



**LIMPOPO**  
PROVINCIAL GOVERNMENT  
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF  
**EDUCATION**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**



**LIFE SCIENCES  
MID YEAR EXAMINATION  
20 JUNE 2025**

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Marks: 150

Time: 2½hours

**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. ALL drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams 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.
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 the ANSWER BOOK, for example,  
1.1.11 B

1.1.1 Which ONE of the following compounds is normally found in the cell wall of a plant cell?

- A Fat
- B Cellulose
- C Glucose
- D Amino Acid



1.1.2 The following elements are found in some organic compounds:

- i. Hydrogen
- ii. Nitrogen
- iii. Oxygen
- iv. Carbon

Which of the above elements are found in proteins but not in carbohydrates and lipids?

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

1.1.3 The building blocks of proteins are...



- A Disaccharides
- B Monosaccharides
- C Amino acids
- D Glycerol

1.1.4 Which one of the following statements about enzymes is INCORRECT?

- A Enzymes are denatured at extreme temperatures
- B Enzymes are denatured at extreme pH
- C Enzymes are used up in a chemical reaction
- D Enzymes control and regulate all chemical reactions that takes place in a cell



1.1.5 Which chemical reagent is used to test for the presence of glucose in a food sample?

- A Iodine solution
- B Alcohol
- C Millon's reagent/Biuret solution
- D Benedict's solution/Fehling's A and B

1.1.6 Mitochondria are the site of...

- A Photosynthesis
- B Cellular respiration
- C Cell division
- D Cytokinesis

1.1.7 During which phase does cytokinesis start to take place?



- A Metaphase
- B Prophase
- C Telophase
- D Interphase

1.1.8 Companion cells are typically found in...

- A Phloem tissue
- B Xylem tissue
- C Chlorenchyma tissue
- D Sclerenchyma

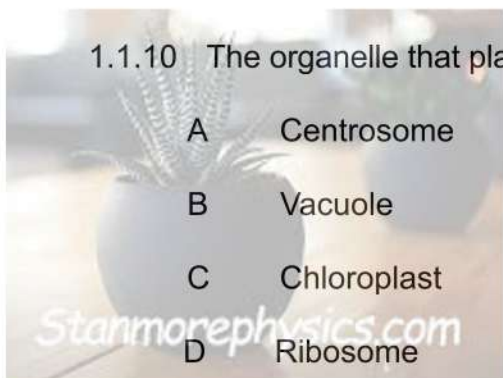
1.1.9 The foramen magnum is found at the base of the...

- A Upper limb
- B Lower limb
- C Vertebral column
- D Skull



1.1.10 The organelle that plays a role in cell division is...

- A Centrosome
- B Vacuole
- C Chloroplast
- D Ribosome



(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 1.2.7) in the ANSWER BOOK.

1.2.1 A change in the structure of a protein as a result of high temperature

1.2.2 The division of the nucleus

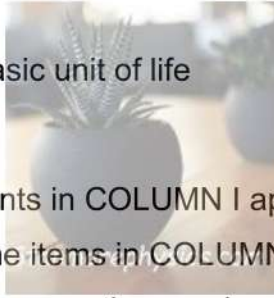
1.2.3 The structure that connects the 2 chromosomes together during cell division

1.2.4 Permanent tissue that lines the surface of roots, stems and leaves

1.2.5 The results of uncontrolled mitosis

1.2.6 Vascular tissue that transport water present in the veins of the leaf

1.2.7 The structural and functional basic unit of life (1 x 7) (7)



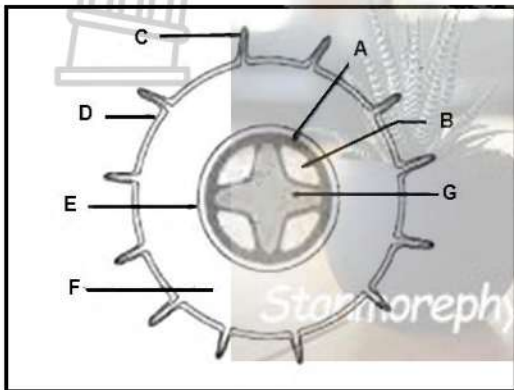
1.3 Indicate whether each of the statements in COLUMN I applies to A ONLY, B ONLY, BOTH A AND B or NONE of the items in COLUMN II. Write A only, B only, Both A and B, or None next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

