education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 10

LIFE SCIENCES P1

NOVEMBER 2024

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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. Do 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 may 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 provided as possible answers to the following questions. Choose the correct answer and write only the letter (A-D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

1.1.1 Which of the following cells make up a xylem tissue?

A Xylem vessel and tracheids

B Sieve tubes and companion cells

C Tracheids and sieve tubes

D Companion cells and xylem vessels

1.1.2 Which of the following is the site of protein synthesis?

A Golgi body

B Cell wall

C Ribosomes

D Plasma membrane

1.1.3 The similarity between sclerenchyma and collenchyma tissue is that they are both …

A packaging tissue.

B contain flexible fibres.

C provide support to the plant.

D manufacture food.

1.1.4 A motor neuron carries a nerve impulse to ...

A a receptor.

B an effector.

C the brain.

D the cell body.

1.1.5 Which bone does not belong to the upper limb?

A Carpals

B Metacarpals

C Ulna

D Fibula

1.1.6 Kwashiorkor is a deficiency disease of …

A proteins.

B vitamin A.

C vitamin B.

D fats/lipids.

1.1.7 Which organelle contains the genetic information of an organism?

A Chloroplast

B Mitochondrion

C Nucleus

D Centrosome

1.1.8 Cells in a leaf that do not contain chloroplast.

A Guard cells

B Sclerenchyma cells

C Palisade cells

D Parenchyma cells

1.1.9 The tissue that allows sunlight to pass through into a leaf.

A Palisade mesophyll

B Epidermis

C Collenchyma

D Epithelium

1.1.10 An organelle that generates spindle fibres in an animal cell during mitosis.

A Cytoplasm

B Chromosome

C Centromere

D Centriole (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 1.2.5) in the ANSWER BOOK.

1.2.1 The tissue which lines all blood vessels

1.2.2 The tissue which continually form new cells in plants

1.2.3 The element needed to form haemoglobin

1.2.4 The structure that joins two chromosomes together during cell division

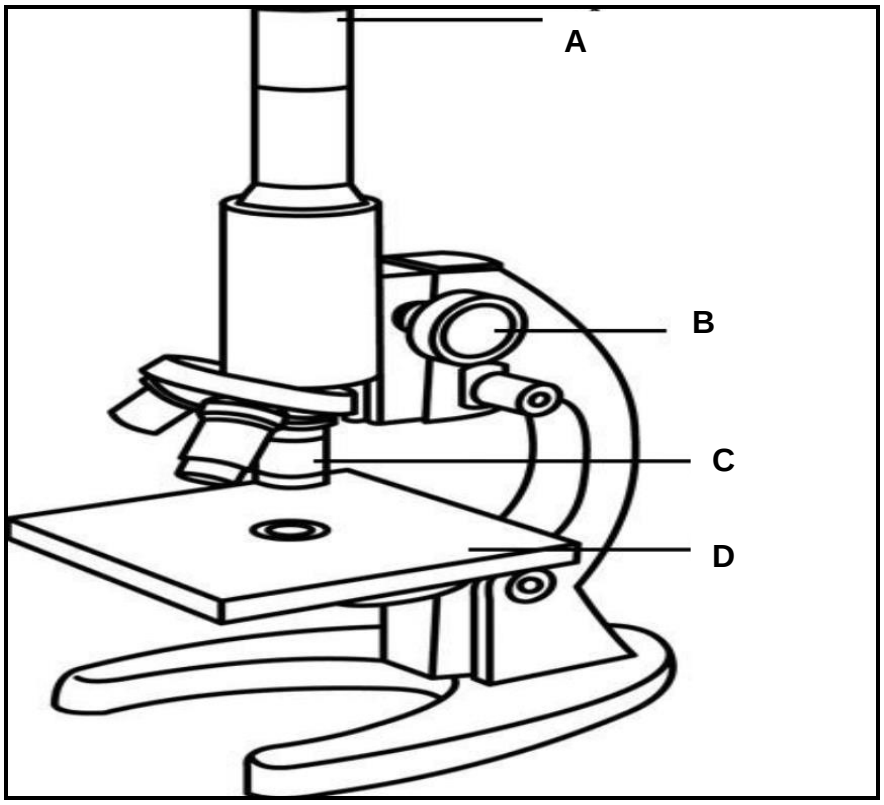
1.2.5 The tissue that transport food from leaves to all parts of the plant (5 x 1) **(5)**

