

Hillcrest High School

LIFE SCIENCE

Gr. 10
Time: 2½ hours

June 2019
Max Marks: 150



Instructions:

1. Write your Life Science teachers name on your answer booklet.
2. Number the answers exactly as the questions are numbered.
3. Write neatly and legibly.
4. Do all drawings in pencil and label them in pen.
5. Only draw diagrams and flow charts when requested to do so.
6. The diagrams in the question paper may not necessarily be drawn to scale.
7. Non-programmable calculators, protractors and compasses may be used.

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–D) next to the question number (1.1.1–1.1.8) in the ANSWER BOOK, for example 1.1.10 D.

1.1.1 The axial skeleton is made up of the following regions:

- A Skull, vertebral column and hip bones
- B Skull, vertebral column, ribs and sternum
- C Skull, pectoral girdle, ribs and sternum
- D Skull, pelvic girdle, ribs and sternum

1.1.2 The building blocks of proteins are ...

- A disaccharides.
- B monosaccharides.
- C amino acids.
- D glycerol.

1.1.3 The mitochondria are the site of ...

- A photosynthesis.
- B cellular respiration.
- C cellular division.
- D cytokinesis.

1.1.4 The single membrane surrounding a vacuole:

- A Lysosome
- B Plastid
- C Tonoplast
- D Dictyosome

1.1.5 Protein substance produced by the body to fight against disease:

- A Enzyme
- B Microbes
- C Bacterium
- D Antibody

1.1.6 Connective tissue that reduces friction between bones:

- A Cartilage
- B Tendon
- C Ligament
- D Blood

1.1.7 The tendency of liquids to move up narrow tubes is called ...

- A capillarity.
- B transpiration.
- C root pressure.
- D transpiration pull.

1.1.8 A hydrostatic skeleton is most likely to be found in the following animals, except in a/an ...

- A millipede.
- B flatworm.
- C jelly fish.
- D earthworm.

(8 x 2 = 16)

1.2 Give the correct **biological term** for each of the following descriptions.

Write only the term next to the question number (1.2.1–1.2.7) in the ANSWER BOOK.

1.2.1 The mineral required to maintain osmotic balance in plants

1.2.2 A change in the structure of a protein as a result of high temperatures

1.2.3 Accepted model that describes the structure of the cell membrane

1.2.4 Plastids that contain chlorophyll in plant cells

1.2.5 Permanent tissue that lines the surfaces of roots, stems and leaves

1.2.6 The body's ability to manufacture antibodies to fight diseases

1.2.7 Loss of water in liquid form from the margins of leaves

(7 x 2 = 14)

- 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 (1.3.1–1.3.7) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Increases the absorption of calcium in the body	A: Vitamin A B: Vitamin D
1.3.2	Active transport of substances into and out of the cell	A: Osmosis B: Diffusion
1.3.3	Dark-stained body in the nucleoplasm of a cell	A: Nucleus B: Nucleolus
1.3.4	Connects bone to bone	A: Tendon B: Ligament
1.3.5	Type of joint formed at the wrists	A: Pivot B: Ball and socket
1.3.6	Number of ribs joined to the vertebral column	A: 24 B: 12
1.3.7	Force responsible for upward movement of water in plants	A: Capillarity B: Transpiration pull

(7)

- 1.4 The Lock and Key Theory of enzymes explains how enzymes work. (7)
- 1.4.1 Explain how enzymes break down a substrate. (you need to write out your explanation, simple diagrams can be used as well) (4)
- 1.4.2 Name TWO factors that affect enzyme activity. (2)
- 1.4.3 What is the function of the enzyme, protease in washing powders? (1)
- 1.5 Carefully observe the diagrams below that show different types of plant tissue and answer the following questions:

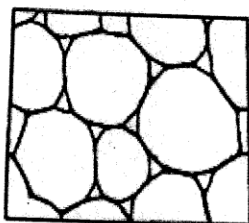


Diagram I

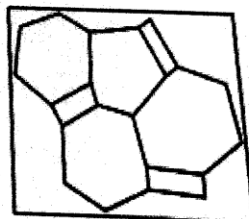


Diagram II

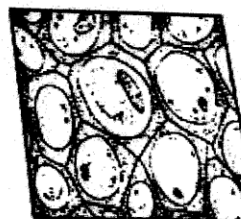


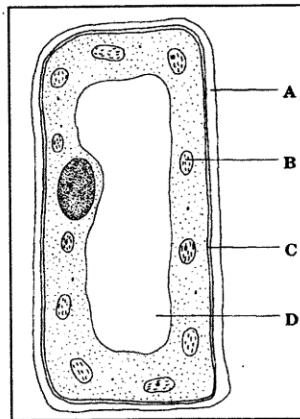
Diagram III

- 1.5.1 Provide the labels for Diagrams I, II and III. (3)
- 1.5.2 Explain ONE consequence if the holes of the sieve plates in the tissue in diagram II become blocked. (2)
- 1.5.3 Explain ONE structural adaptation of the cells in Diagram I. (1)

