KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 10

LIFE SCIENCES

JUNE 2026

MARKS: 150

TIME: 2½ Hours

NB: This question paper consists of 18 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. 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.
11. Write neatly and legibly.

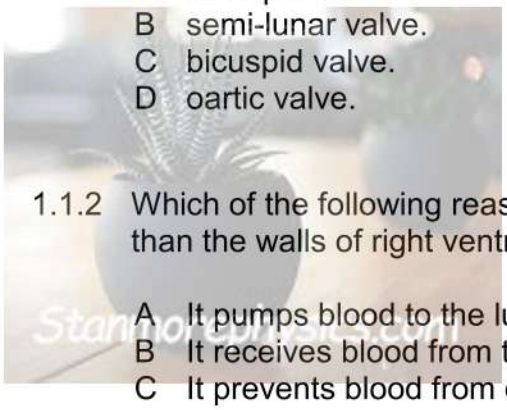
SECTION A

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 to D) next to the question number (1.1.1 to 1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

1.1.1 The valve that prevents blood from flowing back into the left atrium is…

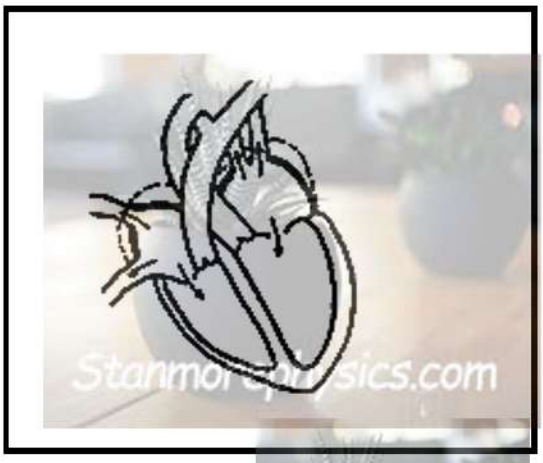
A tricuspid valve.
B semi-lunar valve.
C bicuspid valve.
D oartic valve.




1.1.2 Which of the following reasons make the walls of the left ventricle to be thicker than the walls of right ventricle?

A It pumps blood to the lungs.
B It receives blood from the body.
C It prevents blood from clotting.
D It pumps blood to the entire body.

1.1.3 The following diagram shows a phase during the cardiac cycle.



The following is a list of events taking place in the above phase:

(i) Atria contract
(ii) Bicuspid valve open
(iii) Blood is forced from the atria into the ventricles
(iv) Ventricles fill with blood

Which of the following combination are the events in atrial systole in a sequential order?

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

1.1.4 The connective tissue which is flexible and provides support in the nose, ears and joints is….

A Ligaments
B Bone
C Cartilage
D Areolar

1.1.5 Which of the following is likely to happen when spindle fibres are not formed?

A Chromosomes will not replicate
B Chromosomes will not move to opposite poles
C Chromosome will double up
D Chromosomes will not form

1.1.6 Skin cells are constantly replaced when injured.

Which of the following importance's of mitosis best describes the above statement?

Mitosis produces……

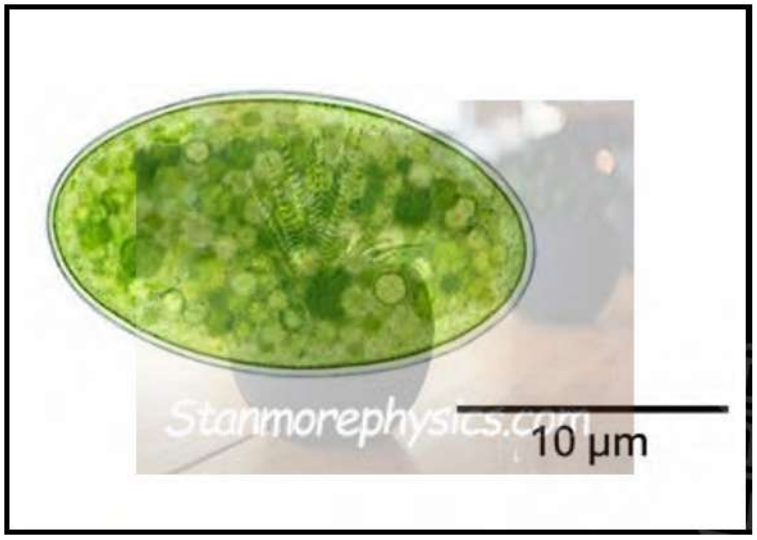
A dissimilar cells for gamete formation.
B dissimilar cells for growth and repair.
C identical cells for growth and repair.
D identical cells for gamete formation.

1.1.7 During an experiment a grade 10 learner notices that a nuclear membrane reforms around two sets of chromosomes at opposite poles of the cell.

Which phase of mitosis is being observed by the learner?

A Interphase.
B Anaphase.
C Metaphase.
D Telophase.

1.1.8 The electron micrograph below shows the chloroplast of a cell.



If the cell visually is about twice the length of the scale bar, what is the actual size of the chloroplast?

A 10 µm
B 20 µm
C 50 µm
D 100 µm

1.1.9 Two plants are placed in identical conditions. Plant **A** has many large leaves, and plant **B** has few small leaves.

Which of the following statements best predicts the difference in their transpiration rate?

A Plant A will have a higher transpiration rate
B Both plants will transpire at the same rate
C Plant B will transpire faster due to smaller leaves
D Plant A will have a low transpiration rate

1.1.10 What will happen if a ring of bark contains the phloem is removed from the stem of a young tree?

A Water will not be transported to the leaves.
B Minerals from the stem will not move to the leaves.
C Transpiration will be increased above the cut.
D Manufactured food cannot be transported to all parts of the plants.