1.3 Indicate whether each of the descriptions in COLUMN I apply 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	A differentially permeable membrane	A: Cell membrane B: Cell wall
1.3.2	Gives colour to the flower	A: Leucoplast B: Chromoplast
1.3.3	Upward movement of water in a plant due to transpiration	A: Force of cohesion B: Transpiration pull

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

1.4 The diagram below shows a scientific instrument.



1.4.1 Name the above instrument. (1)

1.4.2 Identify parts:

(a) **A** (1)

(b) **B** (1)

(c) **D** (1)

1.4.3 Give the function of the part labelled **C**. (1)

1.4.4 What is meant by magnification of a microscope? (1)

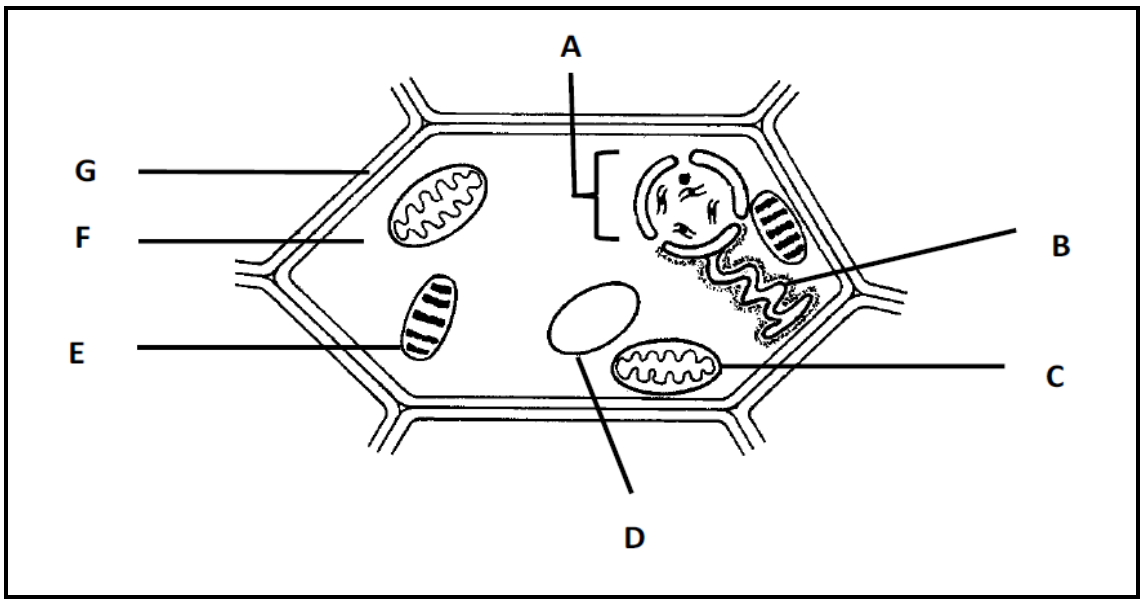
1.4.5 Calculate the actual size of a cell in micrometres use the information and formula below:

Width of a cell = 50 mm
True length of scale line = 0,9 µm
Measured scale line = 8

$$\text{Actual size} = \frac{\text{measured size x true length of scale line}}{\text{Measured length of scale line}}$$ (3)

(9)

1.5 Study the diagram of a cell shown below



1.5.1 Write down the LETTER only of the:

(a) Vacuole (1)

(b) Endoplasmic reticulum (1)

(c) Nucleus (1)

1.5.2 Write down the LETTER of the organelle responsible for the following function:

(a) Support and protects the living contents of the cell and gives rigidity to the cell (1)

(b) The site of all metabolic processes. (1)

(c) Provides the energy to the cell through cellular respiration. (1)

