KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

# PROVINCIAL STANDARDISED ASSESSMENT

## GRADE 10

## LIFE SCIENCES

## JUNE 2026

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**MARKS:** 150

**TIME:** 2½ Hours

**NB: This question paper consists of 18 pages.**

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## 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.

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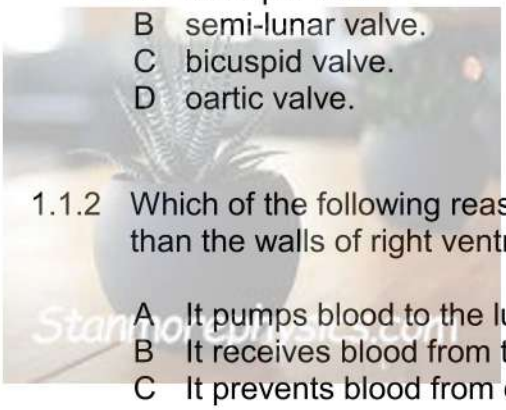
## SECTION A

## 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.



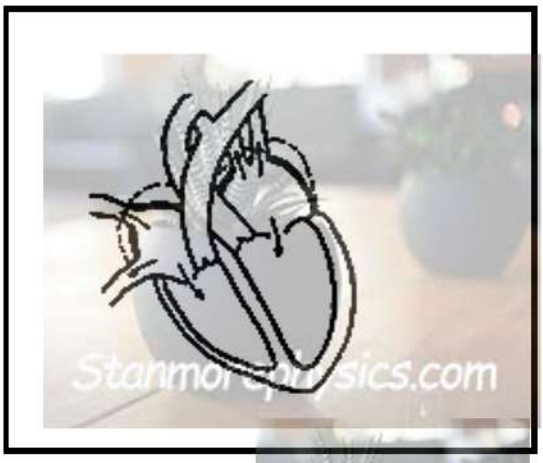




1.1.2 Which of the following reasons make the walls of the left ventricle to be thicker than the walls of right ventricle?

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

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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.

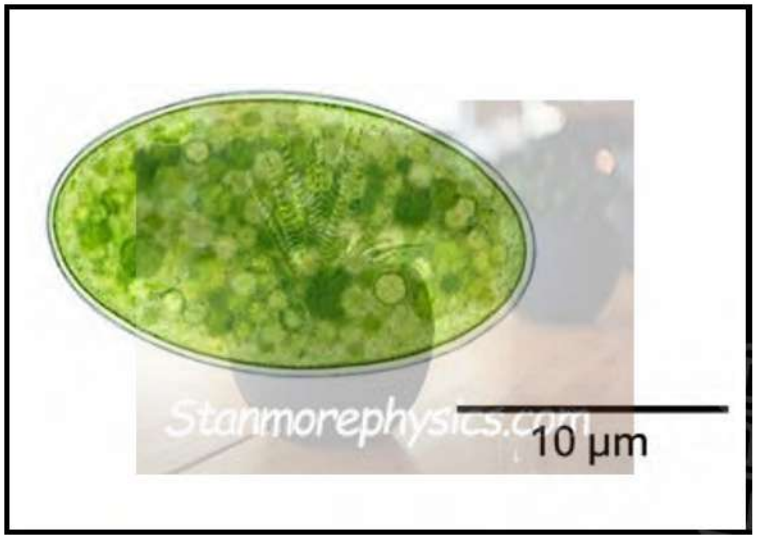
1.1.7 During an experiment a grade 10 learner notices that a nuclear membrane reforms around two sets of chromosomes at opposite poles of the cell.