2x10 **(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 1.2.7) in your ANSWER BOOK

1.2.1 The membrane that surrounds and protects the heart.

1.2.2 Organelle that splits into two centrioles during cell division.

1.2.3 The part of a microscope that is used to hold a slide onto the stage.

1.2.4 Disease that results from uncontrolled cell division.

1.2.5 Part of the skeleton that protects the brain.

1.2.6 Tiny blood vessels that link arteries to veins.

1.2.7 A system where blood passes through the heart twice in one complete circuit of the body.

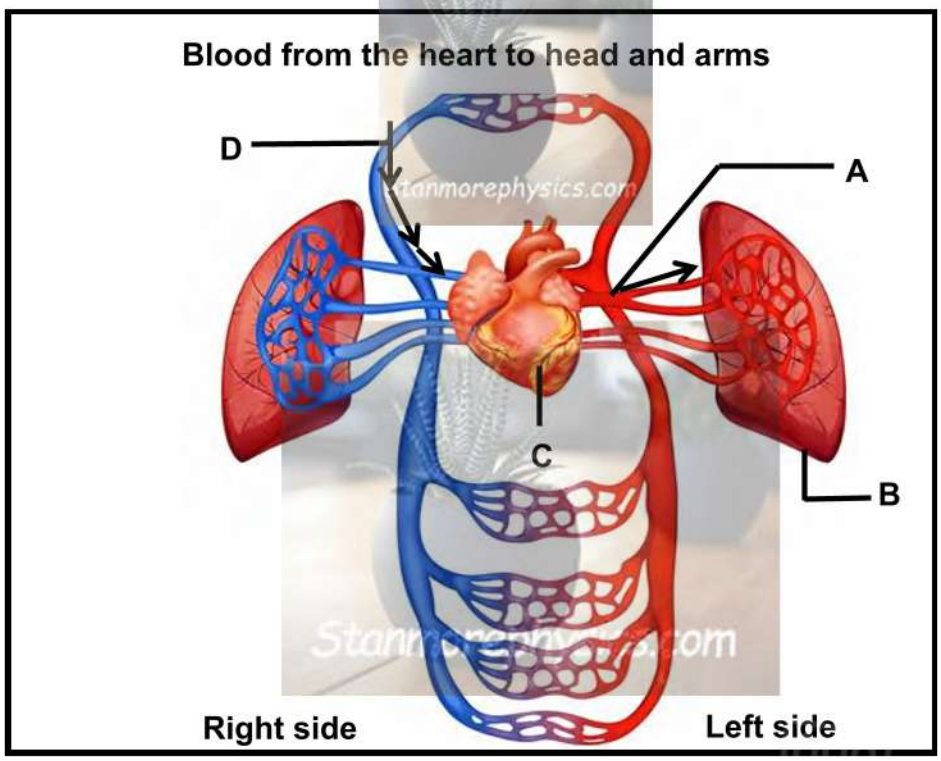
1x7 **(7)**

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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Treatment for cancer	A: Chemotherapy B: Surgery
1.3.2	Contains red, orange and yellow pigment	A: Leucoplast B: Chromoplast

2x2**(4)**

1.4 Diagram below shows the circulatory system of a human.



1.4.1 Identify part:

(a) **B** (1)

(b) **C** (1)

1.4.2 Give only the LETTER and NAME of the artery that

(a) Transport deoxygenated blood from right ventricle to the lungs (2)

(b) Transport deoxygenated blood from upper parts of the body to the right atrium. (2)

1.4.3 Name the muscle that separates the left side of the heart from right side. (1)

1.4.4 Which side (left or right) contains deoxygenated blood? (1)

1.4.5 Give the name of the largest artery in the body. (1)
(9)

1.5 The table below shows the nutritional information on three cereal packets **A, B** and **C.** Each packet has a mass of 500g.

NUTRIENT (g)	CEREAL A	CEREAL B	CEREAL C
Protein	2	9	1
Vitamin C	35	30	60
Sodium	200	270	135
Fats (lipids)	7	36	18
Carbohydrates	50	75	55

1.5.1 Identify the cereal with the least sodium. (1)

1.5.2 Give:

(a) Monomers of fats/ lipids (2)

(b) The inorganic compound from the table (1)

(c) TWO elements making up carbohydrates (2)

1.5.3 State:

(a) The cereal you would recommend for someone who needs a lot of energy for running a race. (1)

(b) Chemical reagent used to test for proteins. (1)

(c) Colour change when tested positive for starch. (1)