1.5.3 Provide ONE observable reason as to why this cell cannot be from the root of a plant. (1)

1.5.4 Explain ONE observation that you would make if this cell was placed in a concentrated sugar solution. (3)
(10)

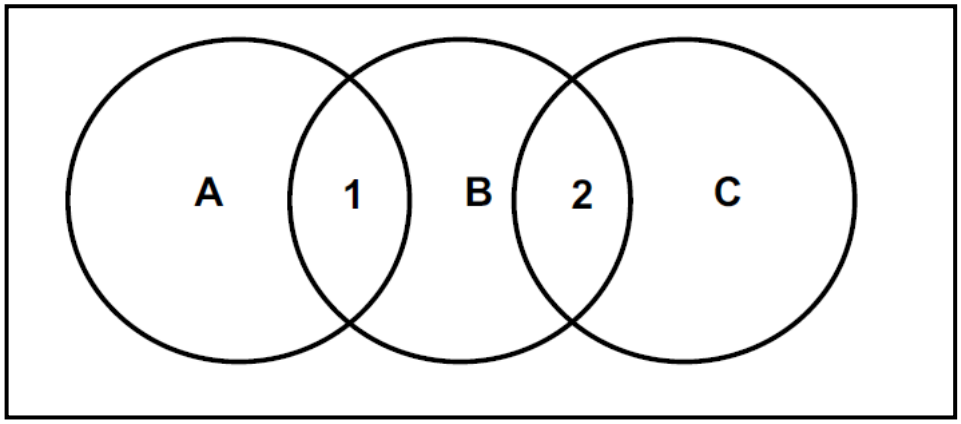
TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 In the diagram below the letters **A**, **B** and **C** represents THREE groups of organic compounds that you have studied.

- Number 1 represents characteristics common to **A** and **B** only.
- Number 2 represents characteristics common to **B** and **C** only.
- **B** and **C** make up a cell membrane.
- **C** is made up of amino acids.



2.1.1 Define an *organic compound*? (2)

2.1.2 Name the organic compound:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

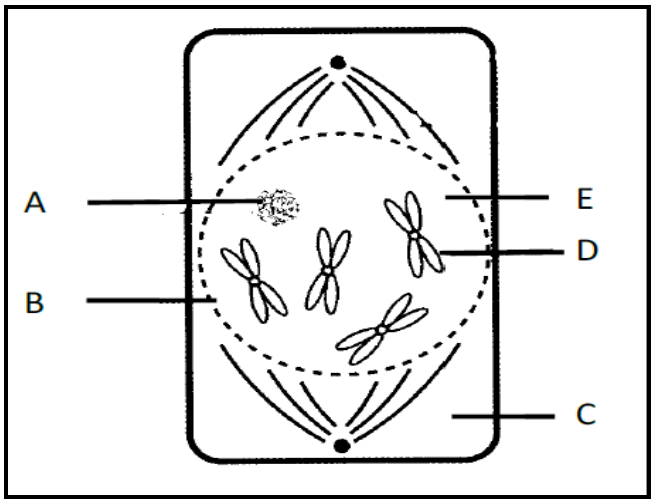
2.1.3 Name the monomers of:

(a) Carbohydrates (1)

(b) Lipids (1)

2.1.4 Which organic compound (**A**, **B** or **C**) is stored as glycogen in the liver of humans? (1)
(8)

2.2 The diagram below shows a phase of mitosis.



2.2.1 Identify the phase of mitosis represented in the above diagram. (1)

2.2.2 Write down the LETTER only, of the part that represent the:

(a) Nucleolus (1)

(b) Nucleoplasm (1)

2.2.3 Identify part:

(a) **D** (1)

(b) **C** (1)

2.2.4 Explain the importance of interphase that occurs before mitosis. (2)

2.2.5 How many chromosomes would you expect in each of the daughter cells after mitosis? (1)

(8)

2.3 Read the extract below about the treatment of cancer.

Chemotherapy either destroys the cancer cells directly or by destroying their DNA. Radiotherapy involves the use of radiation to destroy cancer cells. In an alternative method, traditional healers use the plant S*utherlandia frutescenes.* Recently scientistis carried out tests using an extract from *Sutherlandia frutescences* on 10 vervet monkeys to treat cancer and found that it had no side effects.