COLUMN 1	COLUMN II
1.3.1 A structure that transmits impulses to the cell body	A: Dendrite B: Axon
1.3.2 Joins bone to bone	A: Ligaments B: Tendons
1.3.3 Tissue has a support function	A: Epidermal tissue B: Collenchyma Tissue
1.3.4 Nutrients that are required in large amount	A: micronutrient B: macronutrient

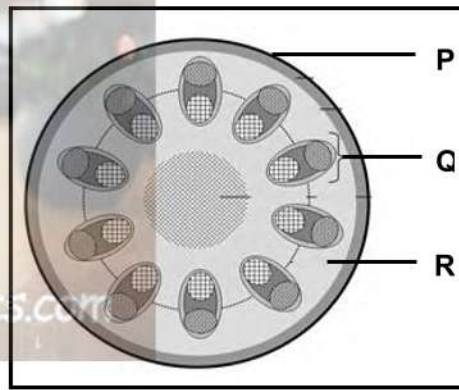
(2 x 4) (8)

1.4 A group of Grade 10 learners looked at micrographs to observe cross sections of dicotyledonous roots and stems. One of the learners drew the following diagrams in her/his workbook.

**DIAGRAM 1**



**DIAGRAM 2**



1.4.1 Which diagram (1 or 2) represents a dicotyledonous root? (1)

1.4.2 Give TWO visible reasons for your answer in QUESTION 1.4.1 above. (2)

1.4.3 Write down TWO LETTERS and THREE names of the parts that form the stele (central cylinder) in DIAGRAM 1 (5)

1.4.4 Identify the label P in DIAGRAM 2. (1)

1.4.5 Why would you say the diagrams above are representations of tissues? (2)

1.4.6 Xylem is a conducting tissue found in stems, roots and leaves. List TWO structural features of xylem that allows it to perform its function. (2)

1.4.7 Write down the LETTERS (A, B or C) of the tissue(s) that:  
 (a) Serve as strengthening tissue (1)

(b) Store food and water (1)

**(15)**

**TOTAL SECTION A: 50**

**SECTION B**  
**QUESTION 2**

2.1 Study the food label below and answer the questions that follow:

Nutritional information

Servings per package: **8**

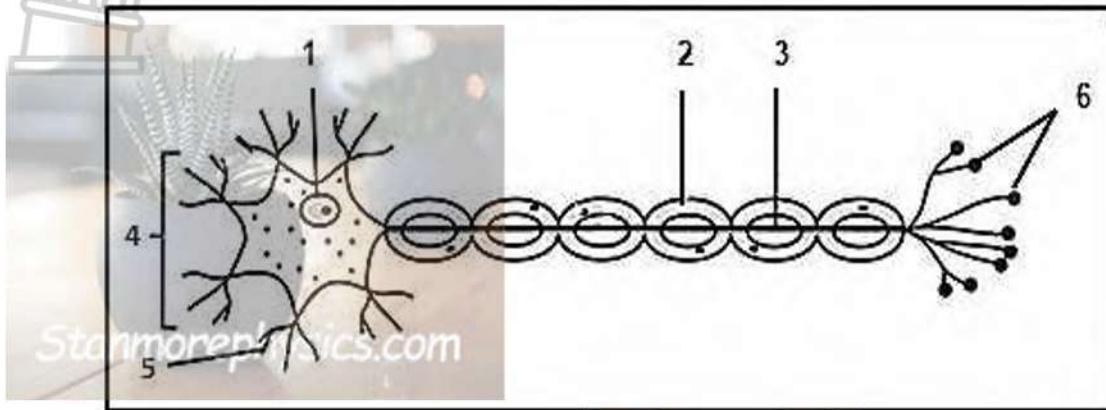
Serving size: **47,5 g (1 sausage)**

Average values	Per 100g	Per sausage
<b>Energy</b>	<b>580 kJ</b> <b>(138 kcal)</b>	<b>276 kJ</b> <b>(65 kcal)</b>
Fat, Total	7 g	3,3 g
- Saturated	0,9 g	0,4 g
- Monosaturated	1,7 g	0,8 g
- Polyunsaturated	4,4 g	2,1 g
Carbohydrate	10,0 g	4,8 g
Of which sugar	1,3 g	0,6 g
Fibre	4 g	1,9 g
Protein	16,5 g	7,8 g
Sodium	800 mg (0,8 g)	380 mg (0,38 g)

