education

Department of Education
FREE STATE PROVINCE

GRADE 10

LIFE SCIENCES P1

JUNE 2024

TOTAL: 150

TIME: 2½ HOURS

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers 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. Present your answers according to the instructions of each question.
6. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

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

1.1.1 The form in which carbohydrates are stored in animal cells.

A Glycogen
B Starch
C Glucose
D Glucagon

1.1.2 This statement defines osmosis.

A Movement of particles from the region of high concentration to the region of low concentration until equilibrium is maintained.

B Movement of water molecules from a region of high water concentration through a semi-permeable membrane to a region of low water concentration.

C Movement of particles from the region of low concentration to the region of high concentration until equilibrium is maintained.

D Movement of water molecules from a region of low water concentration through a semipermeable membrane to a region of high water concentration

1.1.3 The division of one cell by mitosis will produce…

A two daughter cells with half the chromosome number of the mother cell.

B four daughter cells with half the chromosome number as the mother cell.

C two daughter cells with the same number of chromosomes as the mother cell.

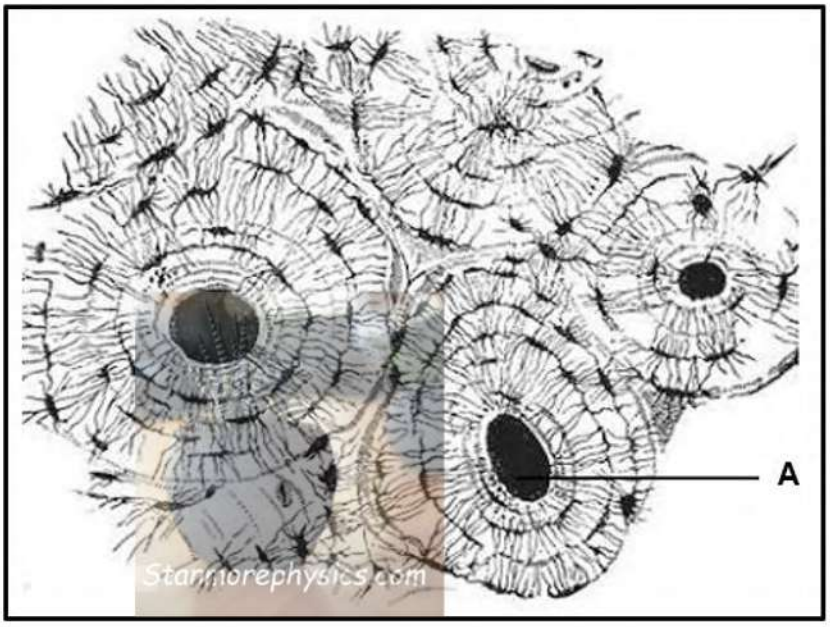
D four daughter cells with the same number of chromosomes as the mother cell.

1.1.4 Plant tissue where thickening occurs in the corners of the cell wall:

A Collenchyma
B Phloem
C Chlorenchyma
D Sclerenchyma

QUESTIONS 1.1.5 AND 1.1.6 ARE BASED ON THE DIAGRAM OF BONE TISSUE BELOW.

1.1.5 Part **A** in the diagram is…



A harversian canal.
B osteocytes.
C lamellae.
D squamous epithelium.

1.1.6 Below is the components of part **A**:

(i) Blood vessels
(ii) Nerve
(iii) Lymphatic vessels
(iv) Calcium

The correct combination of the components of part **A** is…

A (iv) and (iii).
B (ii), (iii) and (iv).
C (i), (ii) and (iii).
D (i) only.

1.1.7 The importance of the lipids(fats) in the human body is to…

A attach muscles.
B to maintain body heat.
C form enzymes.
D oxidise glucose.

