Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE



LIFE SCIENCES

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 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. 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.

Stanmorephysics.com

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 An inorganic constituent of protoplasm is….

A Cholesterol
B Starch
C Water
D Haemoglobin

1.1.2 The organelle where proteins are manufactured is ..

A Chloroplast
B Ribosome
C Centrosome
D Vacuole

1.1.3 The following elements are found in the organic compounds

(i) Hydrogen
(ii) Nitrogen
(iii) Oxygen
(iv) Carbon

Which of the above element/s is not found in carbohydrates?

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

1.1.4 The movement of molecules from a region of high concentration to a region of low concentration until equilibrium is reached.is:

A Translocation
B Diffusion
C Osmosis
D Transpiration.

Stanmorephysics.com

1.1.5 Which ONE of the following is part of the axial skeleton?

A Arms
B Legs
C Hip bone
D Sternum

1.1.6 During which phase of mitosis do chromosomes begin to attach to the spindle fibres?

A Telophase
B Metaphase
C Anaphase
D Prophase

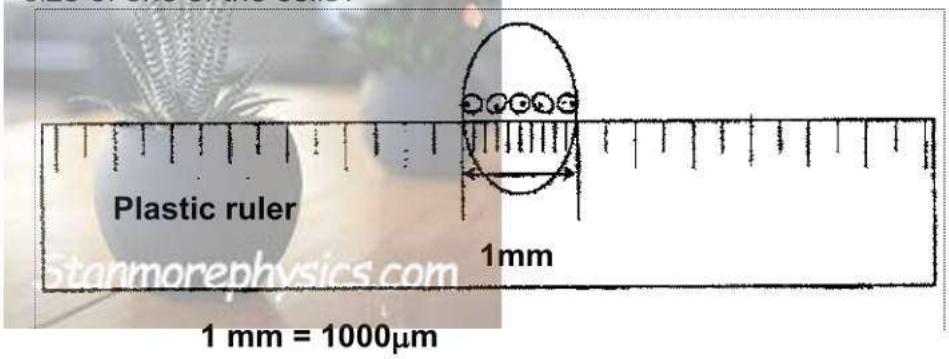
1.1.7 Which ONE of the following is classified as an animal tissue?

A Stomach
B Heart
C Blood
D Kidney

1.1.8 Mitochondrion is an organelle that ..

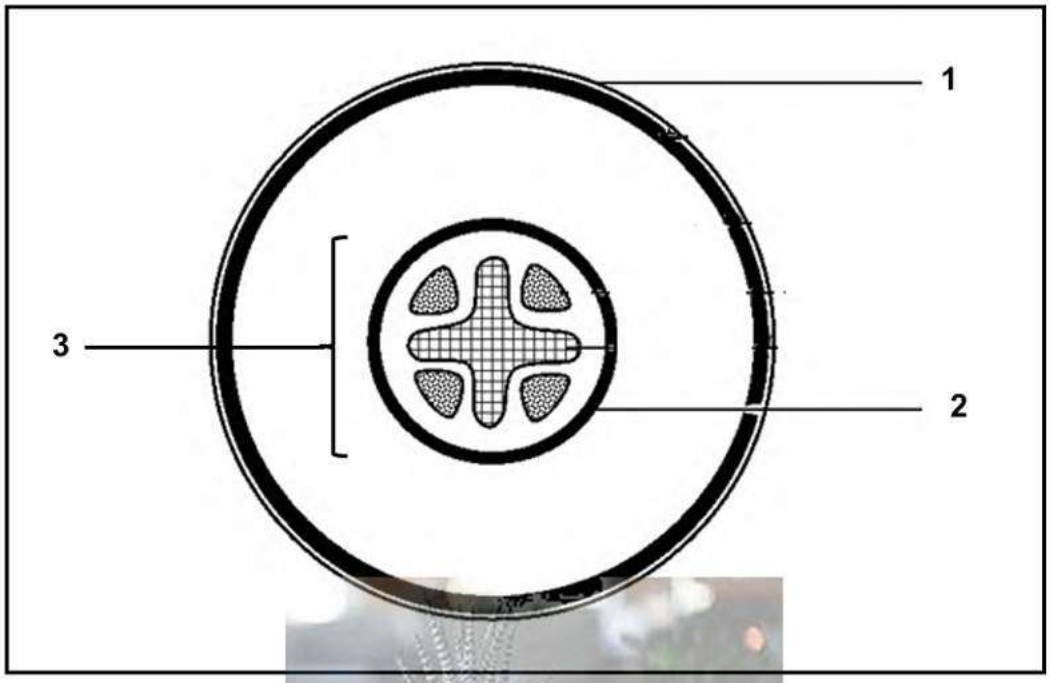
A is the site of cellular respiration.
B absorbs radiant energy from the sun during photosynthesis
C controls all vital activities of the cell
D controls the substances entering the cell.