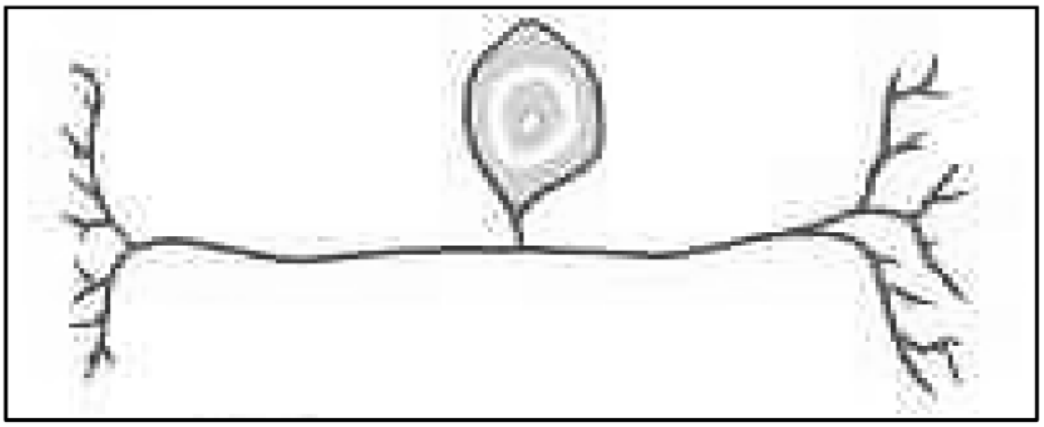
2.3.1 According to the extract, name ONE method used in hospitals to treat cancer. (1)

2.3.2 Identify the genus name of the plant used by traditional healers. (1)

2.3.3 Explain how 'destroying the DNA' can help fight cancer. (2)

2.3.4 State TWO ways in which the scientist can improve the reliability of the results obtained in the test with vervet monkeys. (2)
(6)

2.4 The diagram below represents an animal tissue.



2.4.1 Provide the caption for the above diagram. (1)

2.4.2 From the diagram above identify a structure with the following function:

(a) Provides nutrients and energy to the impulse (1)

(b) Receives and transmits impulses to the cell body (1)

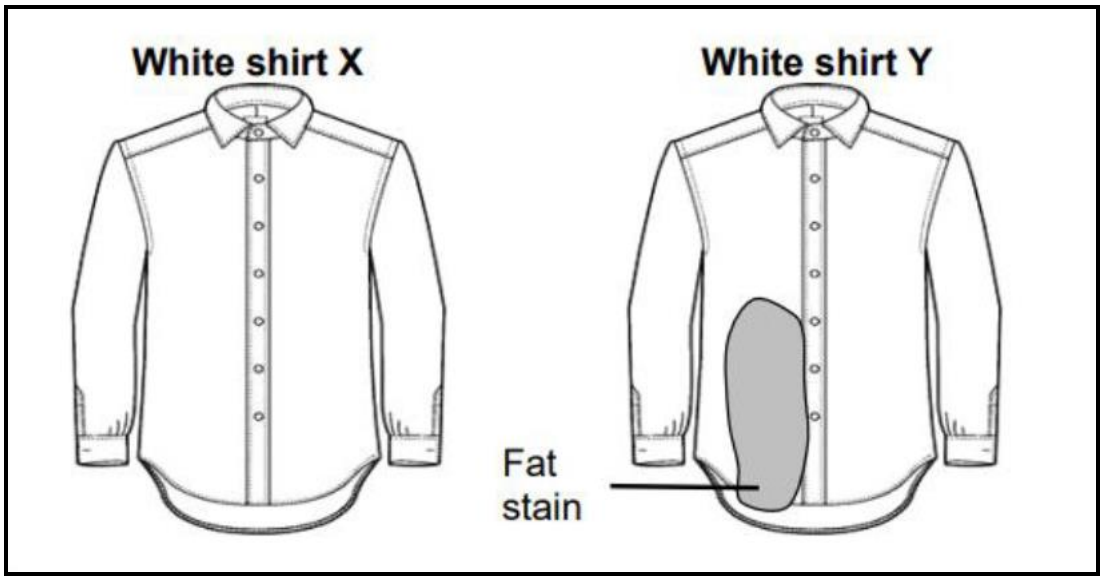
2.4.3 Describe the functional difference between the motor neuron and the sensory neuron. (2)
(5)

2.5 An investigation was carried out to determine the effect of high temperature on a washing powder containing fat digesting enzymes.