1.1.8 The correct sequence of the events in the cell cycle:

A	interphase	mitosis	cytokinesis	growth
B	growth	prophase	interphase	mitosis
C	cytokinesis	interphase	metaphase	mitosis
D	mitosis	cytokinesis	interphase	growth

1.1.9 The disease that develops because of uncontrolled mitosis:

A Rickets
B Xerophtalmia
C Cancer
D Night blindness

1.1.10 Structures from which spindle fibres develop:

A Chromosomes
B Centriole
C Golgi apparatus
D Ribosomes

(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 1.2.10) in the ANSWER BOOK.

1.2.1 The smallest unit of life

1.2.2 The deficiency disease in humans caused by a lack of iron

1.2.3 The phase in mitosis where chromatids are pulled to the opposite poles

1.2.4 A cell without a true nucleus

1.2.5 Part of the microscope that is used to mount the specimen

1.2.6 The organelle responsible for protein synthesis

1.2.7 Modified epidermal cells that control the opening and the closing of the stomata in a leaf

1.2.8 The jelly-like substance that forms part of the cell

1.2.9 The plant tissue that transports organic nutrients from leaves to the rest of the plant

1.2.10 The reagent that is used to test for the presence of glucose

(10 x 1) **(10)**

1.3 Indicate whether each of the descriptions 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 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Nucleic acids	A: DNA B: RNA
1.3.2 Tissues with cubical shaped cells	A: Squamous epithelium B: Columnar epithelium
1.3.3 The vitamin that prevents the development of soft bones	A: Vitamin B B: Vitamin D

(3 x 2) **(6)**

1.4 The table below compares the composition of a 100 ml sample of human milk with undiluted goat's milk.

Ingredient	Goat's milk (100ml)	Human milk (100ml)
Water	90.0ml	89.0ml
Carbohydrates (lactose)	4.3g	5.8g
Proteins	4.0g	1.35g
Fat	2.9g	3.8g
Calcium	0.147mg	0.035mg
Sodium	0.049mg	0.012mg
Vitamin C	0.015mg	0.003mg

1.4.1 Name TWO organic compounds from the table above. (2)

1.4.2 State the monomers of fat. (2)

1.4.3 Name the elements in proteins. (2)

1.4.4 A growing baby needs 20g of protein per day. What amount of undiluted goat's milk will provide for this requirement? Show all calculations. (3)

1.4.5 Which nutrient in goat's milk is significantly higher than in human milk? (2)

1.4.6 What type of milk shown in the table has the highest sodium content per 100 ml milk? (1)

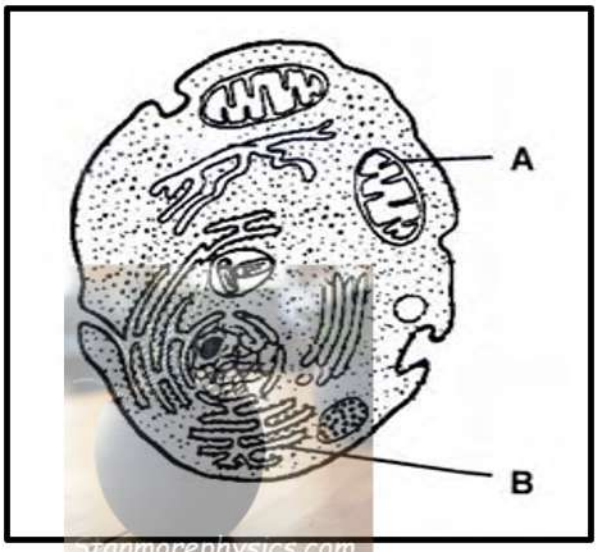
1.4.7 Which ingredient in human milk is mainly responsible for the provision of most energy? (2)
(14)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below shows the structure of an animal cell.



