KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE COMMON TEST

2025

MARKS: 150

TIME: 2½Hours

N.B This question paper consist 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. 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 - 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 blood vessel that carries blood to the kidneys is the …

A renal vein.
B hepatic vein.
C hepatic artery.
D renal artery.

1.1.2 The first scientist to see living cells using microscope is …

A Robert Hooke.
B Gregor Mendel.
C Antonie Van Leeuwenhoek.
D Charles Darwin.

1.1.3 The chemical used to test for glucose is …

A ether.
B Benedict's solution.
C iodine solution.
D Millon's reagent.

1.1.4 The following elements are found in the organic compounds.

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

Which ONE of the following is the CORRECT combination of elements found in carbohydrates?

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

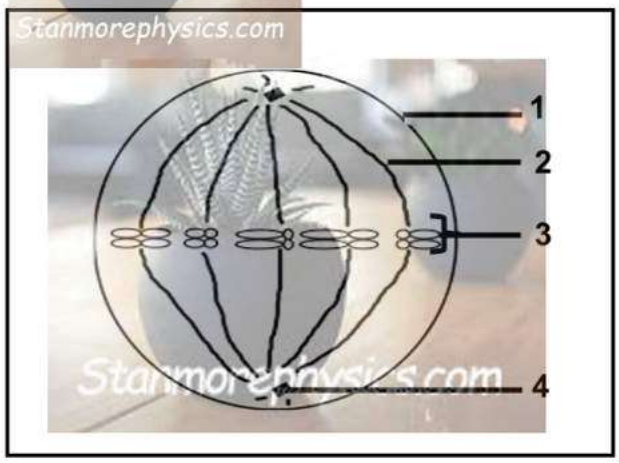
1.1.5 Which ONE of the following parts form the axial skeleton?

A Skull, pectoral girdle, sternum, and lower limbs
B Sternum, arms, ribs and legs
C Ribs, upper limbs, lower limbs and sternum
D Skull, vertebral column, ribs and sternum

1.1.6 The type/s of skeleton/s found in snail is/ are …

A endoskeleton.
B exoskeleton.
C hydrostatic skeleton.
D exoskeleton and endoskeleton.

1.1.7 The diagram below shows a phase in mitosis.



	1	2	3	4
A	Nuclear membrane	Spindle fibres	Chromosome	Centrosome
B	Cell membrane	Chromosome	Centrosome	Spindle fibres
C	Nuclear membrane	Centrosome	Chromosome	Spindle fibres
D	Nuclear membrane	Spindle fibre	Centrosome	Chromosome

1.1.8 The instrument used to measure the rate of transpiration is called …

A thermometer.
B potometer.
C photometer.
D hectometre.

1.1.9 Which of the following consist of sclerenchyma cap, phloem, cambium, and xylem?

A Pith
B Epidermis
C Vascular bundle
D Cortex

1.1.10 Which of the following parts form part of phloem tissue?

A Tracheids and sieve tubes.
B Xylem vessels and tracheids.
C Sieve tubes and companion cells.
D Companion cells and tracheids.

(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 1.2.9) in your ANSWER BOOK.

1.2.1 A large molecule formed when more than two monosaccharides are joined together

1.2.2 Specialised cell in ciliated columnar epithelial tissue which produce mucus

1.2.3 Monomers of protein

1.2.4 The plastid that gives red, yellow and orange pigment to plants

1.2.5 Part of human skull that encloses and protects the brain

1.2.6 The upper chambers of the heart

1.2.7 Connective tissue containing a dense network of collagen fibres

1.2.8 Conducting tissue that transport manufactured food from the leaves to all parts of the plant

1.2.9 Plant organ that has vascular bundles arranged in a ring

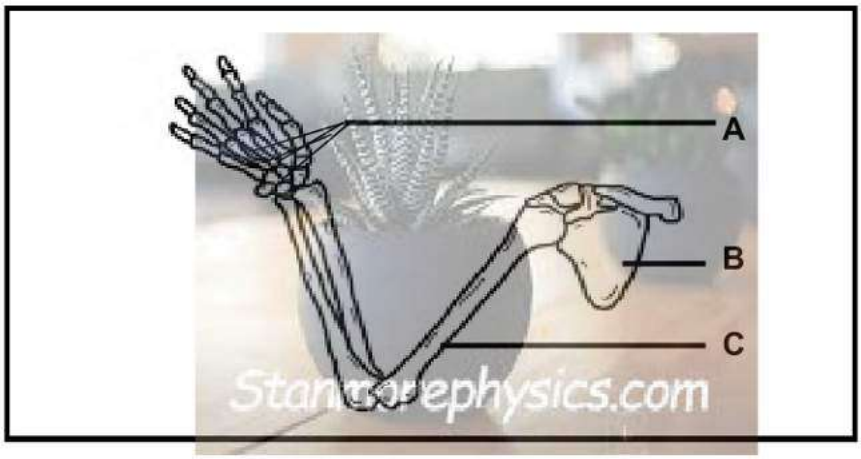
(9 x 1) **(9)**

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 1.3.4) in the ANSWER BOOK.