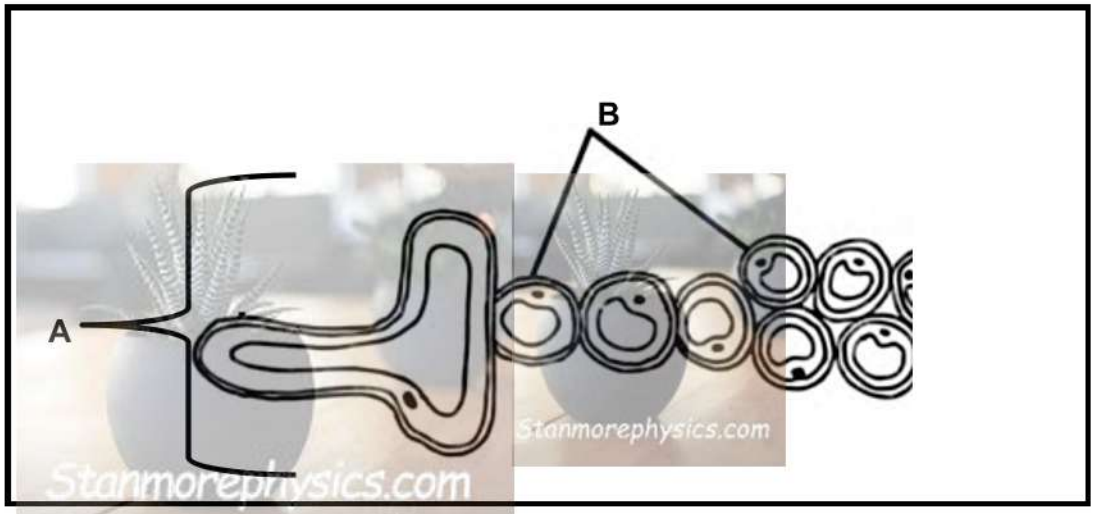
(d) Disease caused by deficiency in vitamin C. (1)
(10)

TOTAL SECTION A 50

SECTION B

QUESTION 2

2.1 The diagram below shows cells/tissues.



2.1.1 Identify part:

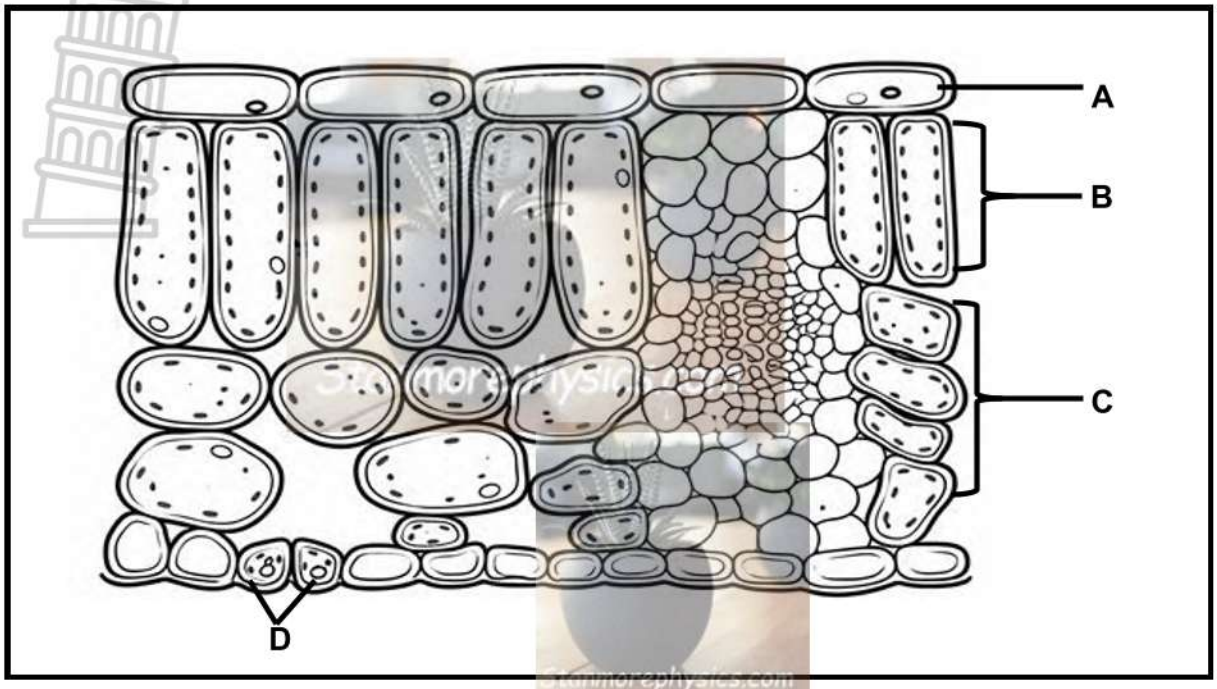
(a) **A** (1)

(b) **B** (1)

2.1.2 Give TWO structural features for part **B**. (2)

2.1.3 Explain TWO structural adaptations that enables part **A** to absorb water. (4)
(8)

2.2 The diagram shows an arrangement of tissues in a cross section of a leaf.



2.2.1 Identify part:

(a) **B** (1)

(b) **C** (1)

2.2.2 Give the LETTER and NAME of the part that is made up of single layer of transparent cells, and it allows light to enter. (2)