2.1.1 Give The LETTER and the NAME of…

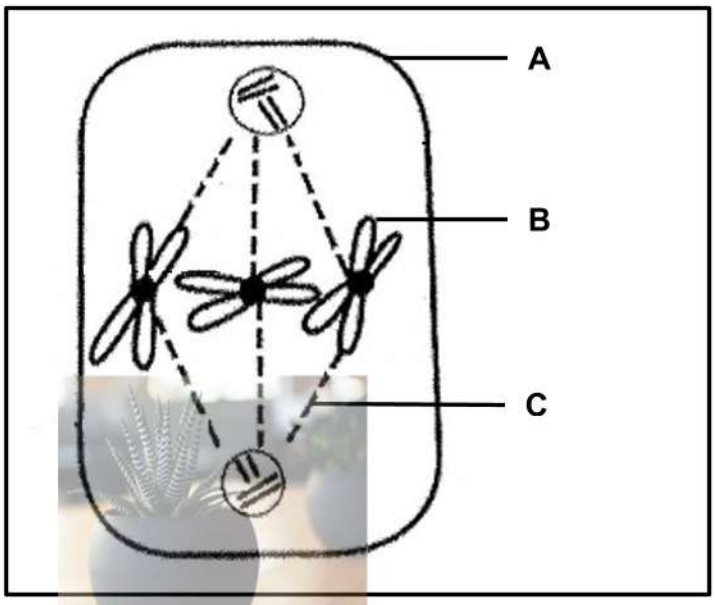
(a) the part that increases the internal surface of the cell. (2)

(b) the organelle where cellular respiration occurs. (2)

2.1.2 Name THREE ways in which this cell is different from the plant cell. (3)

2.1.3 Draw a labelled diagram of the part that controls all the metabolic processes in the cell. (5)
(12)

2.2 The diagram below represents a phase in mitosis.



2.2.1 Identify:

(a) Membrane **A** (1)

(b) Structure **B** (1)

(c) Structure **C** (1)

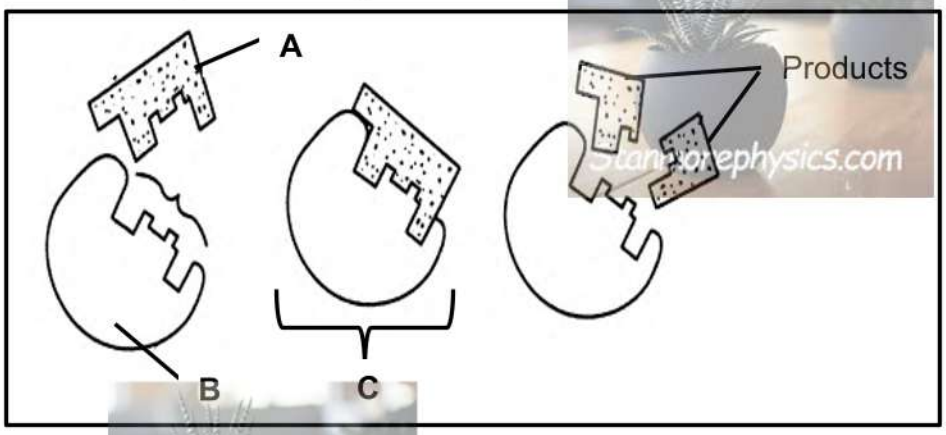
2.2.2 Identify the phase represented by the diagram above. (1)

2.2.3 Explain your answer in QUESTION 2.2.2. (2)

2.2.4 How many centromeres are visible in this diagram? (1)

2.2.5 How does telophase in plant cells differ from telophase in animal cells? (2)
(9)

2.3 The diagram below represents enzyme action.



2.3.1 Identify:

(a) Part **A** (1)

(b) Structure **C** (1)

