1.2 Give a VISIBLE reason for your answer to QUESTION 3.1.1 above. (1)

3.1.3 Identify tissue:

a) A
b) D
c) E (3)

3.1.4 Give the LETTERS OF0 the parts which make up the **cortex**. (2)

(7)

3.2 The rate of water loss from the leaves of a potted plant can be measured by determining the mass of the plant at one-hour intervals. An investigation was done to determine the effect of light intensity on the rate of transpiration.

At each light intensity the apparatus was left for 15 minutes before determining the mass. The loss of water was then determined and recorded in the following table:

Light intensity (kilolux)	Loss of water (g/hr)
0	1
10	15
20	20
30	22
40	22

3.2.1 Draw a line graph showing the loss of water at different intensities. (6)

3.2.2 Explain how light intensity causes an increase in the amount of water lost. (2)

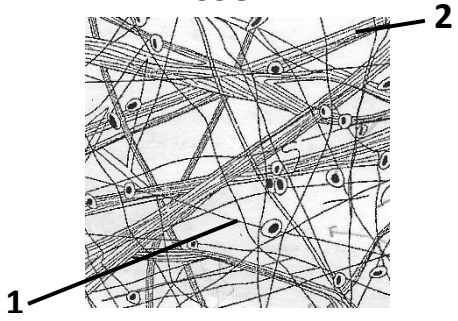
3.2.3 Water vapour leaves through the stomatal pore. Explain the way in which the stomatal pore opens. (3)

3.2.4 Wind is another factor that can affect the rate of transpiration. Explain how an increase in air movement will affect this rate. (3)

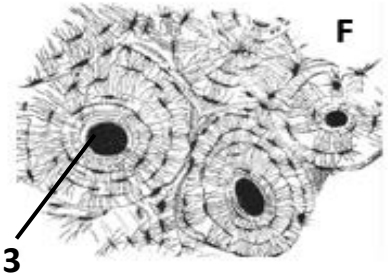
3.2.5 Explain one adaptation that leaves have, regarding their stomata, which can reduce the rate of transpiration. (3)
(17)

3.3 Study the mammalian connective tissues below and answer the questions that follow:

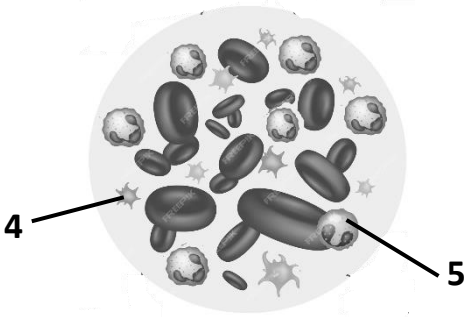
TISSUE A



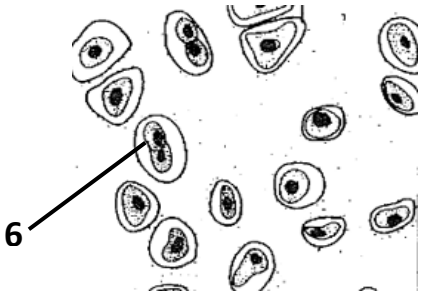
TISSUE B



TISSUE C



HYALINE CARTILAGE



3.3.1 Identify tissue:

a) **A**

b) **B**

c) **C** (3)

3.3.2 Give the NAME of parts**:**

a) 1

b) 2

c) 3

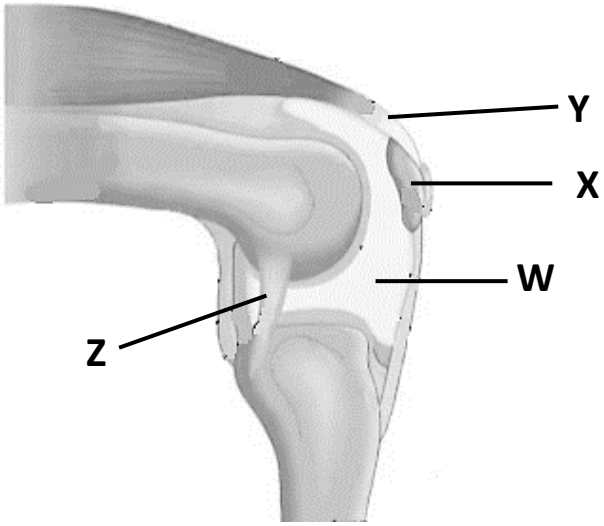
d) 6 (4)

3.3.3 Give the NAME and FUNCTION of parts **4** and **5**. (4)

3.3.4 NAME two types of cartilage not pictured and give ONE location where each can be found. (4)

(15)

3.4 Below is a diagram of a human knee joint.



3.4.1 What is a joint? (1)

3.4.2 NAME Part **Y** and Part **Z**. (2)

3.4.3 Tabulate two differences between Parts **Y** and **Z.** (5)

3.4.4 NAME and provide the function of fluid **W.** (2)

3.4.5 What type of bone is **X.** (1)

(11)

[50]

TOTAL SECTION B: [100]

TOTAL MARKS: 150