	COLUMN I	COLUMN II	
1.3.1	Tissue that joins bone to bone	A: B:	Ligaments Tendons
1.3.2	Provides mechanical support to the plant	A: B:	Sclerenchyma Collenchyma
1.3.3	Contains digestive enzymes	A: B:	Lysosomes Golgi body
1.3.4	Contains bone cells in hard matrix	A: B:	Cartilage Ligaments

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

1.4 The diagram below shows part of a human skeleton.



1.4.1 Identify part:

(a) **B** (1)

(b) **C** (1)

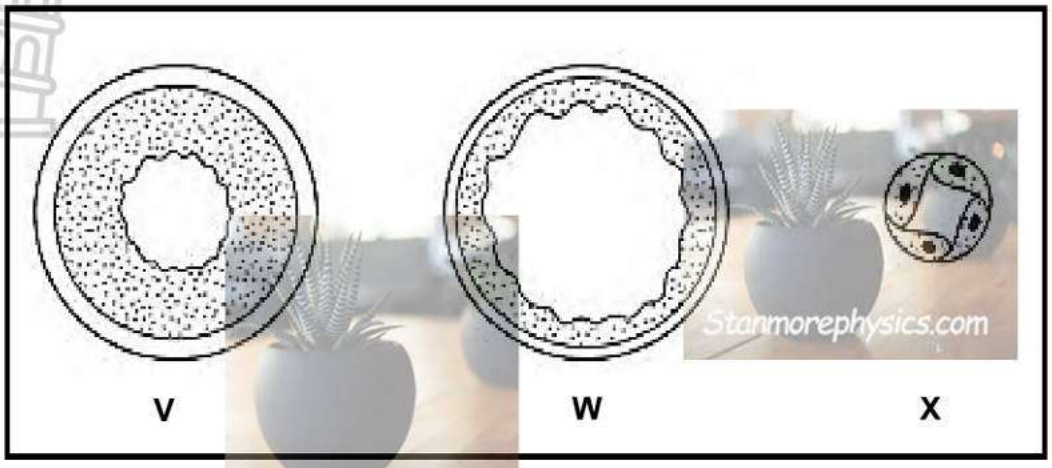
1.4.2 Identify:

(a) The LETTER and the NAME of the part that provide base for finger movement and flexibility. (2)

(b) The part of the skeleton which the above diagram represents. (1)

(c) Any TWO joints found in the above diagram. (2)
(7)

1.5 The diagrams below show cross sections through three types of blood vessels.



1.5.1 Identify blood vessel:

(a) **W** (1)

(b) **X** (1)

1.5.2 Give the LETTER and the NAME of the blood vessel that:

(a) Has thick muscles and elastic (2)

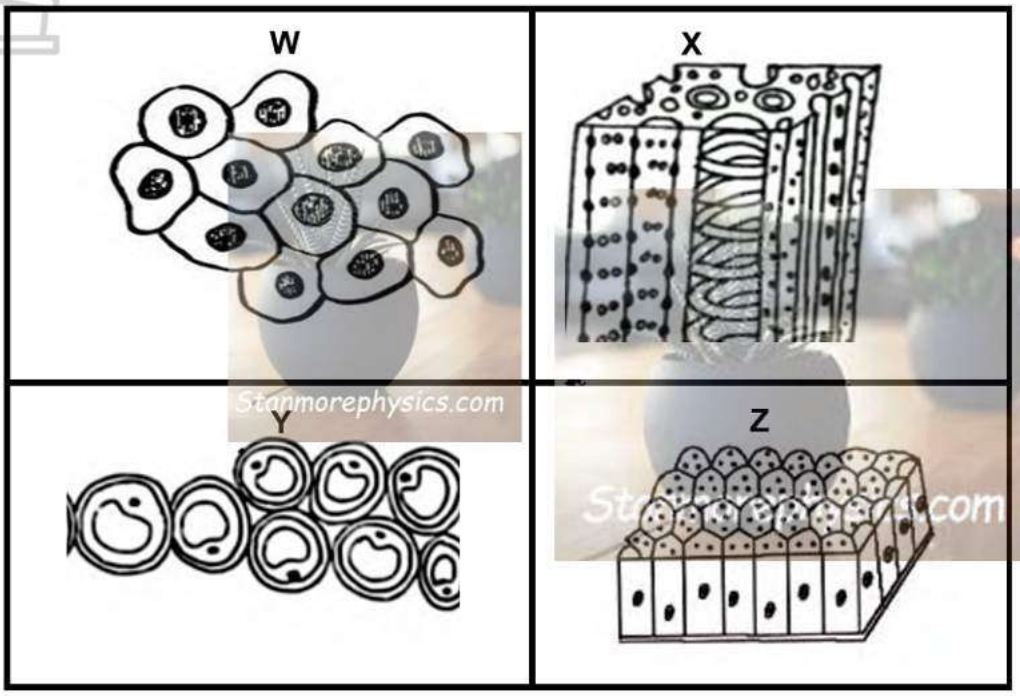
(b) Carries blood to the heart (2)
(6)