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

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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)**

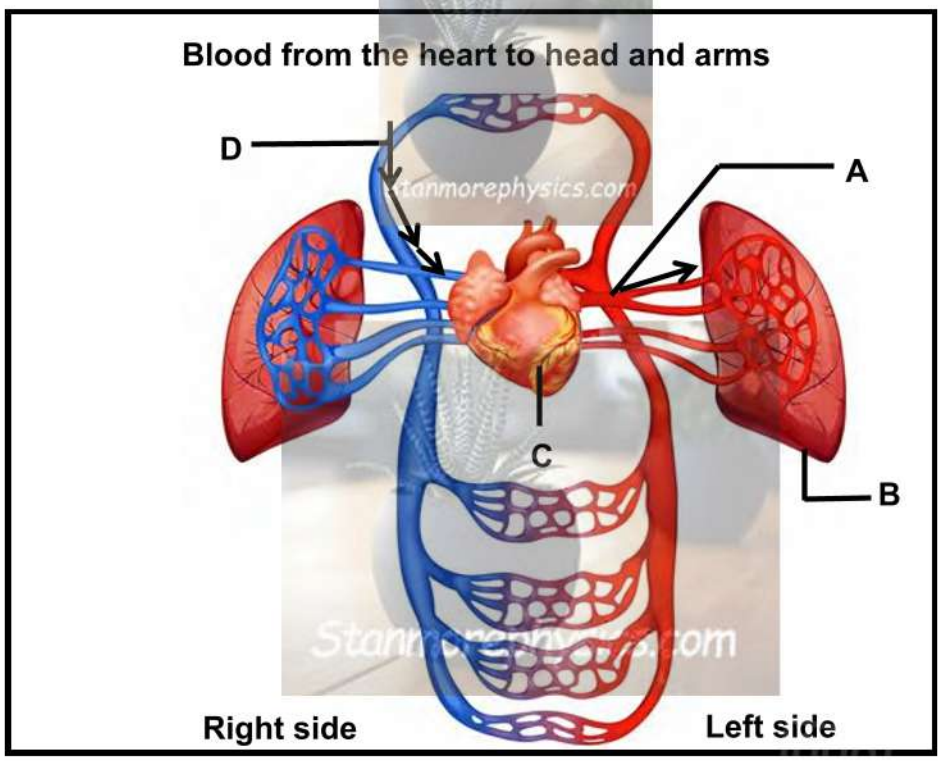
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1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B or NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B,** or **none** next to the question number (1.3.1 to 1.3.2) in the ANSWER BOOK.

| | COLUMN I | COLUMN II |
|---|---|---|
| 1.3.1 | Treatment for cancer | A: Chemotherapy<br>B: Surgery |
| 1.3.2 | Contains red, orange and yellow pigment | A: Leucoplast<br>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 |

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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)

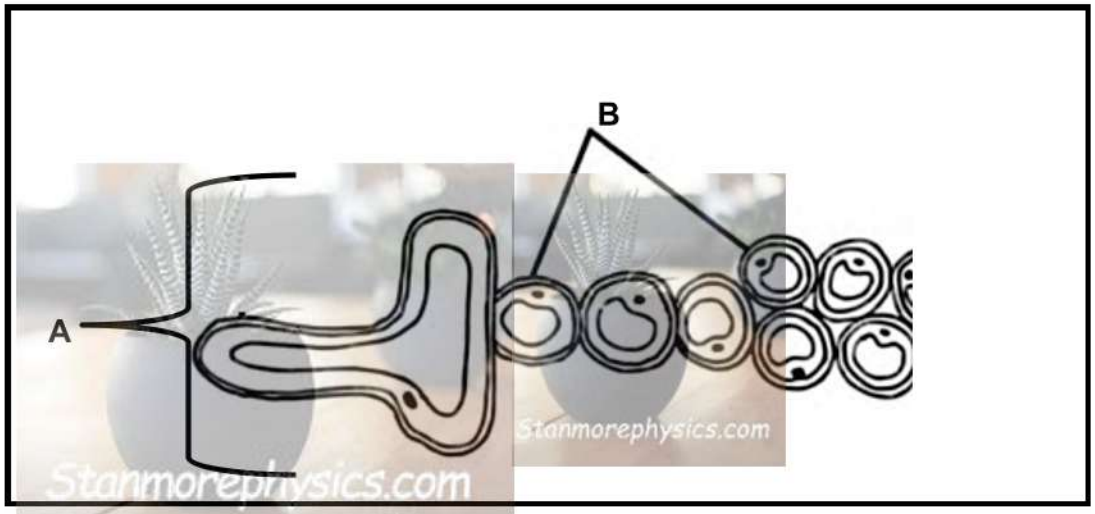
(d) Disease caused by deficiency in vitamin C. (1)
**(10)**