2.3.2 Name the metabolic reaction that results in the products as shown in the diagram. (1)

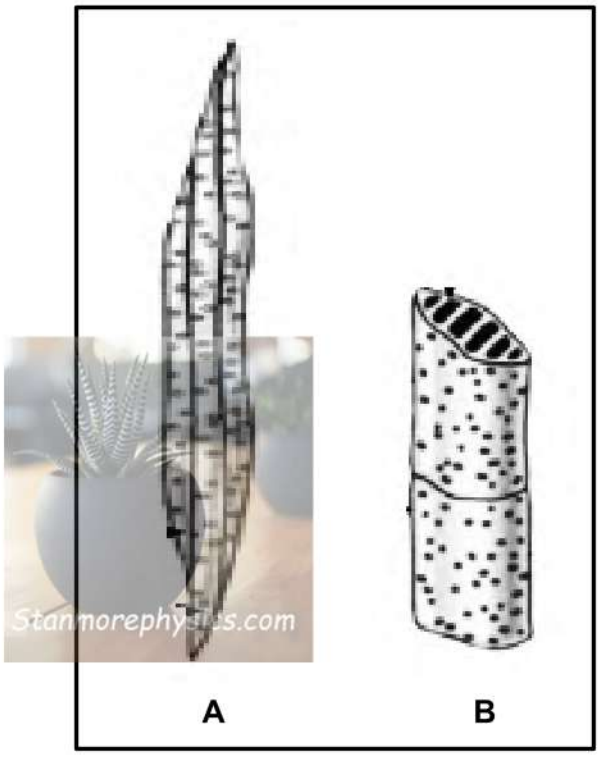
2.3.3 Give ONE reason for your answer in QUESTION 2.3.2. (1)

2.3.4 Explain the role of structure **B** as a biological catalyst. (2)

2.3.5 Explain what will happen to the active site of **B** if it is exposed to high temperatures. (2)

2.3.6 Name ONE other factor, except for the one mentioned in QUESTION 2.3.5, that influences the enzyme action. (1)
(9)

2.4 The diagrams below represent the cells that form the xylem tissue which transport water and minerals upward in a plant.



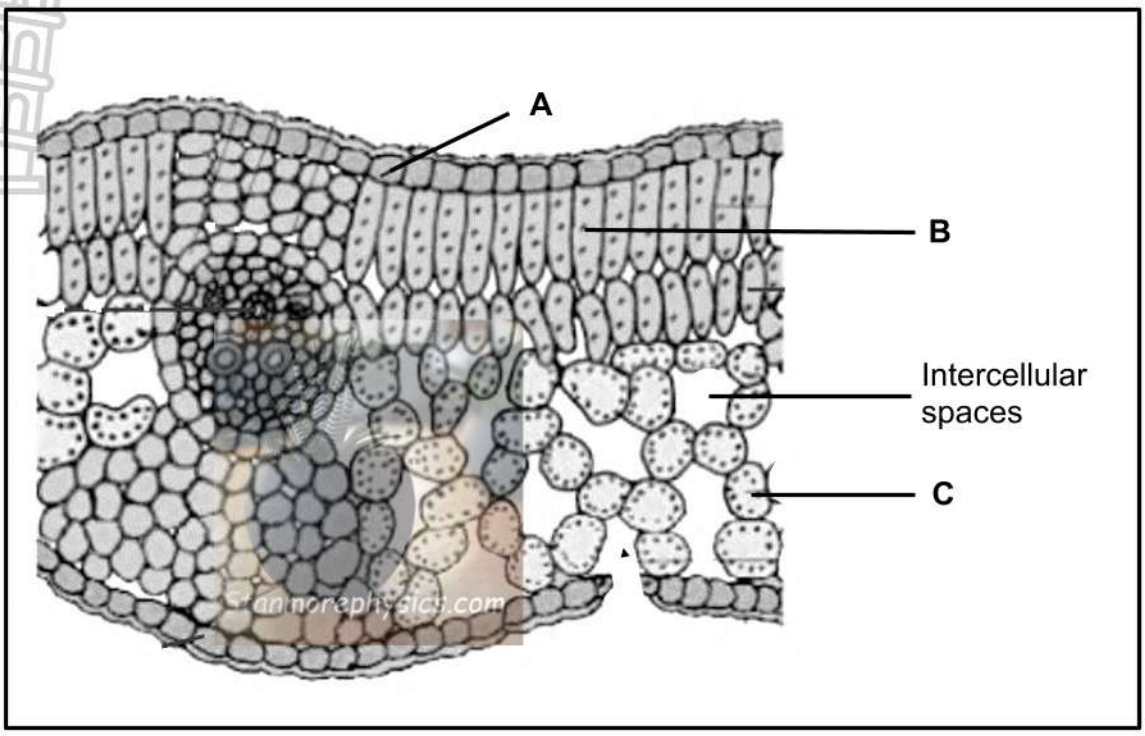
2.4.1 Identify cell **A**. (1)