TOTAL SECTION A: (50)

SECTION B

QUESTION 2

2.1 The diagrams below show animal and plant tissues.



2.1.1 Identify tissue:

(a) **Y** (1)

(b) **Z** (1)

2.1.2 Describe the **structure** and **location** of tissue.

(a) **W** (2)

(b) **Z** (2)

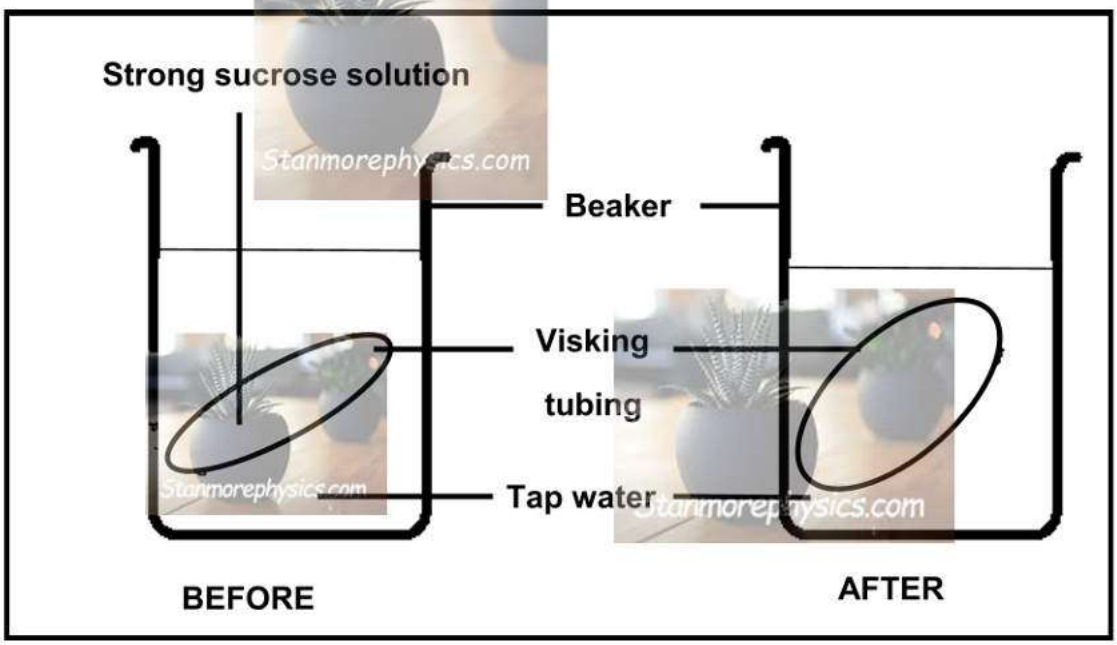
2.1.3 State ONE function of tissue **Y.** (1)

2.1.4 Explain TWO ways in which tissue **X** is structurally suited to perform its function. (4)
(11)

2.2 Grade 10 learners conducted an investigation to illustrate the movement of water across a visking tubing. (Visking tubing allows water to move in and out like the cell membrane of the cell).

The learners:

- Filled the visking tubing with strong sucrose solution.
- Placed the filled visking tubing in a beaker with tap water.
- Recorded the level of water in the beaker at the beginning of investigation.
- The set up was left in the laboratory for 2 hours.
- After 2 hours there was a change in the level of water in the beaker and the solution in the visking tubing.



2.2.1 Identify the process illustrated in the above investigation. (1)

2.2.2 The process shown above is a passive transport.

Tabulate ONE difference between passive transport and active transport. (3)

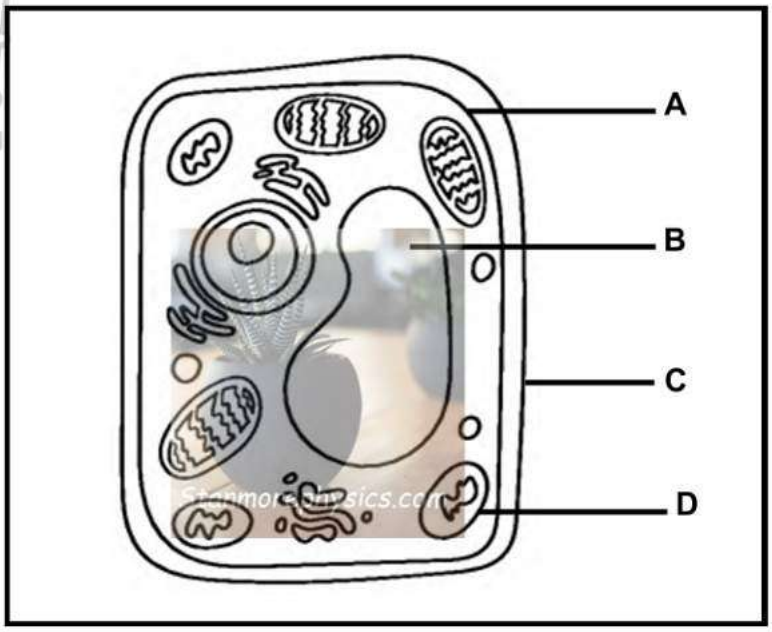
2.2.3 Explain:

(a) ONE reason for recording the water levels in the beaker at the beginning of the investigation. (2)

(b) TWO changes that are shown in the level of the strong sucrose solution after 2 hours. (4)

(c) Why the sugar molecules did not move from the visking tubing to the beaker. (2)
(12)

2.3 The diagram below shows a type of a cell.



2.3.1 Identify:

(a) The type of cell in the diagram above. (1)

(b) Part **B** (1)

(c) Part **C** (1)

2.3.2 Give TWO visible reasons for your answer in 2.3.1 (a) (2)

2.3.3 State TWO functions for part **B.** (2)

2.3.4 Explain:

(a) How part **D** ensures the cell functions properly (2)

(b) What will happen to the cell if part **A** becomes impermeable (4)
(13)

2.4 Grade 10 learners conducted an investigation to determine the effect of temperature on the action of pepsin (protein-digestive enzyme)

The procedure was as follow:

- 20 ml of stomach fluid and 10 grams of protein were placed in each of five test tubes.
- The tubes were then kept at different temperatures.
- After 24 hours, the contents of each tube were tested to determine the amount of protein that had been digested.

The results are shown in the table below.

Temperature (°C)	Amount of protein (g)
5	0.5
10	1.0
20	4.0
37	9.5
85	0.0

2.4.1 Identify the dependent variable. (1)

2.4.2 Give the optimum temperature of the pepsin enzyme. (1)

2.4.3 State TWO ways which can be done to increase the reliability of this investigation. (2)

2.4.4 Calculate the percentage increase between 20° C and 37° C. (3)

2.4.5 The investigation was repeated using 10 grams of starch instead of protein in each test tube. The contents were tested to determine the amount of starch that had been digested.

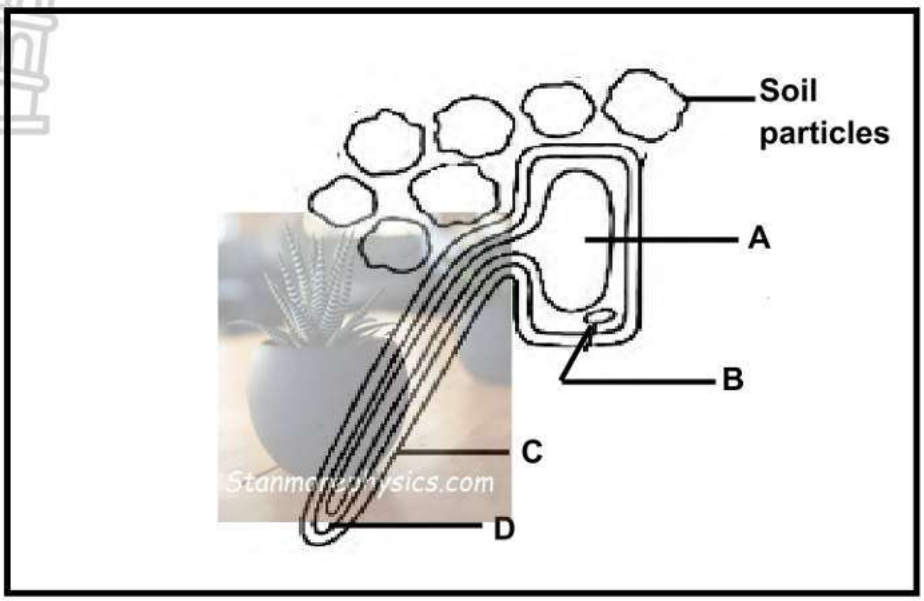
(a) State the outcome of the investigation with starch instead of protein. (2)

(b) Give ONE reason for your answer in QUESTION 2.4.6. (2)