The procedure was as follows:

- Two same school white shirts were used.
- White shirts **X** and **Y** had same fat stain.
- White shirt **X** was washed with detergent containing fat-digesting enzymes for 3 minutes at 37^{o}C.
- White shirt **Y** was washed with detergent containing fat-digesting enzyme for 3 minutes in boiling water.
- The investigation was repeated five times.

The results of the investigation are shown below.



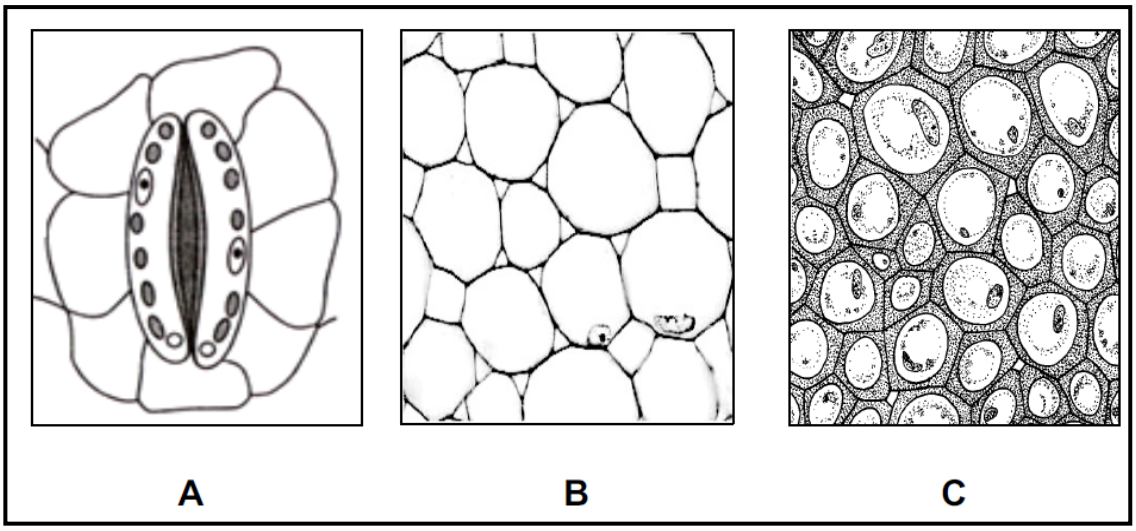
2.5.1 State TWO planning steps that were taken for this investigation. (2)

2.5.2 State TWO factors that were kept constant during this investigation. (2)

2.5.3 Why was the white shirt **X** included in this investigation? (2)

2.5.4 State a conclusion for this investigation. (2)
(8)

2.6 The diagram below shows different types of plant tissues.



2.6.1 Identify tissues **B** and **C**. (2)

2.6.2 Explain TWO structural adaptations of tissue **A** for its functions. (4)

2.6.3 Tissue **A** also lines the root where it plays a role in increasing the surface area for absorption of water.

Draw a labelled diagram of a root hair. (3)

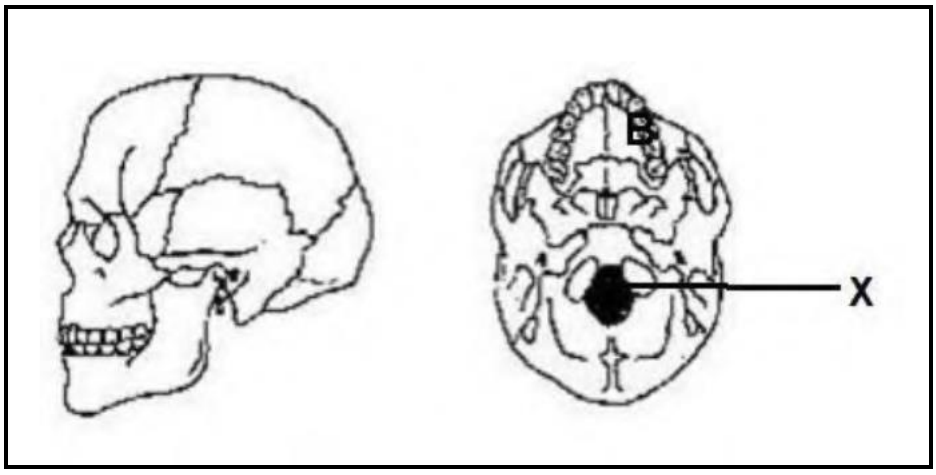
2.6.4 Explain TWO ways in which the roothair is adapted for its function. (4)