2.4.2 Define the term *tissue*. (2)

2.4.3 Explain THREE structural adaptations of cell **B** to transport water upwards in a plant. (6)

2.4.4 State ONE other function of the xylem tissue. (1)
(10)

2.5 The diagram below shows the dorsiventral leaf



2.5.1 Identify:

(a) Cell **B** (1)

(b) Cell **C** (1)

2.5.2 Give the collective name for tissue **B** and **C**. (1)

2.5.3 Explain ONE way in which part **A** is adapted to photosynthesis. (2)

2.5.4 Tabulate TWO structural differences between cells **B** and **C.** (5)
(10)

QUESTION 2: [50]

QUESTION 3

3.1 An investigation was carried out to investigate the influence of temperature on the rate of transpiration. The data collected is shown in the following table.

Temperature (°C)	Water vapour lost (ml) per hour
10	9
20	18
30	32
40	38

3.1.1 Name the apparatus used in a laboratory to demonstrate transpiration. (2)

3.1.2 Identify:

(a) Independent variable (1)

(b) TWO other external factors that is responsible for an increase in transpiration rate (2)

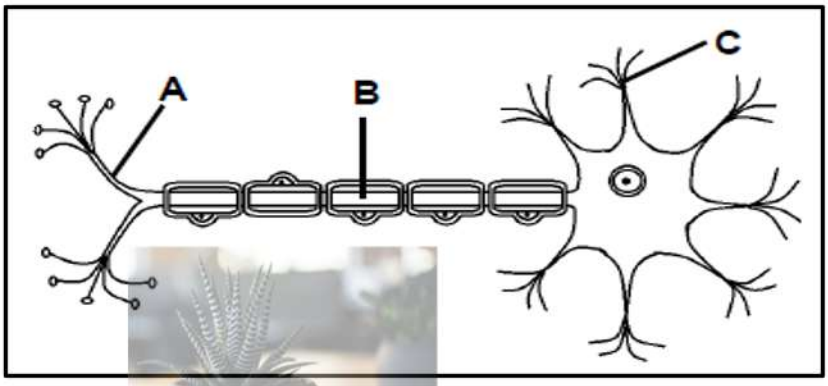
(c) The temperature where transpiration rate is the highest (1)

