



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA



**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

**LIFE SCIENCES
COMMON TEST
JUNE 2023**

MARKS: 150

TIME: 2½Hours



This question paper consist 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 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 1.1.4 D.

1.1.1 Which part of a root is made up of parenchyma and endodermis?

- A Cambium
- B Cortex
- C Pericycle
- D central cylinder

1.1.2 A specimen is viewed under 15x and 10x magnification. The total magnification is ...

- A 400x
- B 500x
- C 150x
- D 350x

1.1.3 The role of a centrosome during mitosis is to ...

- A formation of spindle fibres
- B connects two chromatids
- C carries genetic information
- D production of chromatin material

1.1.4 Identify the plastid that give colours to flowers and fruits

- A Chloroplast
- B Leucoplasts
- C Chromoplast
- D Chromosome

1.1.5 Which of the following combinations are contained in the vascular bundle?

- A Epidermis, phloem and cambium
- B Pith, root hair and sclerenchyma
- C Cortex, epidermis and xylem
- D Sclerenchyma, phloem, cambium and xylem

1.1.6 The function of the xylem is to ...

- A Transport food from the leaves to all parts of the plant
- B Transports waste material out of the plant
- C Transport and store useful substances to all parts of the plant
- D Transport water and mineral salts from the roots to all part of the plants

1.1.7 Below is a list of functions of different systems in the human body

- (i) Enables movement
- (ii) Controls the functioning of the heart
- (iii) Provide shape and support to the body
- (iv) Promote the development of cells

Which of the following combination best match the functions of the skeleton?

- A (i), (iv), (iii) only
- B (ii) only
- C (i) and (iii) only
- D All of the above

1.1.8 Which of the following is the function for cranium?

- A Protects the brain
- B Protects the facial bones
- C Protect the internal organs
- D Provide support the brain

1.1.9 Which of the following tissues lines the nasal cavity and removes dust particles?

- A Cuboidal
- B Areolar
- C Squamous
- D Ciliated columnar



1.1.10 Which of the following tissues have sieve tubes and companion cells?

- A Endodermis
- B Xylem
- C Sclerenchyma
- D Phloem

10x2 (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 1.2.10) in your ANSWER BOOK

1.2.1 Pulls chromatids to opposite poles

1.2.2 Evaporation of water from the leaves of the plants

1.2.3 Thickened bands or strips that are found in the endodermis of roots which controls the movement of water into xylem vessels