2.6.5 Explain why a high temperature in the soil will increase the absorption of water by the root hair. (2)
(15)

TOTAL QUESTION 2: [50]

QUESTION 3

3.1 The diagram below represents the side and ventral views of a human skull.



3.1.1 To which of the two main parts of the skeleton do these structures belong? (1)

3.1.2 Identify the opening marked **X**. (1)

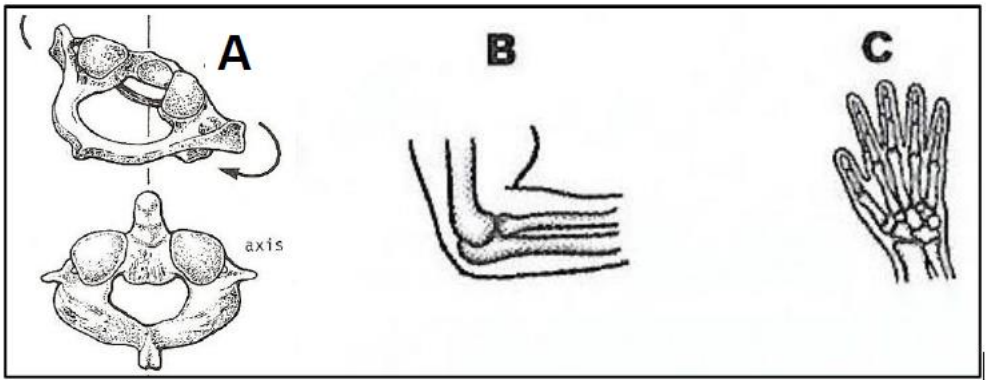
3.1.3 With which vertebra does this part of the skeleton articulate? (1)

3.1.4 Write down the dental formula of a human. (1)

3.1.5 How many teeth does an adult human have in the upper jaw? (1)

3.1.6 What is determined by an animal's dental formula? (2)
(7)

3.2 The diagram below shows different joints.



3.2.1 Identify the type of joint **A**, **B** and **C** according to the movement they permit. (3)

3.2.2 State THREE functions of the skeleton other than giving protection. (3)
(6)

3.3 Osteoporosis is a disorder whereby bones develop small pores and can easily break.

An investigation was conducted to determine the frequency of Osteoporosis amongst different age groups of men and women.
The investigators carried out a survey amongst 500 men and 500 women of different age groups in a certain country.

The results of the survey are shown in the table below.

AGE GROUP (years)	**FREQUENCY OF OSTEOPOROSIS (%)**	
	Men	**Women**
20-35	**0**	**2**
36-50	**2**	**5**
51-65	**8**	**25**
65-80	**26**	**35**