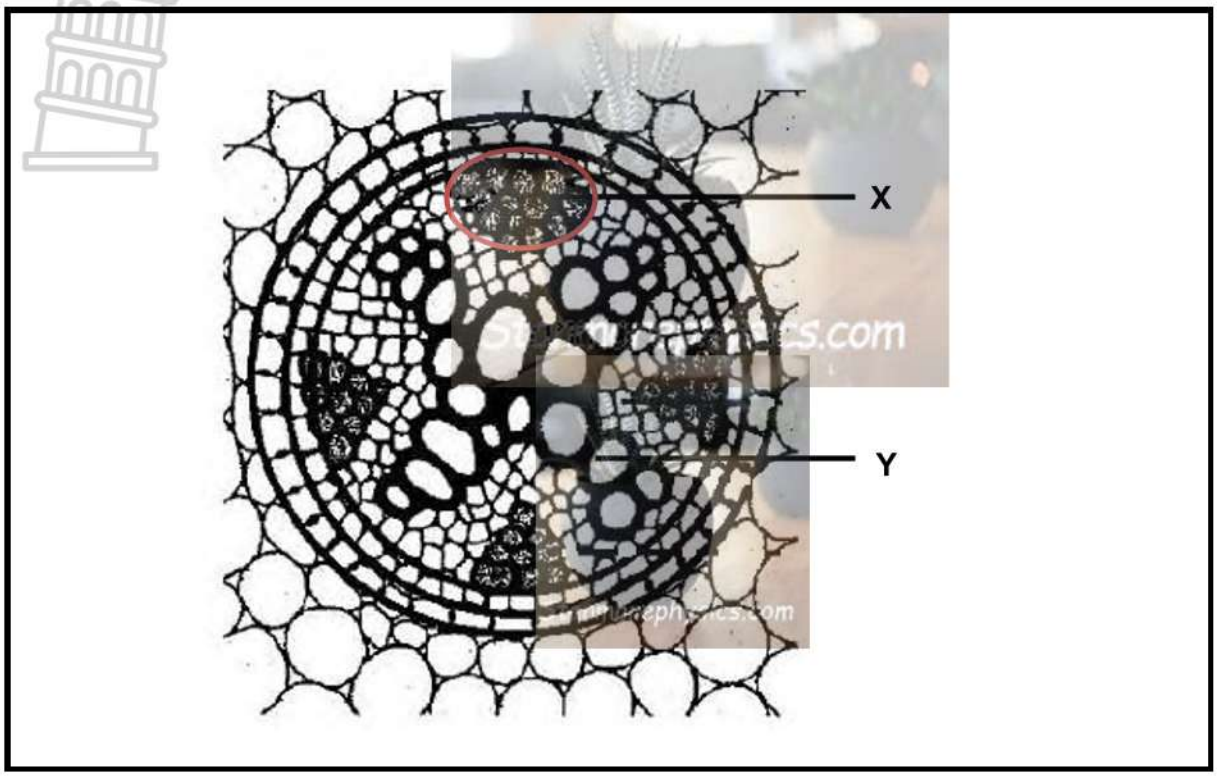
2.2.3 Explain:

(a) The role of intercellular air spaces between part **C.** (3)

(b) How would the function of the leaf be affected if part **B** was rounder in shape than elongated? (4)

(c) The effect of having many part **D** in the leaf on the rate of photosynthesis. (3)
(14)

2.3 Diagram below shows an arrangement of tissues on a root.



2.3.1 If the above diagram was that of a stem, state how would have the plant tissues be arranged? (1)

2.3.2 Tissue **X** has sieve tubes and tissue **Y** has xylem vessels.

Tabulate TWO differences between tissue **X** and tissue **Y**. (5)
(6)

2.4 Grade 10 learners investigated water loss on leaves. They wanted to see which surface of a leaf loses most water.

They set up the investigation in the following way

The procedure was as follows:

- All the three leaves were from the same plant.
- The initial mass was weighed and recorded for all the leaves.
- **Leaf 1: Has no Vaseline**
  Leaf 2: Vaseline covering lower surface
  Leaf 3: Vaseline covering the upper surface
- All the three leaves were left for 24 hours, and their final mass was measured and recorded again.

The table below shows the percentage decrease in mass of the three leaves upon completion of the investigation.

Leaf	Surface covered with Vaseline	Mass/g		Percentage decrease in mass
		Start	End	
1	Neither	1.9	1.3	32
2	Lower	1.8	1.6	11
3	upper	2.2	1,4	?

2.4.1 Identify the independent variable for the above investigation. (1)

2.4.2 Write the aim for the above investigation. (2)

2.4.3 State:

(a) TWO planning steps for the above investigation. (2)

(b) The leaf that was used as a control. Give a reason for your answer. (3)

2.4.4 Calculate the percentage decrease in the mass of leaf 3. Show ALL your workings. (3)

2.4.5 Explain why a percentage decrease in mass was used to compare the results. (2)

2.4.6 State the conclusion of the above investigation. (2)
(15)

2.5 A scientist investigated the number of cells observed in four different types of animal tissues under a microscope.

The results are shown in the table below

Type of tissue	Number of cells observed
Epithelial tissue	50
Muscle tissue	35
Nervous tissue	20
Connective tissue	45

2.5.1 Name the type of epithelial tissue that has cube-shaped cells that line the kidney and some glands. (1)

2.5.2 Draw a bar graph to represent the information in the table. (6)
(7)

TOTAL QUESTION 2 50

QUESTION 3

3.1 Read the following extract.

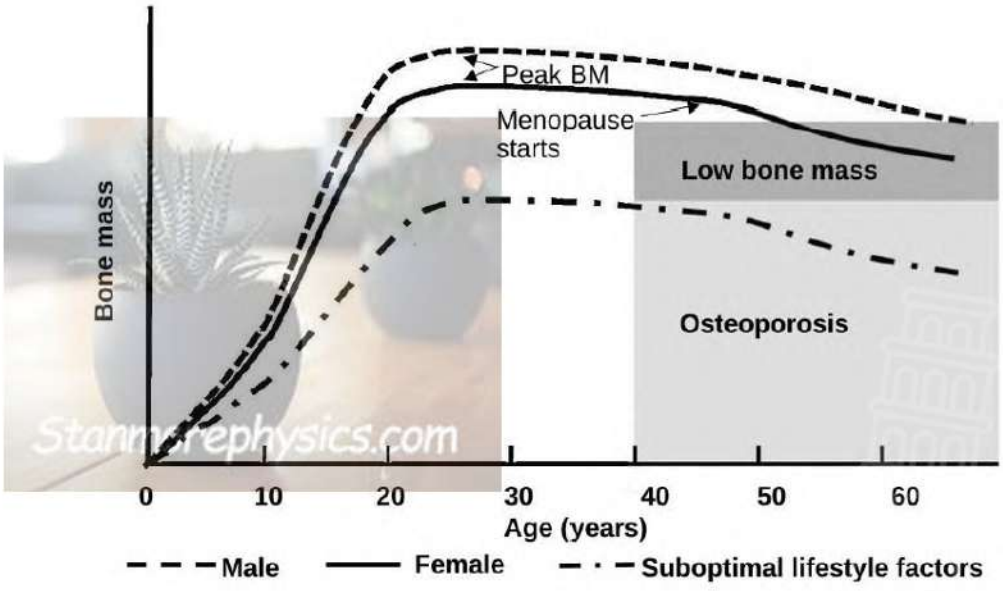
Osteoporosis is a disease in which bones become weak, brittle and more likely to break. It occurs when the body loses too much bone mass or does not produce enough new bone. As a result, the internal structure of the bone becomes less dense and develops spaces, making it fragile.