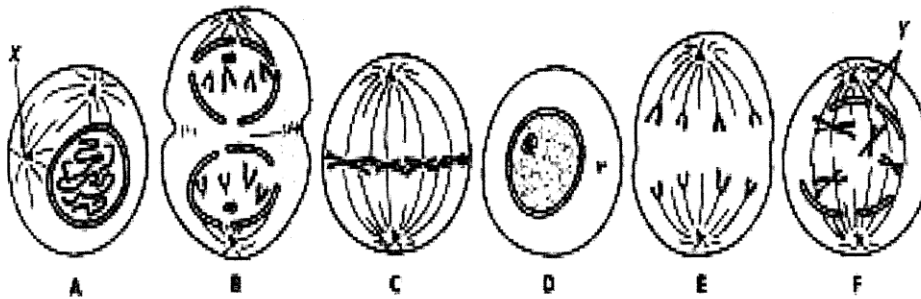
TOTAL SECTION A: 50

SECTION B QUESTION 2

2.1 Study the diagram of a typical cell below and answer the questions that follow.



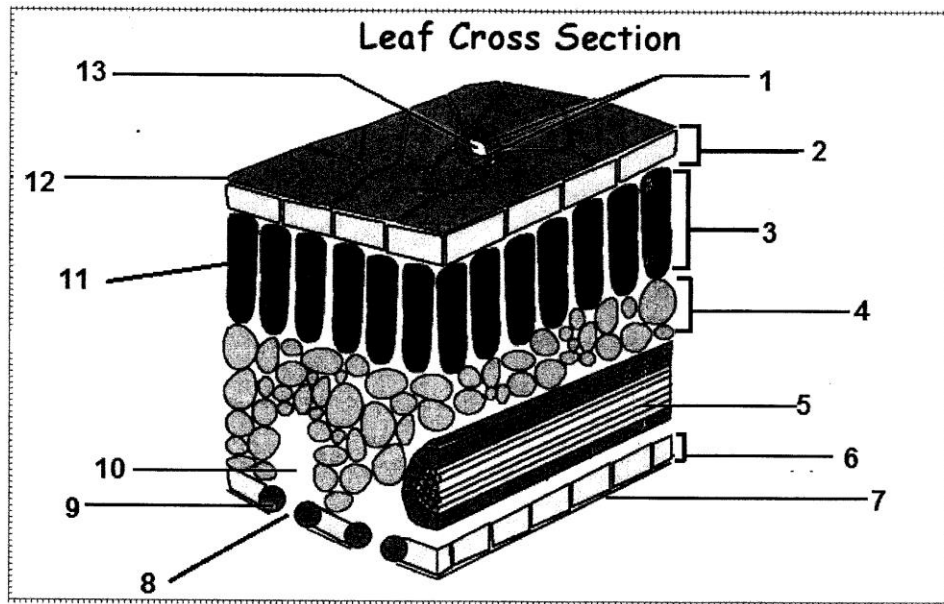
- 2.1.1 Write down the names of the parts labelled A, C and D (3)
- 2.1.2 State whether the cell drawn is a plant or animal cell. (1)
- 2.1.3 Give TWO visible reasons for your answer in QUESTION 2.1.2 (2)
- [6]**
- 2.2 The diagrams below show different phases of mitosis.



[Source: <https://wwwpublications.nigms.nih.gov>]

- 2.2.1 Identify phases A, B, C and D (4)
- 2.2.2 List the main events that occur during phase E. (3)
- 2.2.3 Briefly describe the biological importance of mitosis. (2)
- 2.2.4 Give one difference in telophase between plant and animal cells. (2)
- 2.2.5 Cancer is described as the uncontrollable division of cells.
- (a) List THREE causes of cancer. (3)
- (b) Explain ONE type of treatment used for cancer. (2)
- [16]

2.3 Study the diagram below of the cross section of a dicotyledonous leaf.
Answer the questions that follow.



- 2.3.1 Provide labels for 1, 3, 4 and 10 (4)
- 2.3.2 List ONE function of structure 3. (1)

2.3.3 Xylem is a conducting tissue found in leaves. List THREE structural features of xylem that allows it to perform its function.