1.2.4 The opening at the base of the skull

1.2.5 Part of the skeleton that is made up of the skull and vertebral column

1.2.6 The movement of manufactured food from plant leaves to the rest of the plant

1.2.7 Plant tissue that is responsible for growth

1.2.8 Chemical used for starch test

1.2.9 The roof of the mouth cavity of vertebrates that separates the mouth and nasal cavities

1.2.10 Type of an animal tissue that is found at the end of bones to prevent friction

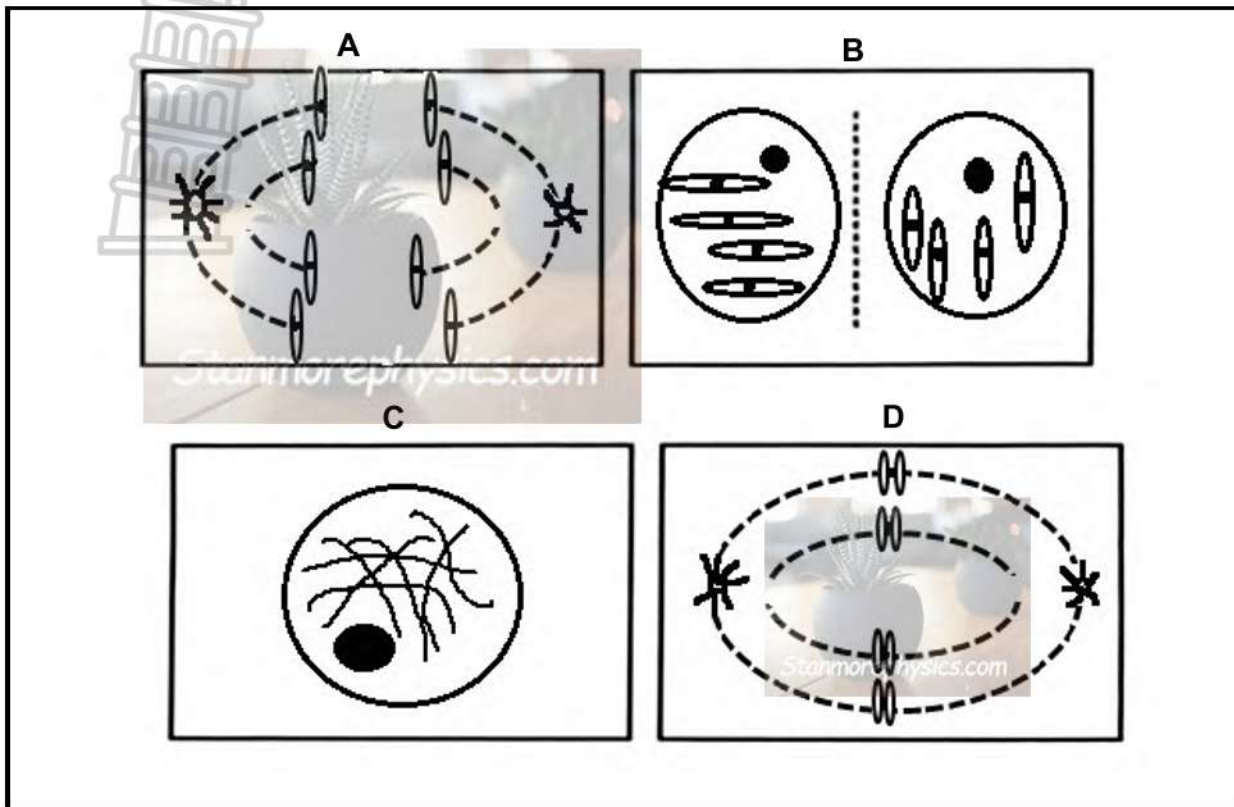
1x10 (10)

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 Mesophyll cells that contains chloroplast	A: Palisade mesophyll B: Spongy mesophyll
1.3.2 Chromosomes are aligned along the equator	A: Anaphase B: Metaphase
1.3.3 Protects the spinal cord	A: Pectoral girdle B: Skull
1.3.4 Factors affecting transpiration rate	A: Light intensity B: Temperature

2x4 (8)

- 1.4 The diagram below shows four stages of cell undergoing mitosis. The diagrams are not in order.



- 1.4.1 Give only the LETTERS and NAMES of diagrams that:

- | | | |
|-----|------------------------------------|-----|
| (a) | Is the site of DNA replication | (2) |
| (b) | Chromosomes aligns at the equator | (2) |
| (c) | Chromatids move to different poles | (2) |
| (d) | Nuclear membrane starts to reform | (2) |

- 1.4.2 Write down the LETTERS of the diagrams in the correct order in which they occur during mitosis (2)

- 1.4.3 State how many:

- | | | |
|-----|---|------|
| (a) | Chromosomes will be present at the end of this cell division | (1) |
| (b) | Daughter cells will be present at the end of this cell division | (1) |
| | | (12) |

TOTAL QUESTION 1	[50]
TOTAL SECTION A	[50]

SECTION B**QUESTION 2**

2.1

Lung cancer is one of the most significant and dangerous healthy issues today, and it is also a major cause of death. Small cell lung cancer and non-small lung cancer are (NSCLC) are two types of lung cancer.

The most successful treatment for early stage lung cancer is surgery, however, patients with advanced lung cancer, for whom surgery is no longer an option, frequent turn to radiotherapy, chemotherapy, and targeted therapy as their final option.