1.1.9 A grade 10 learner placed a clear plastic ruler across the centre of the view of a compound light microscope as shown below. A row of cells was seen under a low-power magnification. What is the actual size of one of the cells?



A 100 μm
B 10 μm
C 2000 μm
D 200 μm

1.1.10 The diagram below represents a transverse section through a plant root.



Which ONE of the following combinations are correct labels for parts labelled **1**, **2** and **3**?

	1	2	3
A	Xylem	Epidermis	Endodermis
B	Epdermis	Endodermis	Stele
C	Pericycle	Endodermis	Epidermis
D	Vascular tissue	Pith	Pericycle

(10 x 2) **(20)**

Copyright reserved

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 A carbohydrate disaccharide consisting of two sugar units

1.2.2 The monomers of proteins

1.2.3 The structure that holds two chromatids together

1.2.4 A substance that speeds up the rate of chemical reactions in the cells of living organisms

1.2.5 A polysaccharide which is a component of cell walls in plants

1.2.6 A factor that is manipulated in an investigation

1.2.7 Bones that surround and protect the brain

1.2.8 The neuron that carries impulses from the sense organs to the central nervous system.

1.2.9 Green pigment found in plants.

1.2.10 Minerals that are needed in small quantities by living organisms.

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

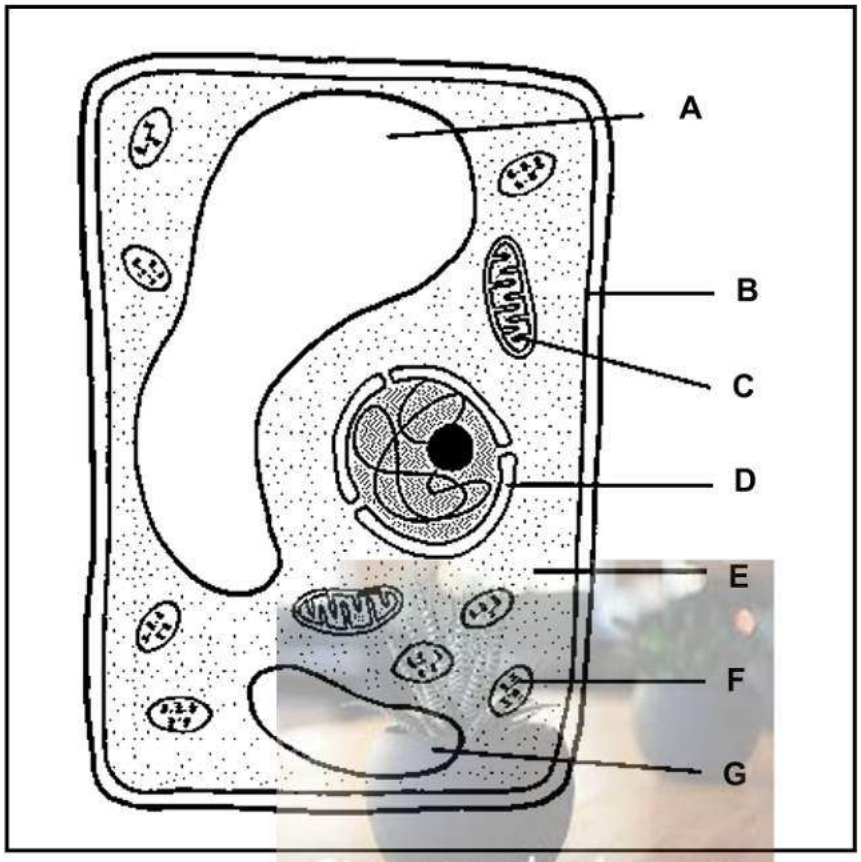
1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