- 2.1.1 What is meant by saturated fatty acids? Suggest a reason why eating food with high saturated fatty acid content is unhealthy. (3)
- 2.1.2 List **THREE** elements found in protein. (3)
- 2.1.3 List **THREE** functions of lipids. (3)
- 2.1.4 Write down the monomers of lipids. (2)
- 2.1.5 Would you consider this product a healthy choice in terms of fat content? Give a reason for your answer. (2)
- 2.1.6 Calculate the total amount of sodium if **THREE** sausages were eaten. Show **ALL** working. (3)

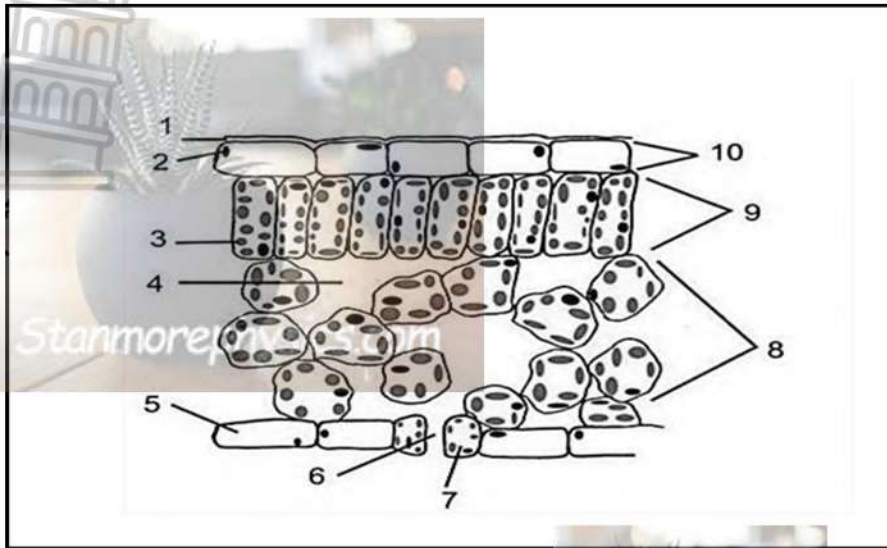
**(16)**

2.2 The following diagram represents a type of nerve cell. Study the diagram and answer the questions that follow.



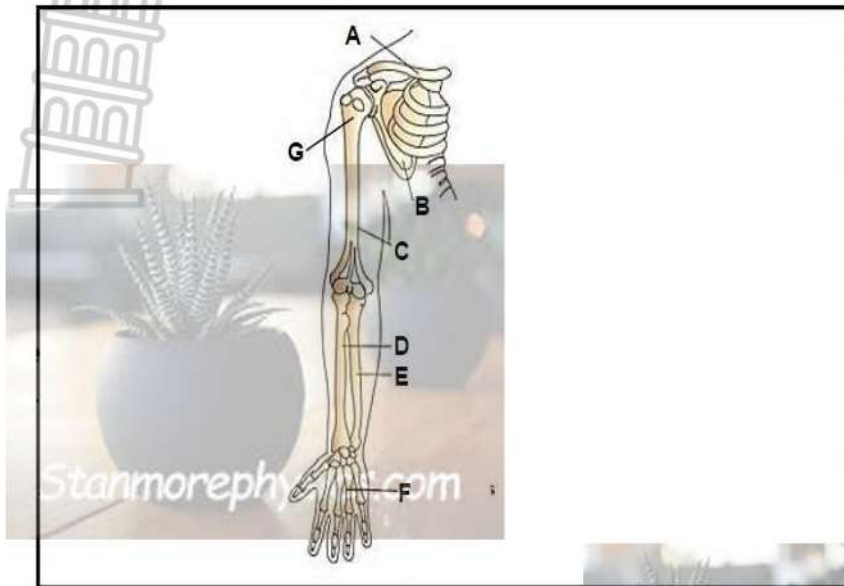
- 2.2.1 What type of cell is illustrated above? (1)
- 2.2.2 State the functions of this type of nerve tissue in the human body? (2)
- 2.2.3 Identify the parts numbered **1**, **2** and **5** (3)
- 2.2.4 State ONE function of the parts numbered: (1)
- (a) **5** (1)
  - (b) **2** (1)
  - (c) **6** (1)
- 2.2.5 Define the word synapse. (1)
- (10)**