2.4.6 Explain the reason for the absence of protein at 85°C. (3)
(14)
[50]

QUESTION 3

3.1 The diagram below shows a root hair.



3.1.1 Identify part **A** (1)

3.1.2 Give ONE function of part **B** (1)

3.1.3 State the region of the root where the root hairs is found. (1)

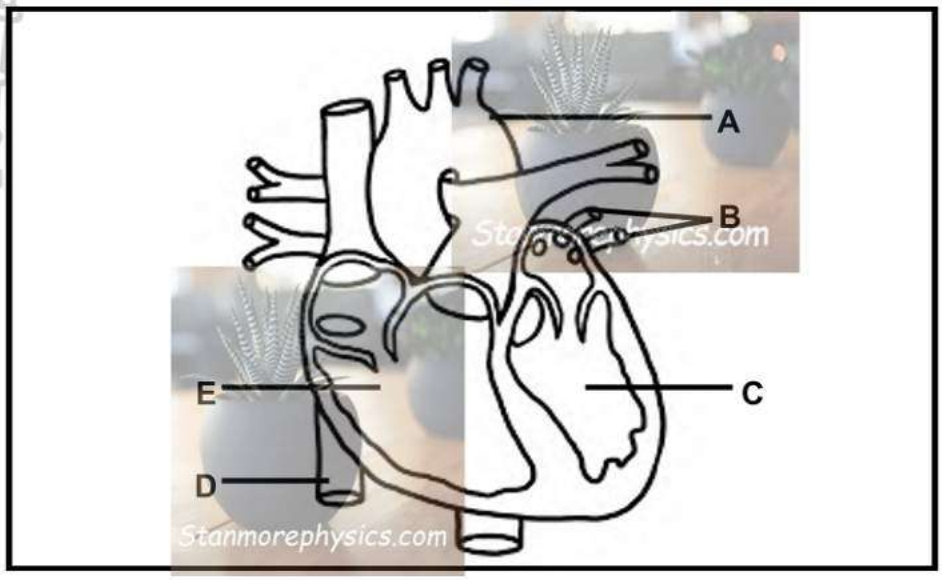
3.1.4 Name THREE forces that are responsible for the upward movement of water from the roots to the leaves. (3)

3.1.5 Explain:

(a) ONE difference related to permeability of part **C** and **D**. (4)

(b) TWO ways in which the root hair cell is structurally suitable to perform its function. (4)
(14)

3.2 The diagram below shows the human heart.



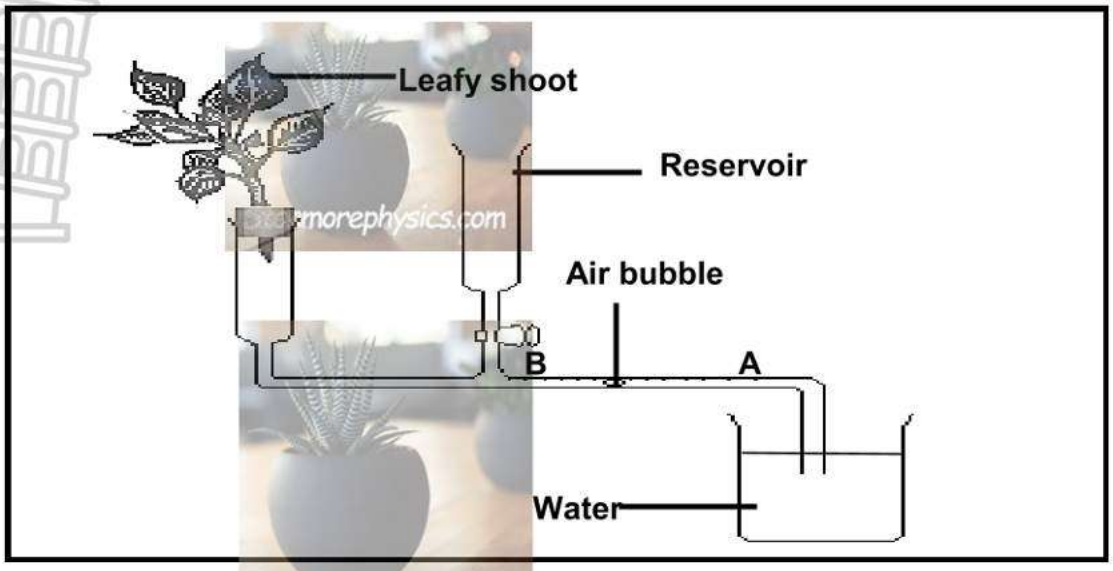
3.2.1 Give only the LETTER of the part that transport deoxygenated blood from the lower parts of the body. (1)

3.2.2 Describe the path of blood flow from the lungs until it reaches part **A**. (5)

3.2.3 Describe ONE structural difference between part **C** and **E**. (2)

3.2.4 Explain the consequences to the heart if part **B** becomes blocked. (3)
(11)

3.3 Grade 10 learners were given the set up to use as shown below.



Learners had to:

- Give the leafy shoot some time to adapt to a new environmental condition before taking readings.
- Introduce an air bubble into the capillary tubing and time how long it takes to move from point **A** to **B**.
- To repeat the procedure several times.
- Use the reservoir with the tap to move the air bubble back to point **A** before it was timed again.
- The table below shows the average results learners obtained after repeating the procedure three times.