**TOTAL SECTION A 50**

**SECTION B**

**QUESTION 2**

2.1 The diagram below shows cells/tissues.




2.1.1 Identify part:

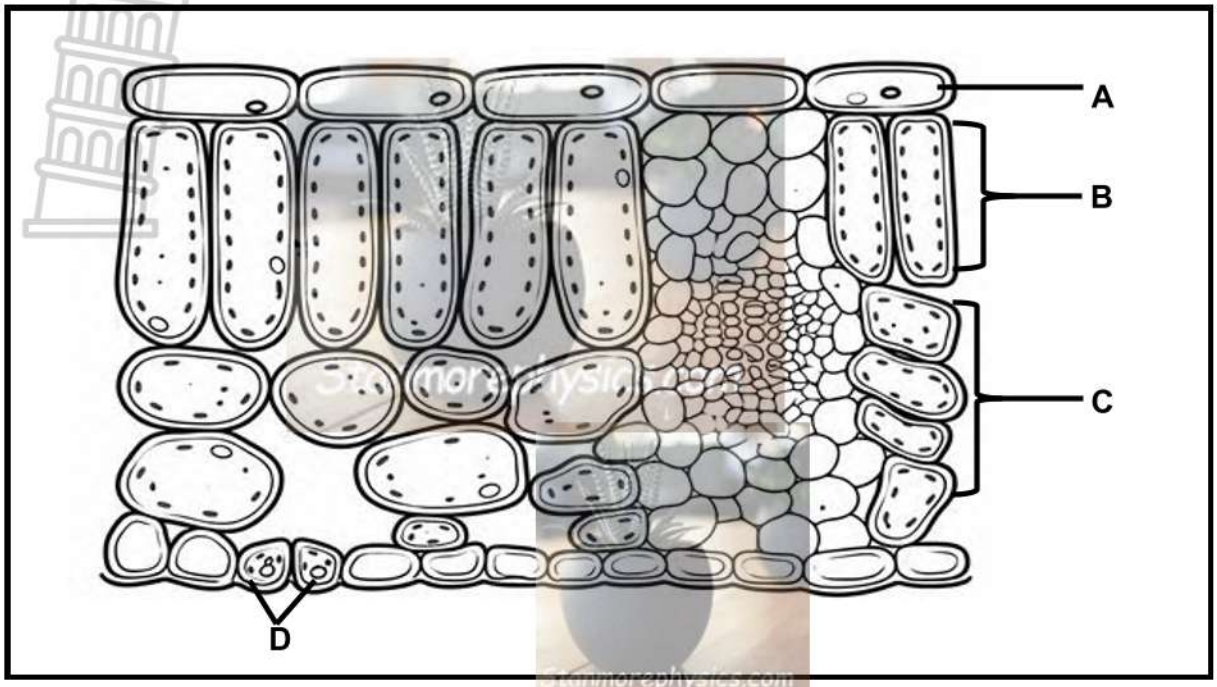
(a) **A** (1)

(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:

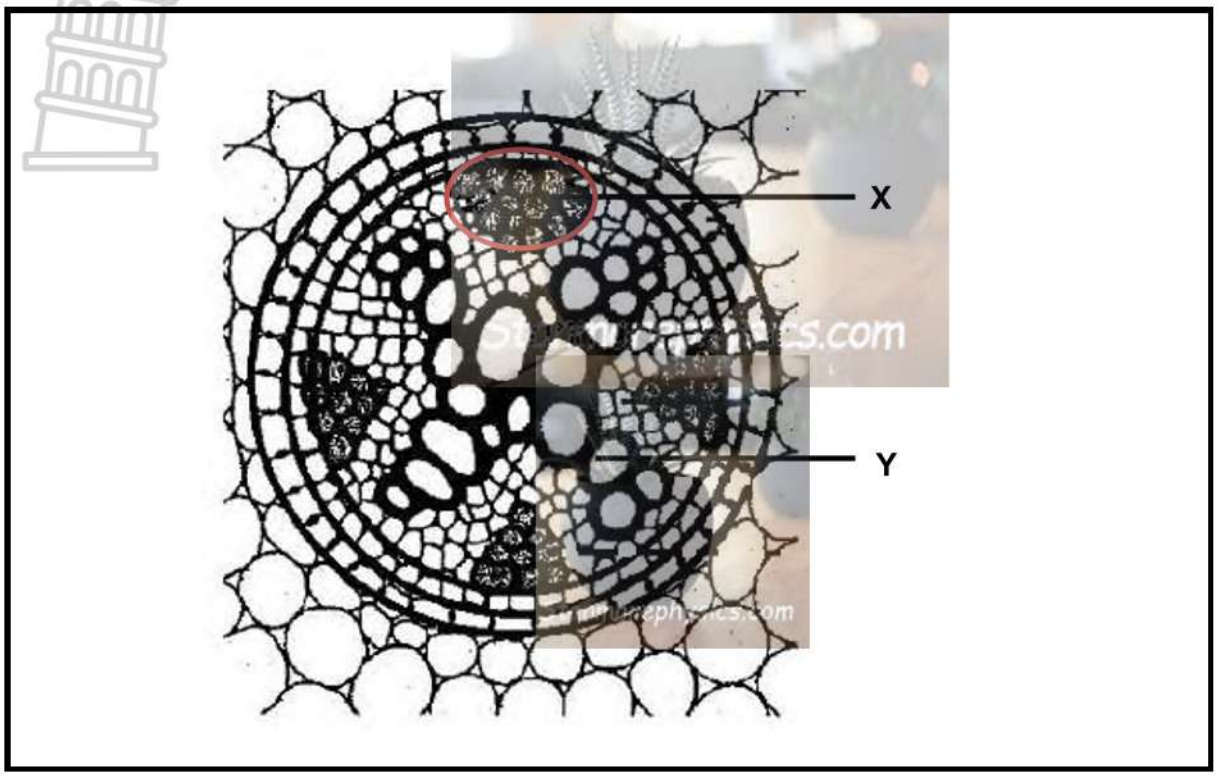
(a) The role of intercellular air spaces between part **C.** (3)

(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)**

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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)

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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**