This condition is common in older adults, especially women after menopause, because of a decrease in calcium levels and hormones such as oestrogen. However, it can also affect younger people due to poor nutrition, lack of exercise, or certain medical conditions.

Bones are living tissues that are constantly being broken down and rebuilt. In healthy individuals, this process is balanced. In osteoporosis, bone breakdown happens faster than bone formation leading to weaker bones. Common fracture sites include hips, spines and wrists.

Prevention includes a diet rich in calcium and vitamin D, regular weight-bearing exercise and avoid smoking and excessive alcohol consumption.

The graph shows the prevalence of osteoporosis in males and females.



3.1.1 Give the age that:

(a) Bone mass reaches its peak. (1)

(b) Menopause starts. (1)

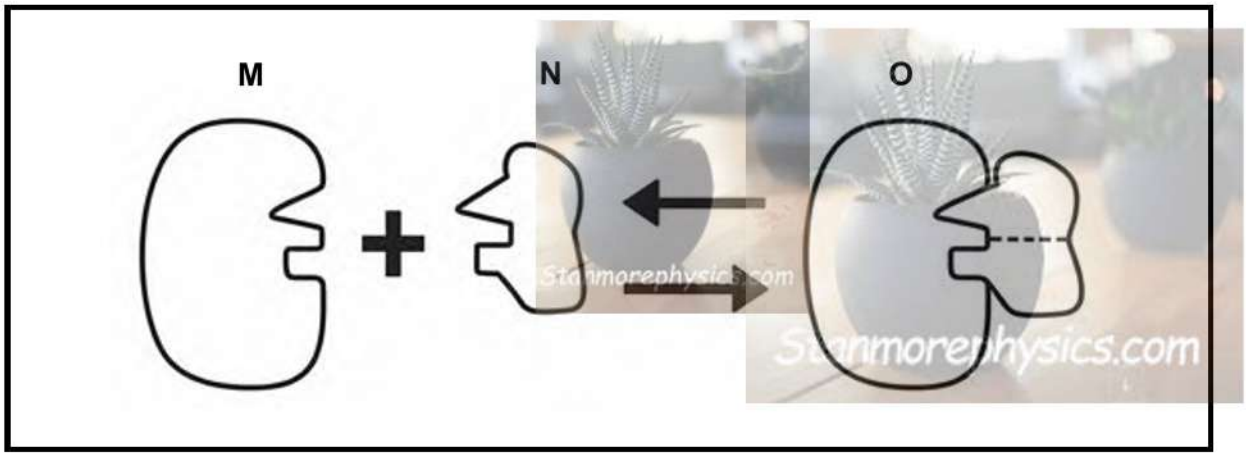
3.1.2 State TWO ways to prevent osteoporosis that are stated in the extract. (2)

3.1.3 Explain:

(a) How an imbalance between bone breakdown and bone formation leads to osteoporosis? (3)

(b) Why osteoporosis is more common in women after menopause. (2)
(9)

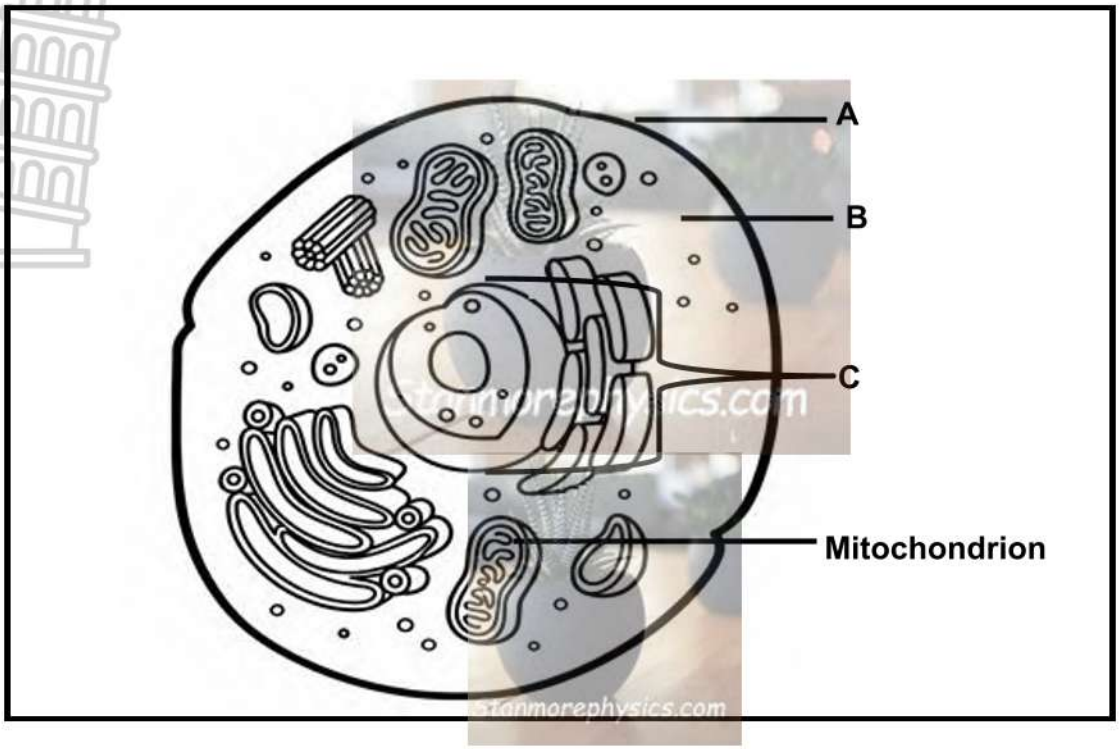
3.2 The diagram below shows a lock and key model of enzymes.