	COLUMN I		COLUMN II
1.3.1	Found in a dicotyledonous root.	A: B:	Starch grains Xylem
1.3.2	Test for proteins	A: B:	Fehling's A and Fehling's B Biuret test.
1.3.3	Connects muscles to bones	A: B:	Ligament Tendon
1.3.4	Site of photosynthesis	A: B:	Ribosomes Lysosomes

(4 x 2) **(8)**

Stanmorephysics.com

1.4 The diagram below shows the structure of a cell.



1.4.1 State whether this cell is a plant or animal cell. (1)

1.4.2 Give TWO visible reasons for your answer to QUESTION 1.4.1 (2)

1.4.3 Provide labels for letters **B, C,** and **E** (3)

1.4.4 Give a function of each of the following:

(a) Organelle **F** (1)

(b) Chromatin network in part **D** (1)

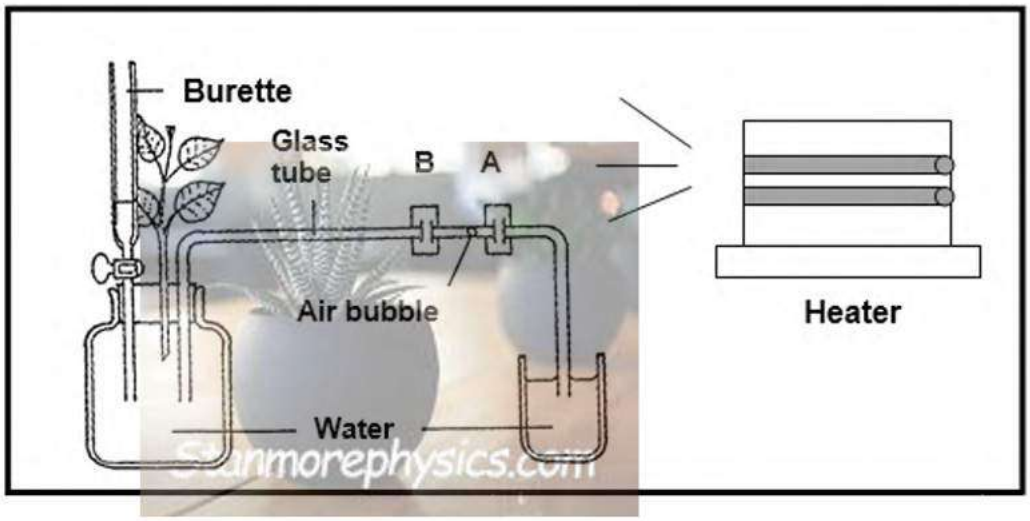
1.4.5 Explain what would happen to the above cell if it were to be put in a solution with a high concentration of salt. (4)
(12)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the diagram below and answer the questions that follow.