2.3 Study the diagram below of a cross section of a dicotyledonous leaf, and respond to the questions that follow.



- 2.3.1 Give **ONE** main function of this plant organ (1)
- 2.3.2 Provide labels for parts **1** and **2** (2)
- 2.3.3 Give **ONE** function of structures **1** and **3** (2)
- 2.3.4 Structure **6** is involved in gaseous exchange. Name **TWO** gases that are exchanged through the opening at **6** (2)
- 2.3.5 Give **TWO** structural differences between tissues labelled 8 and 9. (4)
- (11)**

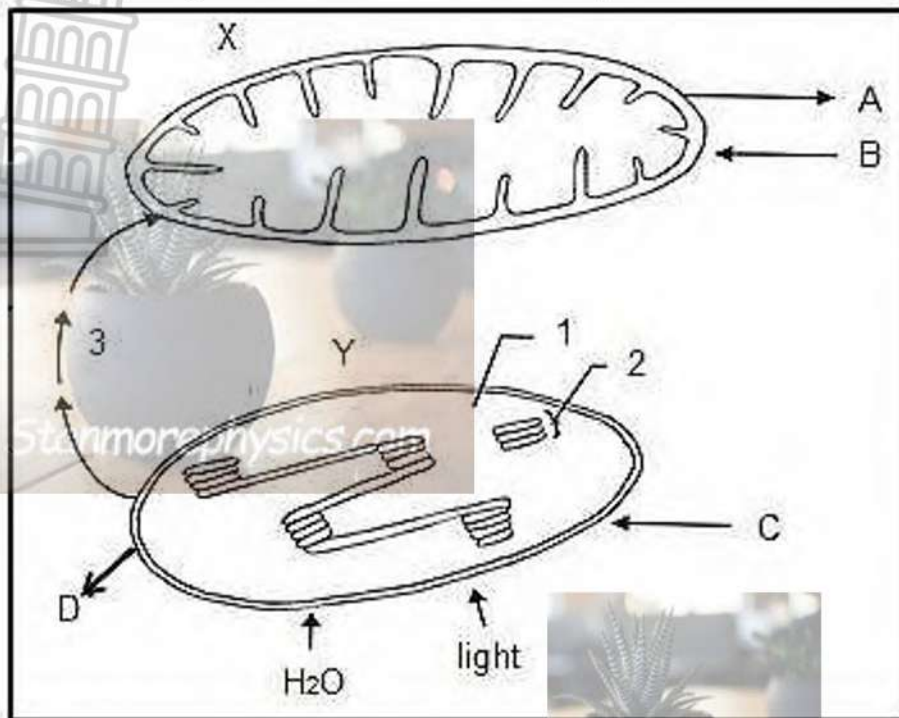
2.4 Study the diagram of a region of the human skeleton. Answer the questions that follow:



- 2.4.1 Mention **TWO** functions of the human skeleton. (2)
- 2.4.2 Referring to the diagram:
- (a) Give the **LETTERS** that point out the radius and ulna (2)
  - (b) What is the collective name for the parts labelled **A, B** and **G**? (1)
- 2.4.3 Give the **LETTER** that indicates the following in the diagram above.
- (a) Metacarpals (1)
  - (b) Humerus (1)
- 2.4.4 Two sets of muscles are attached to the front and back of the humerus respectively.
- (a) Name **ONE** of those muscles. (1)
  - (b) Name the substance that builds and repairs muscle tissue. (1)
  - (c) Mention **ONE** function of the above sets of muscles. (1)
- 2.4.5
- (a) Predict what would happen if the muscle attached to the back of the humerus cannot function. (1)
  - (b) Name **TWO** diseases that affects the skeleton (2)
- (13)**  
**(50)**