3.2.1 Give the LETTER and the NAME of the diagram that denatures when temperatures are high. (2)

3.2.2 Using the above illustration, describe the functioning of an enzyme. (6)
(8)

3.3 The diagram below shows an animal cell.



3.3.1 Identify part **A.** (1)

3.3.2 Give:

(a) The LETTER of the part that provides the medium for chemical reaction in the cell. (1)

(b) TWO visible reasons why this diagram is NOT a plant cell. (2)

3.3.3 State TWO functions of part **C.** (2)

3.3.4 Part **B** is a jelly like substance made up of mainly water (90%) and plays significant roles to other organelles inside the cell.

Explain how a decrease in part B would affect the functioning of the cell. (4)

3.3.5 A muscle cell requires a large amount of energy during exercise.

Explain the effect a decrease in number of mitochondria would have on muscle performance. (3)
(13)

3.4 An egg is similar to one large cell. To prepare for an experiment, Steve and Mawaqa put two raw eggs in an acid (which removed their shells). Each egg is then surrounded by a membrane only.

They treated the eggs in the following way:

- **Beaker A**: had an egg put in **tap water**
- **Beaker B**: had an egg put in a **sea water**
- They were both kept three days in these beakers
- They were examined and noticeable change in their shape and size was observed

The results are shown below

3.4.1 Define the term *osmosis.* (2)

3.4.2 Give TWO ways in which the validity of this investigation was ensured. (2)

3.4.3 State ONE way in which the reliability of this investigation can be increased. (1)

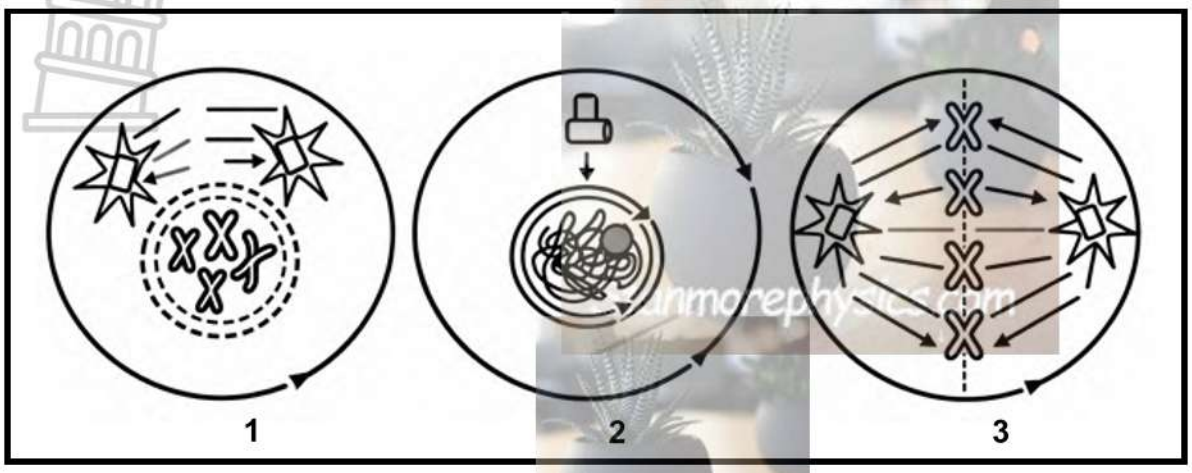
3.4.4 State the appearance of the eggs in beaker:

(a) **A** (1)

(b) **B** (1)

3.4.5 Explain the change in size and shape of egg in **beaker A**. (5)
(12)

3.5 The diagrams below show phases occurring in mitosis. The diagrams are not in the correct order.



3.5.1 Identify phase in diagram **1**. (1)

3.5.2 State the process taking place in diagram **2**. (1)

3.5.3 How many chromosomes will be in each daughter cell at the end of this cell division. (1)

3.5.4 Re-arrange the diagrams above in the correct order as they would occur in mitosis. (2)

3.5.5 Name and describe the events taking place in phase **3**. (3)
(8)

TOTAL QUESTION 3 [50]

TOTAL SECTION B 100
GRAND TOTAL 150

KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

FINAL

STANDARDISED PROVINCIAL ASSESSMENT

GRADE 10

LIFE SCIENCES

MARKING GUIDELINE

JUNE 2026

Marks: 150

N.B This marking guideline consist of 11 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only a part of it is required**
   Read all and credit the relevant part.