(3)
[8]

2.4 Study the food label below and answer the questions that follow.

NUTRITIONAL INFORMATION
Servings per package: 8
Serving size: 47,5 g (1 sausage)

Average values	Per 100g	Per sausage
Energy	580 kJ (138 kcal)	276 kJ (65 kcal)
Fat, Total	7 g	3,3 g
- Saturated	0,9 g	0,4 g
- Monosaturated	1,7 g	0,8 g
- Polyunsaturated	4,4 g	2,1 g
Carbohydrate	10,0 g	4,8 g
Of which sugar	1,3 g	0,6 g
Fibre	4 g	1,9 g
Protein	16,5 g	7,8 g
Sodium	800 mg (0,8 g)	380 mg (0,38 g)

2.4.1 What is the Fibre content of ONE sausage? (1)

2.4.2 List TWO functions of proteins in a diet. (2)

2.4.3 Would you consider this product a healthy choice in terms of fat content? Give ONE reason for our answer. (2)

2.4.4 Calculate in grams, the total amount of sodium if 4 sausages were eaten (2)

2.4.5 Name the basic units (building blocks) of carbohydrates (1)

2.4.6 Vitamins are needed to maintain normal metabolic processes in our bodies. A lack of vitamins leads to various different deficiency diseases. Name the deficiency disease for:

- i. Vitamin C
- ii. Vitamin D

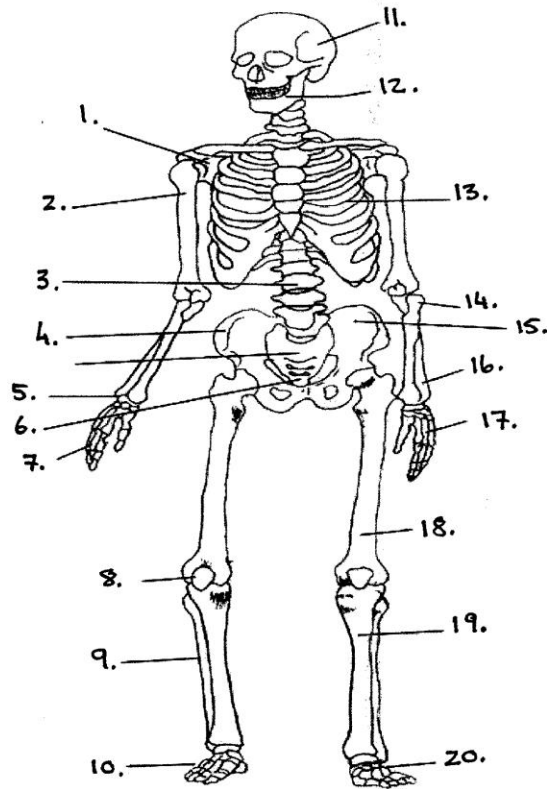
(2)

[10]

[Question 2 total – 40marks]

QUESTION THREE

3.1 Study the diagram of a region of the human skeleton. Answer the questions that follow.

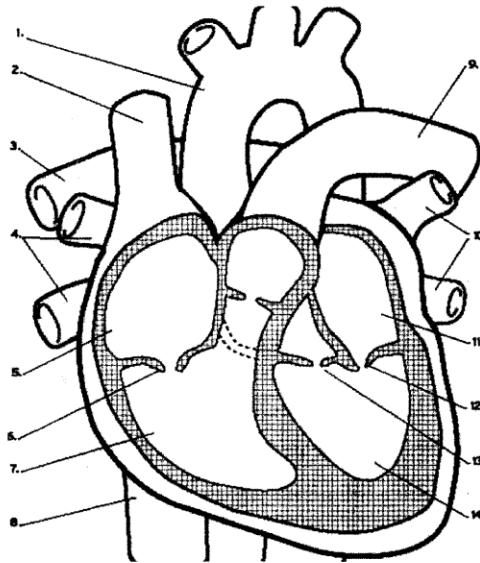


Sketch by Abhishake Sharma

DIAGRAM OF SKELETON

- 3.1.1 List TWO functions of the skeleton. (2)
- 3.1.2 Label parts numbered 13, 17 and 19 only. (3)
- 3.1.3 Synovial joints are freely moveable joints that assist with movement. Draw and label a diagram of a typical synovial joint. (4)
- 3.1.4 Explain how the disease Osteoarthritis occurs. (2)