2.1.1 What is the name of the apparatus illustrated above? (1)

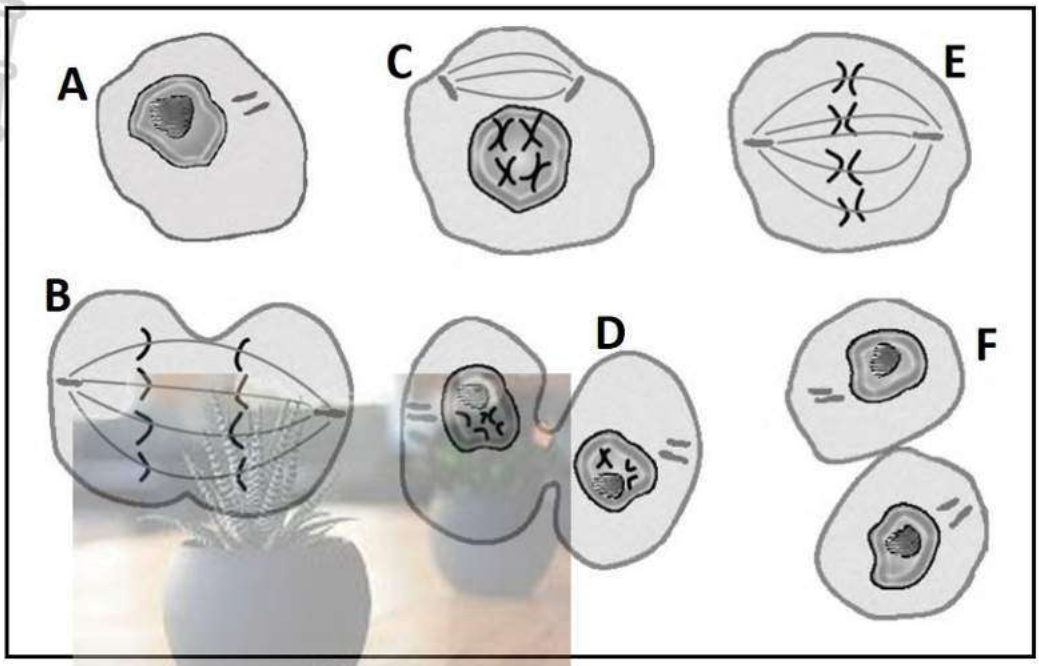
2.1.2 State the aim of the above experiment. 1)

2.1.3 How can the air bubble be moved from **B** to **A**? (3)

2.1.4 Explain what would happen when the underside of each leaf was covered with Vaseline. (3)

2.1.5 List FOUR precautionary measures that should be taken to make the results of the experiment more reliable. (4)
(10)

2.2 The diagrams below show the different phases of mitosis.



Stanmorephysics.com

2.2.1 Name the phase that is represented by diagram **F.** (1)

2.2.2 Describe TWO observable events that take place in Diagram **E** (2)

2.2.3 Using the letters, **A** to **F**, arrange all the phases in the correct sequence. (2)

2.2.4 (a) During which phase does DNA replication take place? (1)

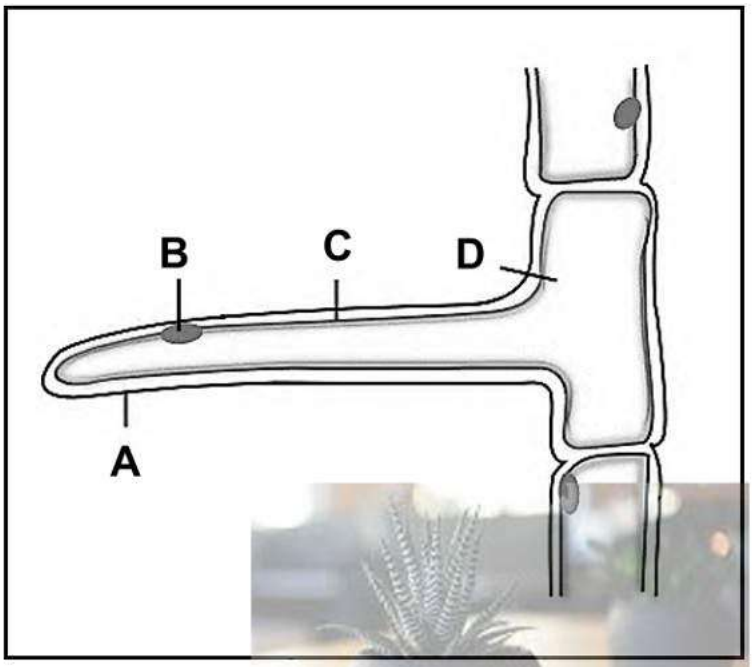
(b) Describe how telophase in plant cells differs from that in animal cells (2)