**QUESTION 3**

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



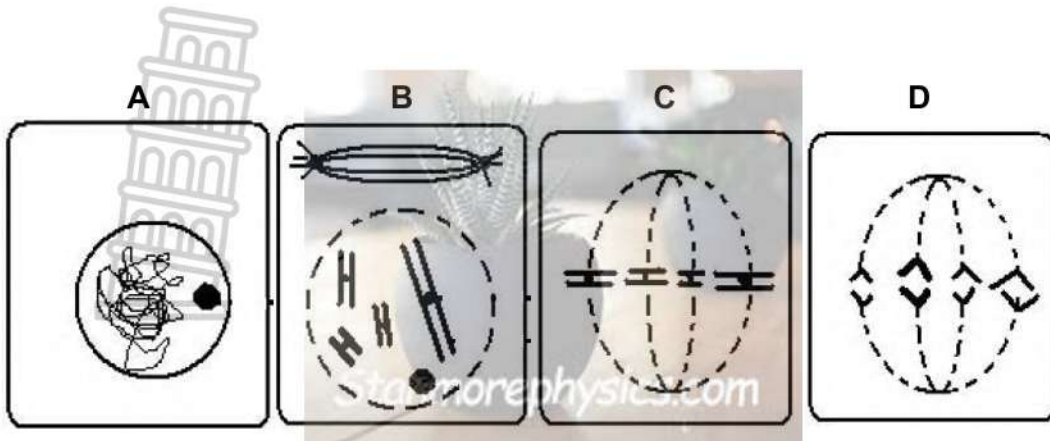
- 3.1.1 Identify the cell organelles **X** and **Y** (2)
- 3.1.2 Which metabolic process is associated with:  
**(a) X** (2)  
**(b) Y** (2)
- 3.1.3 Identify the parts numbered **1** and **2**. (2)
- 3.1.4 Identify the gases **A**, **B**, **C** and **D** respectively. (4)
- 3.1.5 State **THREE** ways in which organelle **X** is structurally suitable for its function. (3)
- (15)**

3.2 The thickness of the annual rings in stems indicates the type of environmental condition that was occurring during the time of the tree's development. A thin ring usually indicates a rough period of development such as lack of water, forest fires, or insect infestation. A thick ring means a prosperous period of development. An investigation done in two forests (**A** and **B**) provided the following results:

Age of trees (years)	Average thickness of annual rings in Forest A (millimetres)	Average thickness of annual rings in Forest B (millimetres)
10	20	24
20	24	28
30	30	35
40	34	38
50	41	45
60	46	51

- 3.2.1 Draw line graphs on the same system of axes that show the information in the table. (6)
- 3.2.2 What was the average thickness of annual rings for all trees found in Forest **B**? Show all calculations (4)
- 3.2.3 What was the average thickness of the annual rings for 40-year-old trees in Forest **A**? (1)
- 3.2.4 Based on the data, what can be concluded about the comparative health (condition) of trees from Forest **A** and Forest **B** and what is the relationship between the ages of trees and the average thickness of the annual rings? (4)
- (15)

3.3 Study the following diagram and answer the questions that follow.



3.3.1 Identify phases **A** and **B** (2)

3.3.2 (a) Name the phase shown in diagram D (1)

(b) Discuss the main events that occur during phase. (3)

3.3.3 What is mitosis? (2)

3.3.4 Give THREE reasons why mitosis is biologically important. (6)



**(14)**

3.4 A learner carried out **four** different food tests to investigate the composition of onions, potatoes and peanuts.

The results are recorded in the table below.