3.1.5 Study the diagram of the heart below:



3.1.5.1 Provide the labels for number 1, 5 and 14.

(3)

3.1.5.2 How many chambers does a human heart have?

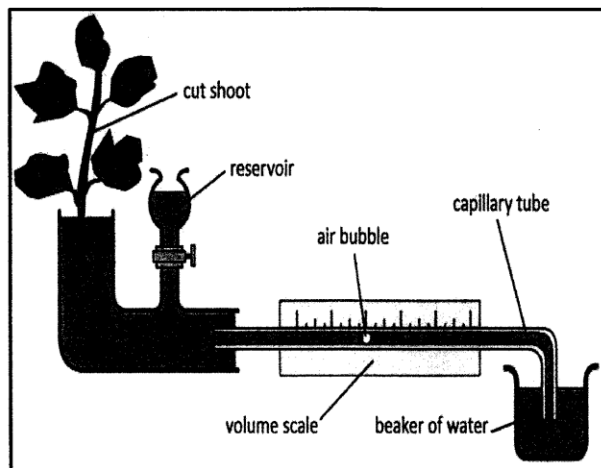
(1)

3.1.5.3 What type of blood (oxygenated or deoxygenated) does No. 2 transport?

(1)

[16]

3.2 Zandile set up the following apparatus to investigate how temperature affects transpiration rate.



3.2.1 What is the name of this apparatus? (1)

3.2.2 Give ONE precaution you would take when setting up this apparatus. (1)

3.2.3 Predict what would happen to the speed of movement of the air bubble if Vaseline was applied to the ventral surfaces of all the leaves. (1)

3.2.4 Why should this apparatus be allowed to stand before starting the experiment? (1)

3.2.5 Give a hypothesis for this experimental investigation. (2)

3.2.6 Identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

3.2.7 A potometer was used to investigate the effect of temperature on transpiration rate. Study the results in the table below.

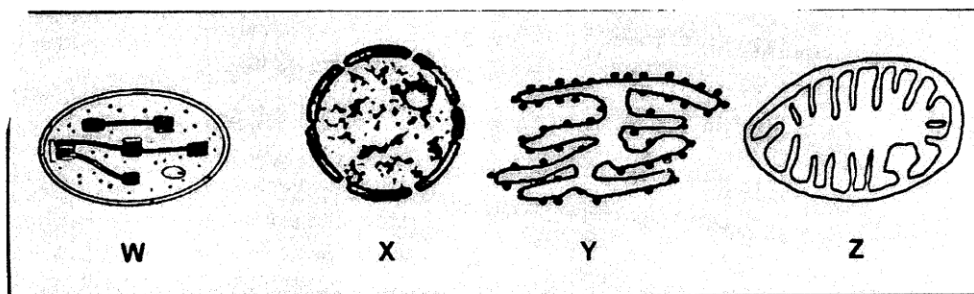
Temperature °C	22	25	27	28	30
Transpiration rate (m mol/m ² sec)	1,5	3,5	5	4,5	4

3.2.7.1 Draw a line graph to illustrate these results. (5)

3.2.7.2 What can you conclude about the relationship between temperature and transpiration rate? (1)

[14]

3.3 Refer to the diagram below and then answer the questions that follow:



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

- a) Contains cristae (2)
- b) Controls cell activities (2)
- c) Acts as a communication system (2)
- d) Contains a green pigment (2)

3.3.2 Explain what the term '*semi-permeable membrane*' means. (2)
[10]

[Total Question 3 = 40 marks]

TOTAL SECTION B: 80

SECTION C: Question 4

4.1 Animal tissue is broken down into 4 categories: Epithelial tissue, Connective tissue,

Muscle tissue and Nerve tissue.

In an essay describe:

- the **STRUCTURE** and **FUNCTION** of the 3 different types of Muscle Tissue and where they are found in the body
- AND**
- Muscles need to be supplied with oxygen. Explain fully the **STRUCTURE** and **FUNCTION** of the connective tissue called **BLOOD**

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

Content: (17)
Synthesis: (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150