4. **If comparisons are asked for but descriptions are given**
   Accept if the differences/similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6 **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks.

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.

10 **Wrong numbering**
   If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
   Do not accept.

12. **Spelling errors**

If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.

14. **If only the letter is asked for but only the name is given (and vice versa), DO NOT credit.**

If units are not given in measurements

15. Candidates will lose marks. Memorandum will allocate marks for units separately.

16. **Be sensitive to the sense of an answer, which may be stated in a different way.**

Caption

17. All illustrations (diagrams, graphs, tables, etc.) must have a caption.

Code-switching of official languages (terms and concepts)

18. A single word or two that appear(s) in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1 1.1.1 C✓✓
1.1.2 D✓✓
1.1.3 D✓✓
1.1.4 C✓✓
1.1.5 B✓✓
1.1.6 C✓✓
1.1.7 D✓✓
1.1.8 NO ANSWER
1.1.9 A✓✓
1.1.10 D✓✓

(2 x 9) **(18)**

1.2 1.2.1 Pericardium✓
1.2.2 Centrosome✓
1.2.3 Clip✓/ clamp
1.2.4 Cancer✓
1.2.5 Cranium✓
1.2.6 Capillaries✓
1.2.7 Double circulation✓

(1 x 7) **(7)**

1.3 1.3.1 Both A and B✓✓
1.3.2 B only✓✓

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

1.4 1.4.1 (a) (Left) lung✓ (1)

(b) Heart ✓ (1)

1.4.2 (a) A✓ Pulmonary artery✓ (2)

(b) NO ANSWER

1.4.3 Septum✓ (1)

1.4.4 Right ✓ (1)

1.4.5 Aorta✓ (1)
(7)

1.5	1.5.1	Cereal C✓		(1)
	1.5.2	(a) - Glycerol✓ - Fatty acids✓		(2)
		(b) Sodium✓		(1)
		(c) - Carbon ✓ - Hydrogen✓ - Oxygen✓ **(Mark first TWO only)**	Any	(2)
	1.5.3	(a) Cereal B✓		(1)
		(b) Millons reagent✓/ Biuret test		(1)
		(c) Blue-black✓/ purple/Violet		(1)
		(d) Scurvy ✓/ bleeding gums		(1) **(10)**

TOTAL SECTION A: 46

SECTION B

QUESTION 2

2.1 2.1.1 (a) Root hair✓ (1)

(b) Parenchyma✓ cells (1)

2.1.2
- Round✓/ oval in shape
- Have thin cell walls✓
- Have intercellular air spaces✓
- Have large vacuoles✓ Any (2)

(Mark first TWO only)

2.1.3
- Have large surface area✓ for water to enter✓
- They are thin✓ fit between the soil particles and come into contact with the soil water✓
- They have large vacuole with low water potential✓ so water can move from the soil and enter them✓ (Any 2 x 2) (4)

(Mark first TWO only) **(8)**

2.2 2.2.1 (a) Palisade mesophyll✓ cells (1)

(b) Spongy mesophyll✓cells (1)

2.2.2 A✓ Epidermis✓ (2)

2.2.3 (a)
- Allows fast diffusion of carbon dioxide and oxygen✓
- to and from the parenchyma cells✓
- for photosynthesis✓
- and cellular respiration✓ Any (3)

(b)
- There would be less light absorption✓
- and number of chloroplast will also be reduced✓
- Causing low photosynthesis ✓
- Leading to less glucose produced✓
- Thus slowing the plant growth and energy supply ✓ Any (4)

(c)
- Increased gas exchange✓ / more carbon dioxide will enter
- And more oxygen will leave the leaf✓
- Increasing the rate of photosynthesis✓ (3)

(14)

2.3 2.3.1 In a ring✓/xylem and phloem are arranged along the same radius (1)

2.3.2

Tissue X/ Phloem	Tissue Y/Xyem
- Conduct dissolved food✓	- Conduct waters and dissolved mineral salts✓
- Walls are thin✓ /made up of cellulose	- Walls are thickened✓ /lignified
- Sieve plates present✓	- Cross walls perforated✓ / absent
- Transport is from leaves to roots✓	- Transport is from root to leaves✓

Table + Any (2 x 2) (5)
(6)

2.4 2.4.1 Surface of the leaf✓ (1)

2.4.2 To determine which surface of the leaves loses most water✓✓ (2)

2.4.3 (a) - Type of leave✓
- Decide on recoding tool✓
- Decide on the duration of the investigation✓ Any (2)

(Mark the first TWO only)