Chemical reagent	Onions	Potatoes	Peanuts
Iodine solution	-	+	-
Benedict's / Fehling's solution	+	-	-
Ethanol and water	-	-	+
Biuret / Millon's test	-	+	+

**KEY:**  
 + = positive  
 - = negative

From the above results identify the food types contained in each of the following:

3.4.1 Onions (2)

3.4.2 Potatoes (2)


3.4.3 Peanuts (2)

(6)

[50]

**TOTAL SECTION B: 100**


**GRAND TOTAL: 150**




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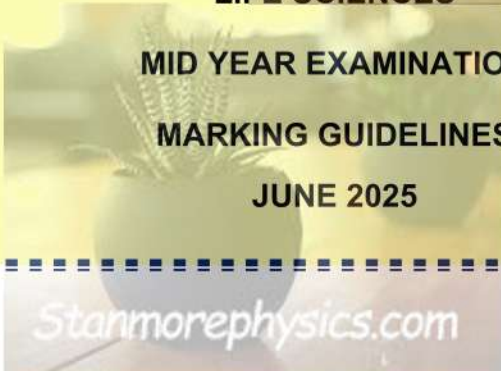
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**GRADE 10**



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**LIFE SCIENCES**  
**MID YEAR EXAMINATION**  
**MARKING GUIDELINES**  
**JUNE 2025**



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Marks: 150  
Time: 2½hours

**This Marking Guideline consists of 11 pages**

## PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. If more information than the 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 the 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  
Learners will lose marks for not tabulating.
6. If diagrams are given with annotations when descriptions are required  
Learners will lose marks.
7. If flow charts are given instead of descriptions  
Learners 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 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 the questions but the wrong number is given, it is acceptable.
11. If the language used changes the intended meaning  
Do not accept.
12. Spelling errors  
If recognisable, accept answer, provided it does not mean something else in Life Sciences or if it is used 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 accept.

15. If units are not given in measurements  
Learners 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.



**SECTION A**

**QUESTION 1**

1.1

1.1.1 B✓✓

1.1.2 B✓✓

1.1.3 C✓✓

1.1.4 C✓✓

1.1.5 D✓✓

1.1.6 B✓✓

1.1.7 C✓✓

1.1.8 A✓✓

1.1.9 D✓✓

1.1.10 A✓✓



(10 x 2)    **(20)**

1.2

- 1.2.1 Denature/denaturation✓
- 1.2.2 Karyokinesis✓
- 1.2.3 Centromere✓
- 1.2.4 Epidermis/epidermal cells✓
- 1.2.5 Cancer✓
- 1.2.6 Xylem✓
- 1.2.7 Cell✓

(1 x 7)    **(7)**

1.3



1.3.1 A only ✓✓

1.3.2 A only ✓✓

1.3.3 B only ✓✓

1.3.4 B only ✓✓

(2x4) (8)

1.4

1.4.1 Diagram 1 ✓ (1)

1.4.2

- Xylem is arranged in the form of a cross ✓
- phloem occurs between the arms of the cross ✓
- clearly defined endodermis is visible ✓
- Root hairs are present ✓

ANY TWO (2)



1.4.3 A ✓, B ✓, E ✓, G ✓  
 Pericycle ✓  
 Endodermis ✓  
 Phloem ✓  
 Xylem ✓

ANY THREE (5)

1.4.4 P epidermis ✓ (1)

1.4.5 Because they are groups ✓ of similar cells which perform a common function ✓ (2)



1.4.6 Cells are cylindrical ✓  
 thick walls impregnated with lignin ✓  
 large lumen ✓  
 Long tubes with openings ✓  
 No cell contents (dead cells) ✓ (2)

1.4.7 (a) B and C ✓ (Any 1) (1)  
 (b) A ✓ (1)

(15)

[50]

TOTAL SECTION A: 50

**SECTION B**

**QUESTION 2**

2.1

2.1.1 These fats are derived from animals✓, Excessive intake of this fats leads to high cholesterol level in the blood✓, which causes fats deposits in the arteries therefore narrowing✓ them. (3)

2.1.2 Carbon✓, Hydrogen✓, Oxygen✓ (3)

2.1.3

- source of reserve energy✓
- insulating material ✓
- Shock absorption ✓
- Water proofing✓ (3)