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**QUESTION 3**

3.1 Read the following extract.

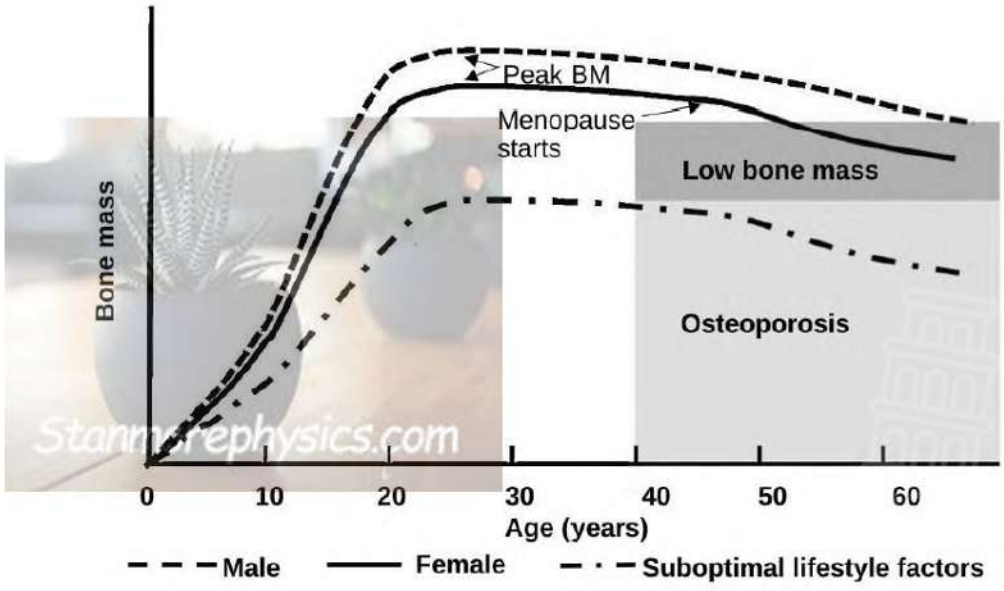
Osteoporosis is a disease in which bones become weak, brittle and more likely to break. It occurs when the body loses too much bone mass or does not produce enough new bone. As a result, the internal structure of the bone becomes less dense and develops spaces, making it fragile.

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)

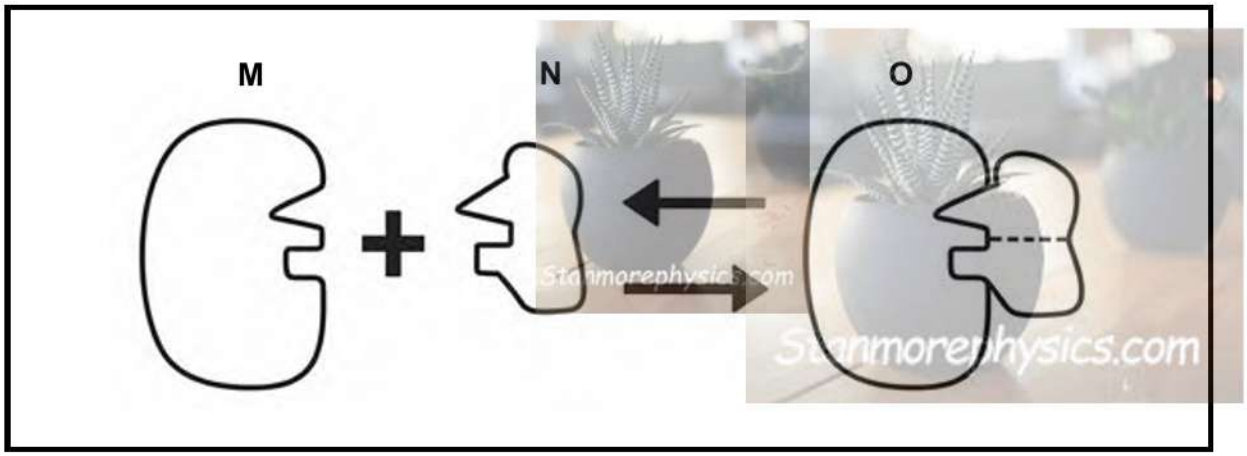
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3.1.3 Explain:

(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)**

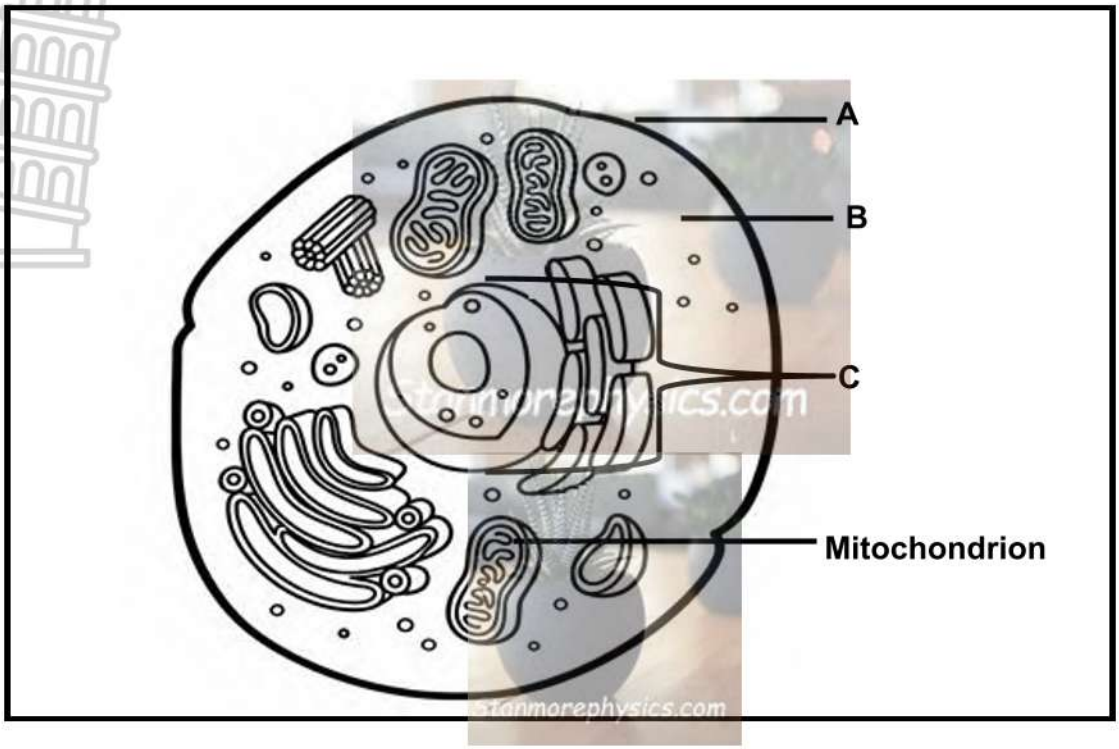
3.2 The diagram below shows a lock and key model of enzymes.




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:

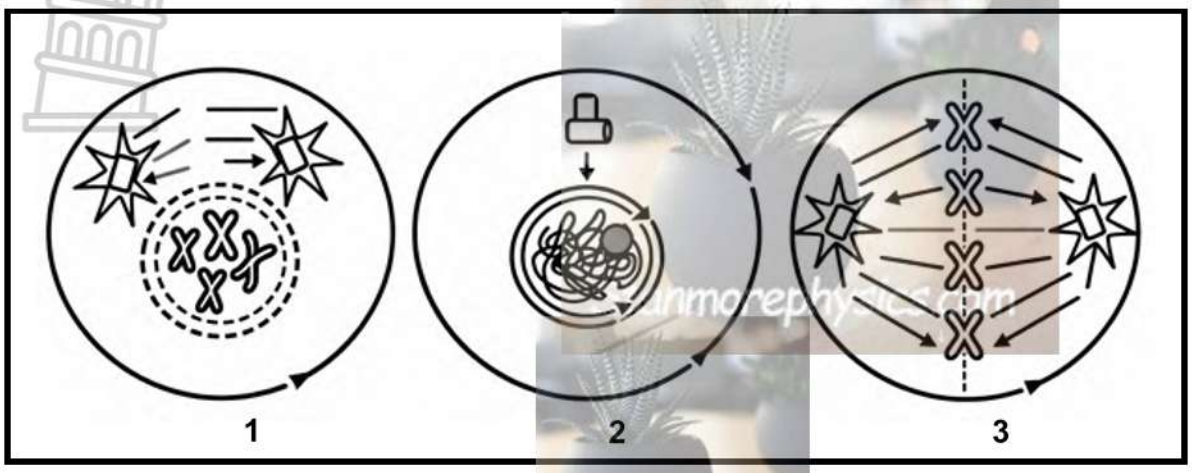
(a) **A** (1)

(b) **B** (1)

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

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




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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**

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