2.2.5 How many chromosomes will each of the daughter cells in the diagram contain at the end of mitosis . (1)

2.2.6 State THREE reasons why mitosis is of biological importance to living organisms. (3) **(12)**

Copyright reserved

2.3 The diagram below part of the root showing a fully grown root hair.



Stanmorephysics.com

2.3.1 State the part of the root where the root hair is found (1)

2.3.2 Identify the parts labelled **B** and **D**. (2)

2.3.3 Explain TWO ways in which the root hair cell is structurally suitable to perform its function. (4)

2.3.4 Explain ONE difference related to permeability of parts **A** and **C.** (4)

2.3.5 Name THREE forces that are responsible for the upward movement of water from the roots to the leaves (3)
(14)

2.4 Read the extract below.

Leukemia and Bone Marrow Transplant

Leukemia, is a type of cancer which affects blood cells. This disease (as well as many other) is caused by abnormal stem cells in the bone marrow producing defective or immature blood cells. These abnormal stem cells are usually treated by chemotherapy. Unfortunately, the large doses of chemotherapy required also destroy healthy bone marrow. A bone marrow transplant is necessary to replace the diseased and damaged bone marrow.

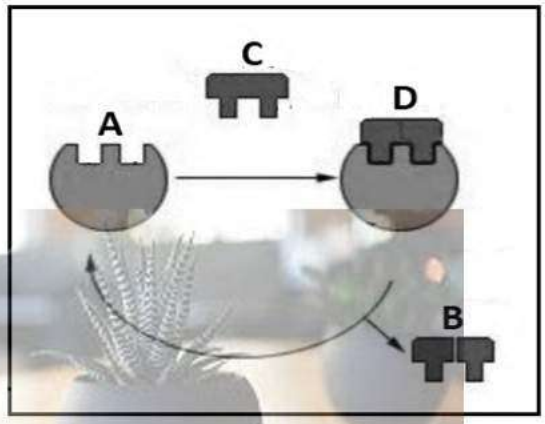
2.4.1 What is cancer? (2)