2.1.4 fatty acids✓ and glycerol✓ (2)

2.1.5 Yes✓, low level of saturated fat✓ in relation to total fat content✓ (2)

2.1.6 Amount of sodium in one sausage = 380 mg (0,38g)  
Amount of sodium in three sausage =  $3 \times 380 \text{ mg} / 3 \times 0,38 \text{ g}$ ✓ (3)  
 $= 1140 \text{ mg} / (1,14 \text{ g})$  (16)

2.2

2.2.1 Motor neuron✓ (1)

2.2.2 Motor neuron carry impulses✓  
from the brain / spinal cord ✓ to the effectors / gland /  
Muscle ✓ to bring about a response ✓.(Any 2) (2)



2.2.3 1 Nucleus✓  
2 Myelin sheath✓  
5 Dendrite✓ (3)

2.2.4 (a) 5 Receive and transmit impulses to the cell body✓ (1)

(b) 2 Protects the axon✓ (1)

(c) 6 Transmit impulse away from the cell body /  
transmits impulse to the effector organ /muscle /  
forms synaptic knob / node with effector organ /  
muscle✓ (1)

2.2.5 A junction between two neurons/nerve cells✓ (1)  
(10)

2.3

2.3.1 Traps sunlight for photosynthesis✓  
Allow gaseous exchange for photosynthesis / respiration /  
and transpiration✓ **ANY ONE** (1)

2.3.2 1 – Cuticle✓  
2 – (Upper) epidermis ✓ (2)

2.3.3 1 – protects the epidermis reducing excessive moisture  
loss✓  
- Allowing sunlight to pass through for photosynthesis✓  
**ANY ONE**  
3 – Photosynthesis✓ (2)

2.3.4 carbon dioxide✓ , oxygen✓ and water vapour✓  
**ANY TWO** (2)

2.3.5

- **Spongy parenchyma** is rounded✓ while **palisade parenchyma** is elongated✓
- **Spongy parenchyma** contains few✓ number of chloroplasts while **palisade parenchyma** contains a large✓ number of chloroplasts
- **Spongy parenchyma** contains large intercellular spaces✓ while **palisade parenchyma** does not have✓ intercellular spaces **ANY 2X2** (4)

(11)



2.4

2.4.1 **Protection:** protects internal organs of the body ✓

**Storage of minerals:** Various minerals such as calcium stored by the bones ✓

**Framework:** Gives the body shape ✓ **ANY TWO** (2)

2.4.2

(a) D ✓ and E ✓ (2)

(b) Pectoral girdle ✓ (1)

2.4.3

(a) F ✓ (1)

(b) C ✓ (1)

2.4.4

(a) Biceps/triceps ✓ (1)

(b) Protein ✓ (1)

(c) They bring about movement ✓

They work antagonistically to make movement possible ✓

**ANY ONE** (1)

2.4.5

(a) It will prevent the straightening of the arm ✓ (1)

(b) Osteoporosis ✓

Rickets ✓ (2)

Arthritis ✓ **ANY 2** (13)

**(50)**

**QUESTION 3**

3.1

3.1.1 **X** - Mitochondrion ✓ and **Y** - Chloroplast ✓ (2)

3.1.2 (a) Cellular respiration ✓ ✓ (2)

(b) Photosynthesis ✓ ✓ (2)

3.1.3 1 - Stroma ✓ (2)