Environmental conditions	**Average time taken for air bubble to move 5 cm(seconds)**
Laboratory	155
Bright light	125
Wind / fan	130
Plastic bag	160

3.3.1 State the aim of the above experiment. (2)

3.3.2 Under what condition was the rate of transpiration the lowest? (1)

3.3.3 Give:

(a) ONE reason for your answer in QUESTION 3.3.3 (2)

(b) ONE factor that was kept constant during the investigation. (1)

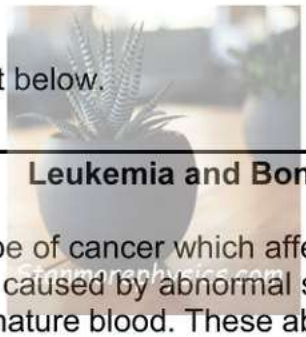
3.3.4 Explain:

(a) ONE precautionary measure when cutting the leaf under water. (2)

(b) What would happen when the underside of each leaf was covered with Vaseline. (3)

3.3.5 Draw a bar graph to represent the information on the table. (6)
(17)

3.4 Read the extract below.



Leukemia and Bone Marrow Transplant

Leukemia is type of cancer which affects blood cells. This disease (as well as many others) is caused by abnormal stem cells in the bone marrow producing defective or immature blood. These abnormal stem cells are usually treated by chemotherapy.

Unfortunately, the large doses of chemotherapy required also destroy heathy bone marrow. A bone marrow transplant is necessary to replace the diseased and damaged bone marrow.

3.4.1 Define the term *cancer.* (2)

3.4.2 From the extract, state:

(a) ONE effect of large doses of chemotherapy (1)

(b) Why is bone marrow necessary (1)

(c) How leukemia is caused (2)

3.4.3 Give TWO other ways of treating cancer other than the one mentioned in the extract. (2)
(8)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES

JUNE EXAMINATION

2025

MARKING GUIDELINE

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**

15. **If units are not given in measurements**
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.**

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

18. **Code-switching of official languages (terms and concepts)**
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 D✓✓
1.1.2 C✓✓
1.1.3 B✓✓
1.1.4 D ✓✓
1.1.5 D✓✓
1.1.6 B/C✓✓
1.1.7 **No answer**
1.1.8 B✓✓
1.1.9 C✓✓
1.1.10 C✓✓

2x9 **(18)**

1.2 1.2.1 Polysaccharides ✓
1.2.2 Goblet✓ cells
1.2.3 Amino acids ✓
1.2.4 Chromoplast ✓
1.2.5 Cranium ✓
1.2.6 Atria ✓
1.2.7 Fibrous✓connective tissue
1.2.8 Phloem ✓
1.2.9 Stem ✓

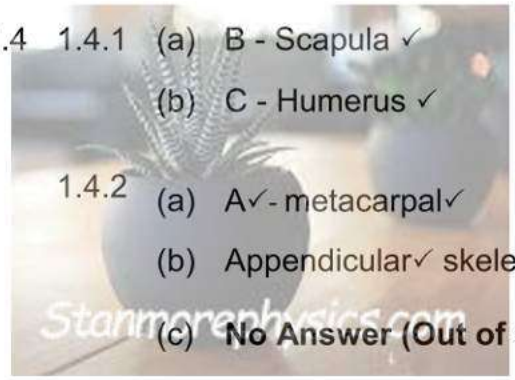
1x9 **(9)**

1.3 1.3.1 A only ✓✓
1.3.2 Both A and B ✓✓
1.3.3 A only ✓✓
1.3.4 None ✓✓

4x2 **(8)**

1.4 1.4.1 (a) B - Scapula ✓ (1)

(b) C - Humerus ✓ (1)



1.4.2 (a) A✓- metacarpal✓ (2)

(b) Appendicular✓ skeleton (1)

(c) **No Answer (Out of scope)**

(5)

1.5 1.5.1 (a) Vein ✓ (1)

(b) Capillary✓ (1)

1.5.2 (a) V ✓ - Artery✓ (2)

(b) W ✓- Vein✓ (2)

(6)

TOTAL QUESTION 1 (46)
TOTAL SECTION A 46

SECTION B

QUESTION 2

2.1.1 (a) Y- parenchyma ✓ (1)

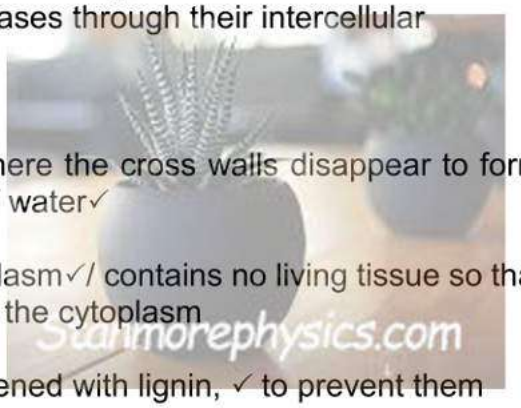
(b) Z – columnar epithelium ✓ (1)