(b) NO ANSWER

2.4.4 $\left[\frac{2.2 - 1.4}{2.2}\right]$ ✓ x 100✓

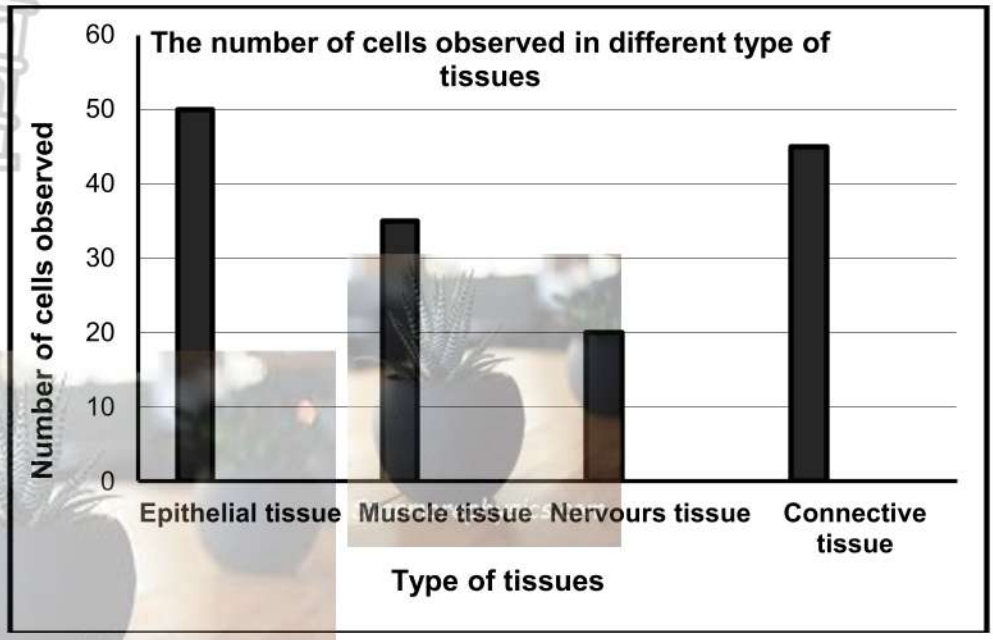
= 36%✓ (3)

2.4.5 NO ANSWER

2.4.6 More water is lost from the lower surface of the leaf✓✓ (Vaseline is applied to the upper surface) (2)
(10)

2.5 2.5.1 Cuboidal epithelial✓ tissue (1)

2.5.2



MARKING CRITERIA FOR THE GRAPH:

Criteria	Elaboration	Mark
Correct type of graph **(T)**	Bar graph drawn	1
Caption of graph **(C)**	Both variables included	1
Axis Labels **(L)**	X- and Y-axis correctly labelled with units	1
Scale for X and Y-axis **(S)**	- Equal space and width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of co-ordinates **(P)**	- 1 to 3 co-ordinates plotted correctly - ALL 4 co-ordinates plotted correctly	1 2

(6)
(7)
[45]

QUESTION 3

3.1 3.1.1 (a) 25 years✓ (accept range 24 - 26) (1)

(b) 45 years✓ (accept range 44 – 46) (1)

3.1.2 - Diet rich in calcium and vitamin D✓
- Regular weight-bearing exercise✓
- Avoid smoking and excessive alcohol consumption✓ (2)
(Mark first TWO only)

3.1.3 (a) - Bone tissue is constantly broken down and rebuild✓
- In osteoporosis, bone breakdown occurs faster than formation✓
- This results in decreased bone density, making bones weak and fragile✓ (3)

(b) After menopause:

- Levels of hormone oestrogen decrease✓
- Oestrogen helps maintain bone density, so its decrease leads to increased bone loss✓ (2)
(9)

3.2 3.2.1 M ✓ Enzyme✓ (2)

3.2.2 - Each enzyme has a specific shape✓
- The substrate✓
- on which the enzyme works fit into the enzyme✓
- An enzyme-substrate complex is formed✓
- A chemical reaction occurs and the substrate is changed✓
- The enzyme and the product are then separated✓
- The enzyme is free and ready to react with a substrate again✓ (6)
(8)

3.3 3.3.1 Cell membrane✓ (1)

3.3.2 (a) B✓ (1)

(b) - No chloroplast✓
- No large vacuole✓
- No cell wall✓
- Irregular shape✓ Any (2)

(Mark first TWO only)

3.3.3
- Control all the activities of the cell✓
- Transmits hereditary characteristics from parents to offspring✓
- Controls the production of enzymes✓ Any (2)

(**Mark first TWO only**)

3.3.4
- There will be a decrease in cell size✓ leading to
- Leading to fewer organelles being supported✓
- Reduced metabolic reactions✓
- Poor transport of substances✓
- All these can lead to cell malfunction or death✓ Any (4)

3.3.5
- Less energy will be produced✓
- Causing muscle cells fatigue more quickly✓
- Leading to muscle weakness/cramps and reduced endurance✓ (3)

(13)

3.4 3.4.1
- Movement of water molecule from high water potential area to low water potential✓
across (differentially permeable) membrane✓ (2)

3.4.2
- Both shells were removed/surrounded by membrane only✓
- Both eggs were raw✓
- Same type of beakers✓ Any (2)

(**Mark first TWO only**)

3.4.3
- Increase sample size/ number of eggs✓
- Repeat investigation several times✓ Any (1)

(**Mark first ONE only**)

3.4.4 (a) Swollen✓/ increased in size (1)

(b) Shrunken✓/ decreased in size (1)

3.4.5
- The water potential in the tap is higher✓
- than in the egg✓
- Water will move from the high-water potential in tap water to low water potential in an egg✓
- that results in the egg swelling / increasing in size✓
- because water is entering the egg through the egg membrane✓ (5)

(12)

3.5 3.5.1 Prophase✓ (1)

3.5.2 DNA replication✓ (1)

3.5.3 Four✓/4 (1)

3.5.4 2, 1, 3✓✓ (2)

3.5.5
- Metaphase✓*
- Chromosome are arranged along the equator✓
- Spindle fibres attaché to chromosomes✓
- through centromere✓ Any (3)

(8)
[50]

TOTAL SECTION B	**95**
GRAND TOTAL	**141**

Conversion Table:

0 – 7	No mark
8 – 23	+ 1
24 – 39	+ 2
40 – 54	+ 3
55 – 74	+ 4
75 – 85	+ 5
86 – 100	+ 6
101 - 116	+ 7
117 – 132	+ 8
133 - 141	+ 9