2.4.2 Describe how is leukemia caused. (1)

2.4.3 Why is bone marrow transplant necessary? (1)

2.4.4 State TWO other ways of treating cancer that are not mentioned in the extract. (2)
(6)

2.5 Study the diagram below and answer questions that follow.



2.5.1 What does the above diagram represent? (1)

2.5.2 Identify the structures labelled **B** and **D** respectively (2)

2.5.3 The arrows in the diagrams show that structure **A** retains the same shape throughout the process.

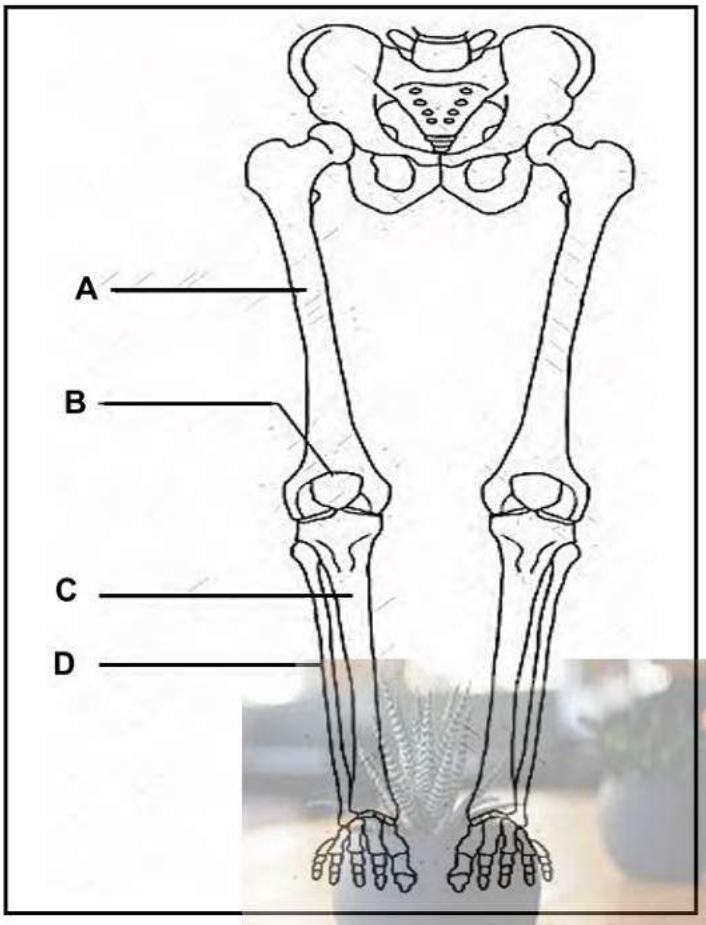
Explain this statement. (1)

2.5.4 Explain what happens to structure **A** when it is exposed to temperatures above the optimum temperature (2)
(8)
[50]

Copyright reserved

QUESTION 3

3.1 The diagram below shows part of a human skeleton



Stanmorephysics.com

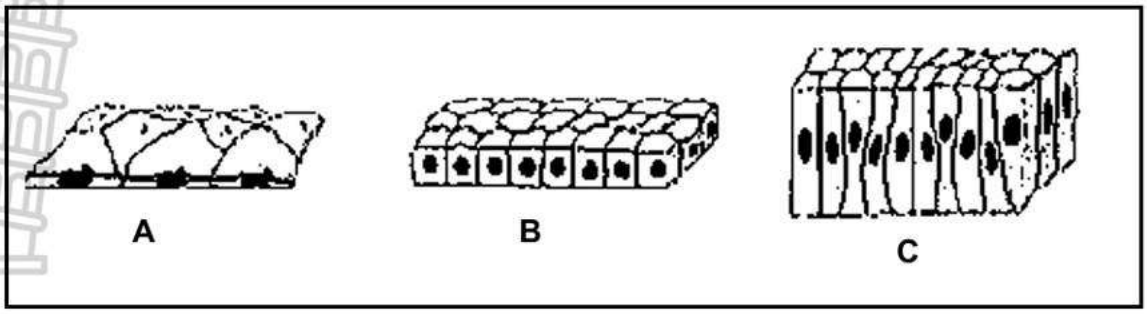
3.1.1 Identify the parts labelled **A**, **B** and **D** (3)