2.1.2 (a) Thin✓/ flat /single layer of cells lining blood vessels✓/mouth / lungs (2)

(b) Long ✓/elongated/ single layer of cells lining the stomach✓/intestines/ parts of respiratory tracts (2)

2.1.3
- Act as a packaging tissue✓
- Store food in the form of starch and other sugars✓
- Allows for movement of water and gases through their intercellular spaces ✓

(Mark Any ONE) (1)



2.1.4
- The cells are elongated cells, ✓/ where the cross walls disappear to form continuous tubes for the transport of water✓
- Xylem tissue does not contain cytoplasm✓/ contains no living tissue so that the path of water is not blocked ✓by the cytoplasm
- The cellulose cell walls are strengthened with lignin, ✓ to prevent them from collapsing ✓under the strong suction pressure

Any (2x2) (4)
(11)

2.2 2.2.1 Osmosis ✓ (1)

✓

2.2.2

Passive transport	Active transport
-Does not require energy✓/ carrier molecule	-Requires energy/ ✓carrier molecule
-Movement along concentration gradient✓	-Movement against concentration gradient✓

(Table* + any 1 × 2) (3)

2.2.3 (a)
- To serve a baseline✓/ reference point
- where the results will be compared✓ after two hours
- To see how much water the beaker lost✓ after two hours

Any (TWO) (2)

(b) There is an increase in the amount of solution in the visking tubing ✓
Since the water has moved from the beaker✓ into the visking tubing.
Through the selectively permeable membrane✓
and the visking tubing increased in size✓
(4)

(c) They are large✓ to pass through the selectively permeable membrane✓ of the visking tubing (2)
(12)

2.3 2.3.1 (a) Plant cell ✓ (1)
(b) Vacuole✓ (1)
(c) Cell wall✓ (1)

2.3.2 Has :
- Cell wall✓
- Chloroplast✓
- Regular shape✓
- Large vacuole✓ (Any TWO) (2)

(Mark the first TWO)

2.3.3
- Provide support to the plant cell✓
- Serves a s storage organelle✓/Stores water/salts (2)

(Mark the first TWO)

2.3.4 (a)
- During cellular respiration part D/mitochondrion produces/store energy✓
which will be used by the cell for to function✓/for metabolic process. (2)

(b)
- No movement of substances in and out of the cell✓
- there will be shortage of useful substances inside the cell✓
- the waste material will also accumulate inside the cell✓
- resulting to the death of the cell✓/cell become dysfunctional (4)

(13)

2.4 2.4.1 Action of pepsin ✓ (1)

2.4.2 37°✓C (1)

2.4.3 - Increase the sample size✓ / amount of stomach fluid and proteins
- Repeat investigation✓several times (2)

2.4.4 % increase = $\frac{9.5 - 4.0}{4.0}$ ✓ x 100 ✓
= 137.5%✓ (3)

2.4.5 (a) The starch would not be digested✓✓ (2)

(b) **No Answer**

2.4.6 **No Answer**

(9)

TOTAL QUESTION 2 **[45]**

QUESTION 3

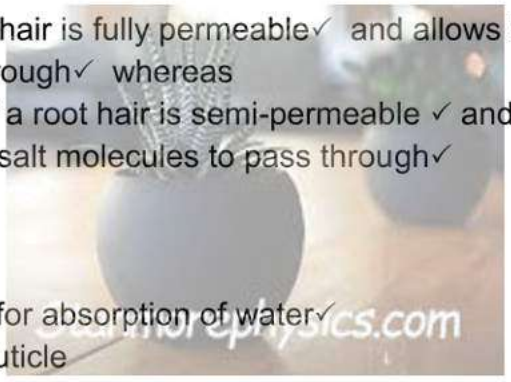
3.1 3.1.1 Vacuole ✓ (1)

3.1.2 - Controls all the activities of the cell✓
- Contains DNA which controls hereditary characteristics✓
(**Mark the first ONE)** (Any ONE) (1)

3.1.3 Root hair region ✓ (1)

3.1.4 - Root pressure✓
- Transpiration pull✓
- Capillarity ✓ (3)

3.1.5 (a) - Part C/ cell wall of a root hair is fully permeable✓ and allows both salt and water to pass through✓ whereas
- Part D/ cell membrane of a root hair is semi-permeable ✓ and does not allow dissolves salt molecules to pass through✓ (4)



(b) Has:
- finger like projections✓
to increase surface area for absorption of water✓
- Thin cell wall✓ /without cuticle
to absorb water from the soil✓
- Low water potential in cell sap✓
increases the absorption of water✓ Any(2x2) (4)
(**Mark the first TWO)**

(14)

3.2 3.2.1 D✓ (1)

3.2.2
- Oxygenated blood returns from the lungs ✓
- Enters the heart through pulmonary veins✓
- Into the left atrium✓
- Pass the bicuspid valve✓/mitral valve enters the left ventricle
- which pumps the blood to part A✓/aorta (5)