3.3.1 Identify the:

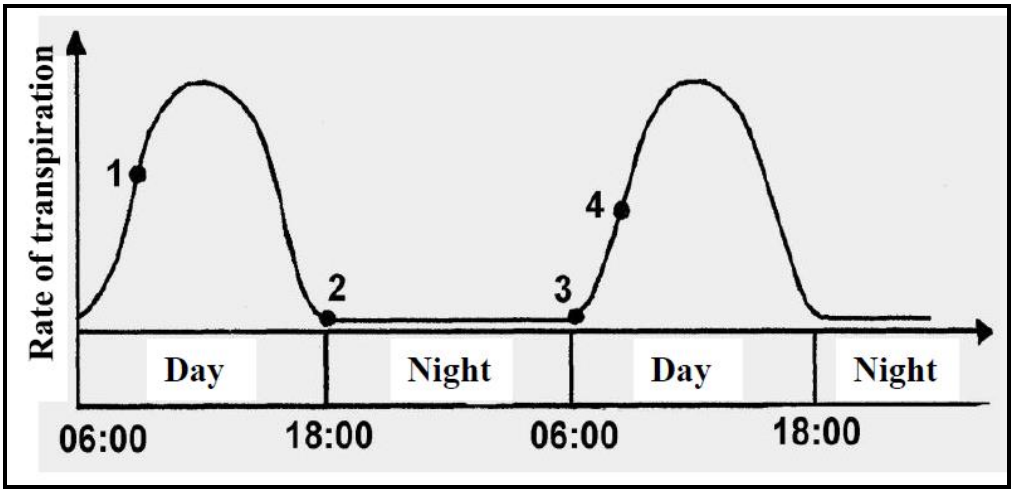
(a) Dependent variable (1)

(b) The age group with the lowest frequency of Osteoporosis (1)

3.3.2 Which gender shows the higher frequency of Osteoporosis? (1)

3.3.3 Draw a bar graph to show the results of the survey.
(6)
(9)

3.4 The graph below illustrates the rate of transpiration in a plant under conditions of light and darkness.



3.4.1 Give the numbers which will indicate:

(a) Open stomata (2)

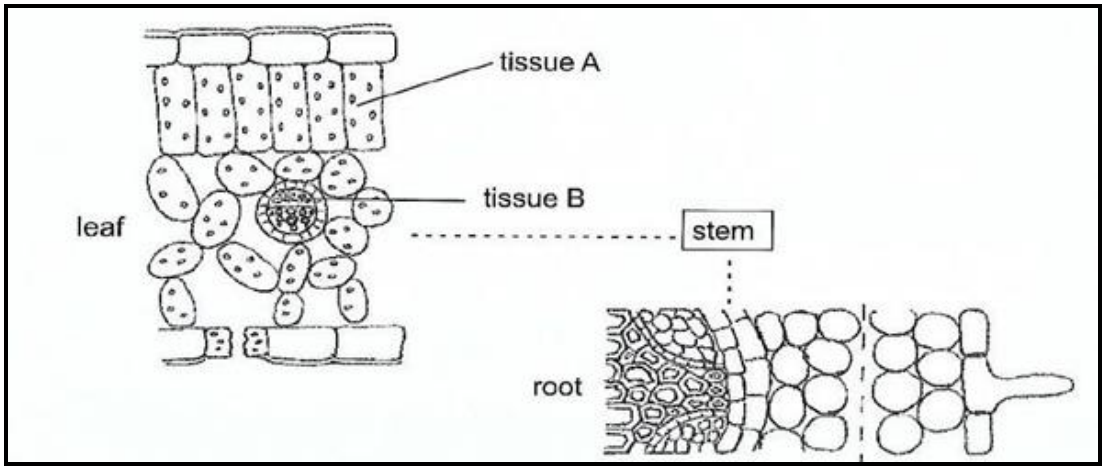
(b) Closed stomata (2)

3.4.2 Mention any ONE environmental condition in the guard cells responsible for the changes at **2.** (1)

3.4.3 Explain TWO structural adaptations of leaves to limit transpiration. (4)

3.4.4 Tabulate TWO structural differences between a dicotyledonous root and a dicotyledonous stem. (5) **(14)**

3.5 The diagram below shows different parts of a plant.



3.5.1 Explain ONE visible structural adaptation that assist the plant to prevent water loss. (3)

3.5.2 Name the tissue that transports water from the root to reach the leaf. (1)

3.5.3 Explain TWO ways how the tissue mentioned in QUESTION 3.6.2 is structurally adapted to perform its function efficiently. (4)

3.5.4 Name the process for which tissue A is responsible. (1)

3.5.5 Name the process which causes water to move from one parenchyma cell to another, as it passes through the cortex of the root. (1)
(10)

3.6 Explain any TWO precautions you would take when measuring the rate of transpiration using a potometer. (4)
(4)

TOTAL QUESTION 3: [50]

TOTAL SECTION B: 100
GRAND TOTAL: 150