3.1.2 To which of the two main sections of the skeleton do these bones belong? (1)

3.1.3 Draw a well-labelled diagram of the part labelled **A.** (5)

3.1.4 Apart from protection, list any other TWO functions of a human skeleton. (2)
(11)

3.2 The diagram below shows different animal tissues.

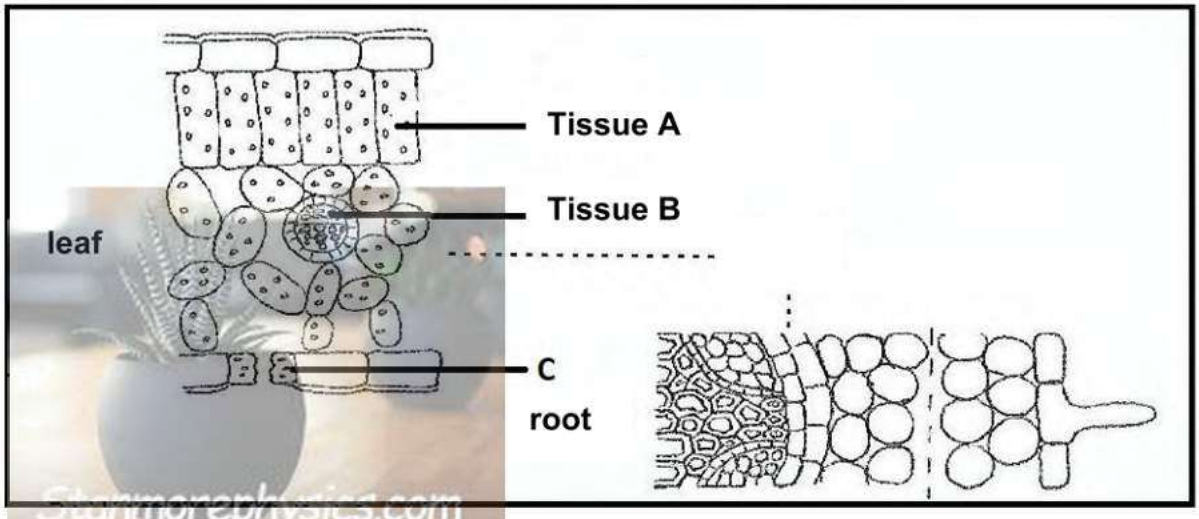


3.2.1 Identify the tissues labelled **A** and **C** (2)

3.2.2 State the difference in function between tissue **A** and **C.** (2)

3.2.3 Explain the consequences of damage to tissue **B**. (2)
(6)

3.3 The diagrams below show cross sections through a dicot leaf and a root.



Stanmorephysics.com

3.3.1 Name the tissue that transports manufactured organic food from the leaf to the other parts of the plant. (1)

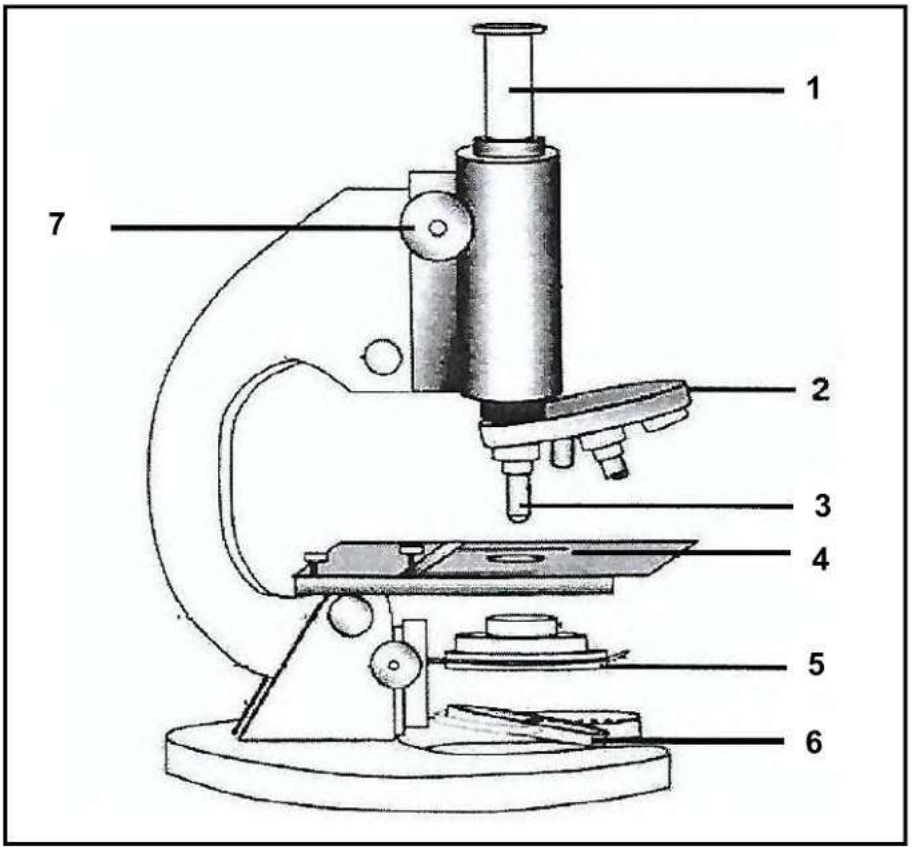
3.3.2 Identify the tissues labelled **A** and **B**. (2)