3.2.3 Part C/left ventricle is thicker and muscular✓/Larger while part E/right ventricle is thinner and less muscular✓ (2)

3.2.4
- The heart will be starved of oxygen✓
- Since the blood with oxygen cannot enter✓
- Leading to serious heart diseases✓ like heart attack /death of heart muscle (3)

(11)

3.3 3.3.1 To measure the rate of transpiration under different environmental conditions✓✓ (2)

3.3.2 Plastic bag✓ (1)

3.3.3 (a) **No Answer**

(b) Same Leafy twig was used ✓ (1)

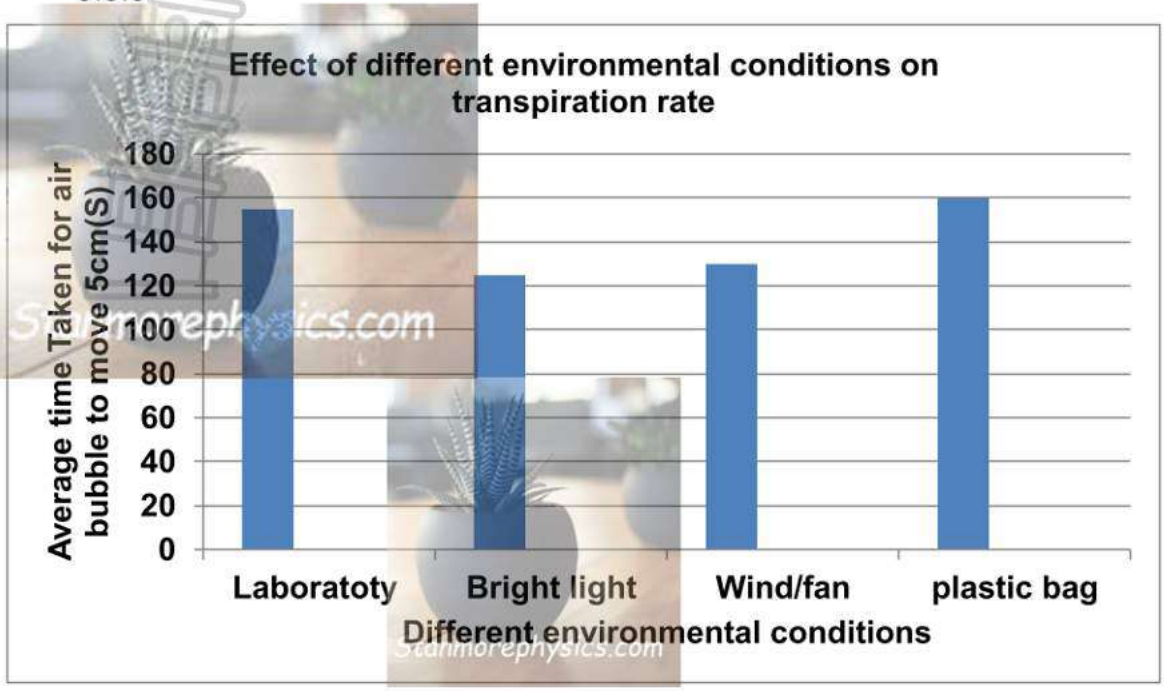
3.3.4

(a) Leafy twig shoot should be cut at oblique angle ✓

To increase surface area for water absorption ✓ (2)

(b)
- The stomata would be clogged✓ /blocked
- Causing the leaf to retain water✓
- and stopping transpiration✓ (3)

3.3.5



Criteria for marking of the graph:

Criteria	Marking allocation
Bar graph drawn **(T)**	1
Caption of the graph includes both variables **(C)**	1
Correct labels on the X- axis and Y-axis with correct units of Y-axis **(L)**	1
Correct scale for Y – axis and bars of equal width and equal spaces in between bars on X-axis **(S)**	1
Plotting **(P)** correctly done for: 1-3 points All four points	 1 2

(6)
[15]

3.4

3.4.1 Cancer is a disease caused by abnormal and uncontrolled cell division in the body✓✓ (2)

3.4.2 (a) Destroys healthy bone marrow✓ (1)

(b) -Replace the diseased and damaged bone marrow✓

- Produces the blood cells and platelets ✓

-Contains stem cells ✓

-Stores fat✓ (Any ONE) (1)

(c) Is caused by abnormal stem cells in the bone marrow✓

producing defective✓/ immature blood cells (2)

3.4.3 Surgery ✓
Radiotherapy ✓
(**Mark the first TWO only**) (2)
(8)

TOTAL QUESTION 3 [48]
TOTAL SECTION B 93
GRAND TOTAL 150

CONVERSION TABLE	
0-6	**+0**
7-18	**+1**
19-31	**+2**
32-44	**+3**
45-56	**+4**
57-69	**+5**
70-82	**+6**
83-94	**+7**
95-107	**+8**
108-120	**+9**
121-132	**+10**
133-139	**+11**