2 - Granum ✓

3.1.4 **A** - Carbon dioxide / CO<sub>2</sub> ✓

**B** - Oxygen / O<sub>2</sub> ✓

**C** - Carbon dioxide / CO<sub>2</sub> ✓

**D** - Oxygen / O<sub>2</sub> ✓ (4)

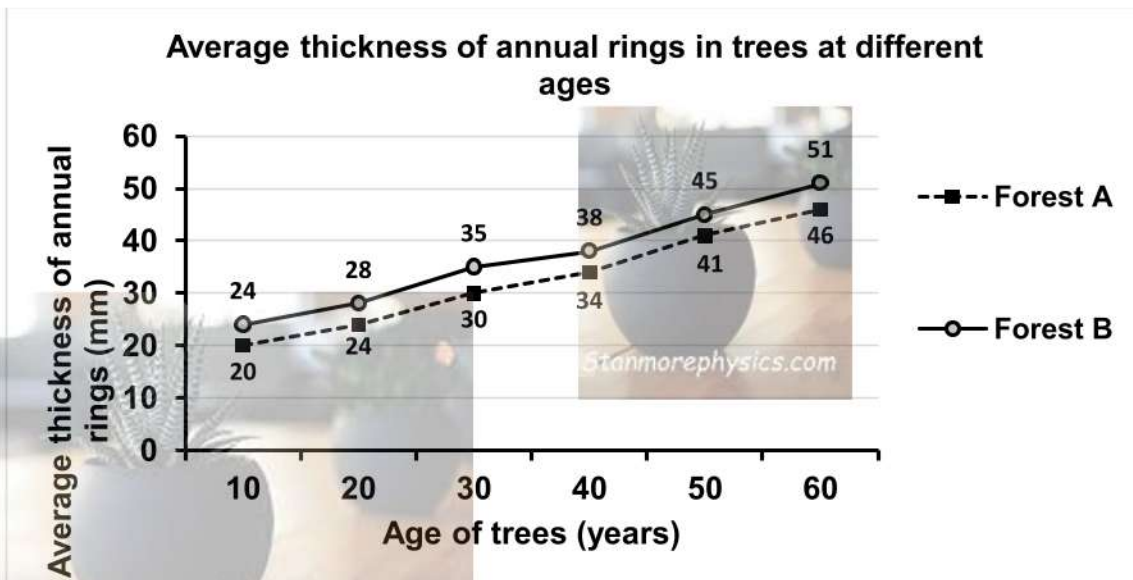


- 3.1.5 -Has differentially permeable double membrane ✓
- Outer membrane is smooth for easy movement through the cytoplasm ✓
  - Inner membrane is folded / has cristae that increase surface area ✓
  - Cristae coated with enzyme for maximum chemical ✓
- ANY THREE**

(3)  
(15)

3.2

3.2.1



Criteria and marks		Mark Allocation
Caption (both variables)	<b>C</b>	1
Line graphs are drawn (type)	<b>T</b>	1
X and Y axes (label, unit, scale)	<b>A</b>	1
Two graphs drawn	<b>G</b>	1
Plotting	<b>P</b>	1 – 10 readings correctly plotted: 1 All 12 readings correctly plotted: 2

(6)



3.2.2  $24 + 28 + 35 + 38 + 45 + 51 = 221$  ✓

$$\begin{array}{r} 221 \text{ ] } \checkmark \\ 6 \\ \hline = 36,8 \checkmark \text{ mm } \checkmark \text{ OR } 37 \text{ mm} \end{array}$$

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(4)

3.2.3 34mm ✓ (unit must be given)

(1)

3.2.4 Forest **B** trees are healthier ✓ / in a better condition than those in forest **A** ✓, with increased age of trees ✓, the thickness of the annual rings increase ✓

(4)  
(15)

3.3

3.3.1 **A** – Interphase ✓  
**B** – Prophase ✓



(2)

3.3.2 (a) D -Anaphase ✓

(b) - Spindle fibres contract ✓

(1)

- Two chromatids pull apart ✓

- To opposite sides of the cell (poles) ✓

-Chromosome split at the centromere ✓

(3)

3.3.3 The process of cell division where one cell divide into two identical daughter cells ✓ ✓

(2)

3.3.4 – **Growth**: ✓ Increase in size of the organism ✓  
 - **Replacement** ✓ of dead cells ✓

-Responsible of **asexual reproduction** ✓ in certain plant and animals ✓

- **Repairs** damaged tissues ✓

(6)  
(14)

**ANY 6**

3.4



3.4.1 Glucose ✓✓ (2)

3.4.2 Starch✓ and Protein✓ (2)

3.4.3 Lipids✓ and protein✓ (2)

(6)  
(50)  
[100]

**TOTAL SECTION B: 100**

**GRAND TOTAL : 150**