3.3.3 State ONE structural difference between the cell labelled **C** and the cell attached to it. (2)

3.3.4 Name the function of the cell labelled **C** (1)

3.3.5 Explain TWO visible structural adaptations that assist the plant In the prevention of water loss. (4)
(10)

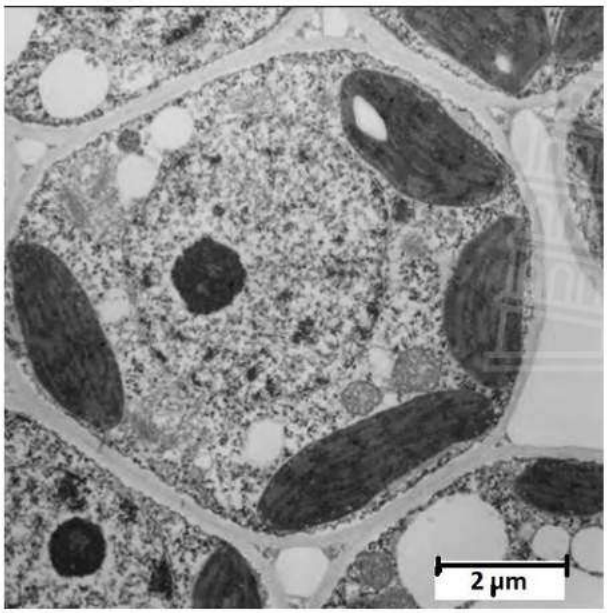
3.4 The diagram below shows a light microscope.



3.4.1 Label the parts numbered **1** and **7**. (2)

3.4.2 What is the function of the part labelled **4**? (1)

3.4.3 Calculate the size of a plant cell from the micrograph given below.



(4)
(7)

3.5 Eight grade 10 learners investigated the effect of a salt solution on the size (turgidity) of onion rings.

The procedure was as follows:

- 100 onion rings of the same size from the same type of plant were cut out from onion bulbs.
- The onion rings were all put on a weighing scale at 08h30 and it was found that they all weighed 8 grams each.
- The learners divided the onion bulbs into two groups of 50.
- One group that was labelled Group **A** was placed in one large beaker that was full of water.
- At the same time the other Group labelled group **B** was placed in another large beaker of the same size that contained a mixture of salt and water (a salt solution).
- All the onion rings were removed from the beakers at 14h30 and put on a weighing scale again. Their mass was measured and recorded and they were then returned to the water and the salt solution as in the beginning.
- Two of the learners who stay in the school hostel were requested to do the same and to record two more readings and record them at 21h30 and 04h30.
- The last reading was recorded by all the learners at 08h30.

Stanmorephysics.com

The table below shows the result of the investigation.

Observation time.	**At the start 08h30**	**14h30**	**21h30**	**04h30**	**08h30**
Group A mass in grams.	8	20	24	24	24
Group B mass in grams.	8	17	15	7	2

3.5.1 Identify the independent variable in this investigation. (1)

3.5.2 List TWO fixed/ controlled variables in this investigation. (2)

3.5.3 State ONE way in which reliability was ensured in this investigation (1)

3.5.4 Calculate the percentage decrease between 21h30 and 08h30 for Group **B** (3)

3.5.5 State the conclusion for this investigation. (2)
(9)

3.6 The table below shows the percentage of incidence of high cholesterol level of in different population groups in the Eastern Cape.

Population group	Percentage of individuals with high cholesterol levels
A	30 %
B	65 %
C	10 %
D	25 %

3.6.1 Draw a bar graph based on the data in the table above (6)

3.6.2 According to the table, which population (**A, B, C** or **D**) is the least affected by high cholesterol? (1)

(7)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150

Copyright reserved