3.1.3 State the conclusion of the investigation. (2)

3.1.4 Name TWO structural adaptations of the leaves to limit transpiration rate. (2)

3.1.5 Draw a line graph to represent the results in the table. (6)
(16)

3.2 The diagram below represents a nerve cell.



3.2.1 Name the type of the nerve cell illustrated in the diagram. (1)

3.2.2 Identify **B**. (1)

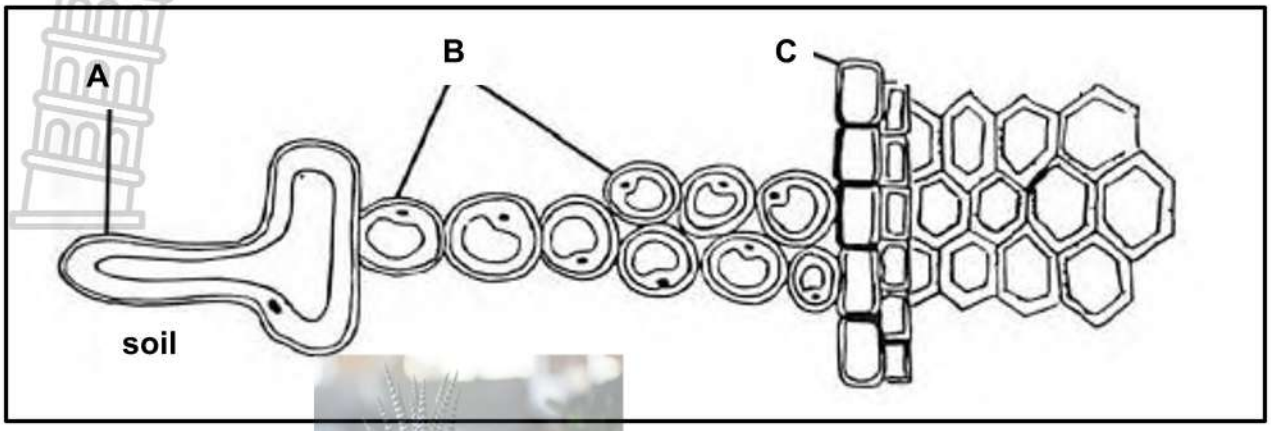
3.2.3 Describe the function of this neuron. (2)

3.2.4 Give ONE way in which part **B** is protected. (1)
(5)

3.3 Blood is the only liquid connective tissue and consists of blood plasma and blood cells.

3.3.1 Name the THREE types of blood cells and their functions. **(6)**

3.4 The diagram below represents the path of water through the root of a plant.



3.4.1 Give the LETTER and the NAME of:

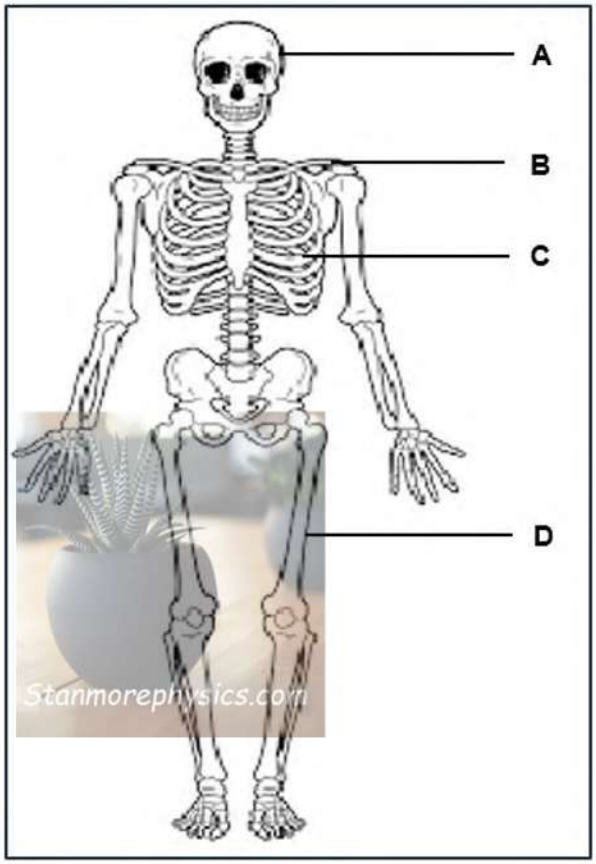
(a) The layer containing Casparian strips (2)

(b) The part that is a finger-like outgrowth of the epidermal layer (2)

3.4.2 Describe the process by which water enters structure **A**. (5)

3.4.3 Name TWO processes by which water moves upward in a plant. (2)
(11)

3.5 The diagram below represents the human skeleton.



3.5.1 Give the LETTER and the NAME of the part(s) that…

(a) houses the brain. (2)

(b) protects the lungs and the heart. (2)

(c) forms part of the lower limb. (2)

3.5.2 State any FIVE functions of the skeleton. (5)

3.5.3 Name the connective tissue that joins bone to bone. (1)
(12)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150