Ongoing drug therapies have many side effects and other others being sought at present, so this is malignancy still remains incurable, requiring traditional medicine as an alternate source to treat lung cancer and reduce death rate.
<https://my.clevelandclinic.org/health/diseases/4375-lung-cancer>

- 2.1.1 Give ONE reason why do you think lung cancer is considered as dangerous (1)
- 2.1.2 State TWO ways of treating cancer mentioned in the extract (2)
- 2.1.3 List TWO causes of cancer studied (2)
(5)



2.2 The table below shows the composition of certain food types in the human diet per 100g units

Food type	Energy (KJ)	Proteins (g)	Fats (g)	Carbo-hydrates (g)	Calcium (mg)	Iron (mg)	Vit A (Ug)	Vit C (Ug)
Bacon	1983	18.0	52.0	0	15	0	0	0
Beans	376	7.0	0.4	22.0	65	2.4	298	0
Bread	1072	8.8	1.4	58.1	1.2	1.8	0	0
Butter	3230	0.2	87.3	0	1.7	0	2015	1.5
Milk	281	3.9	4.6	5.4	129	0.15	87	0.1

2.2.1 Identify the food type that supplies the most in the nutritional needs of the body. Give a reason for your answer (2)

2.2.2 State the food types from the above table that would be beneficial for:
(a) Growth development (1)

(b) Normal night vision (1)

(c) Preventing anaemia (1)

(d) Preventing bleeding gums (1)

2.2.3 Explain why butter may not be recommended for young children at night (2)
(8)



2.3 The diagram below show how an enzyme functions



Certain washing powders are described as 'biological washing powders' because they contain enzymes. These washing powders are good for removing stains such as egg, chocolate, blood and gravy. In some instances these enzymes are obtained from a type of bacterium. These enzymes are somewhat unusual in that they work optimally (best) at a temperature of 60°C.

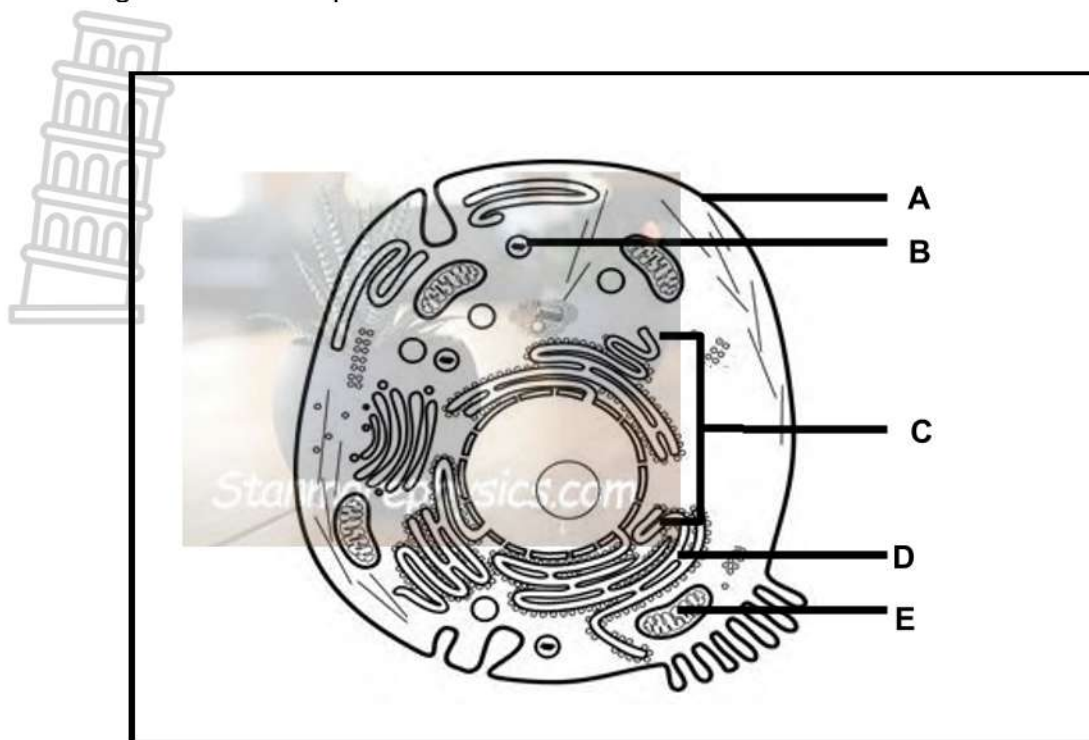
2.3.1 Identify the type of model illustrated in the diagram above (1)

2.3.2 State the property of enzymes represented by the above diagram. (1)

2.3.3 Refer to the extract above:

- (a) Explain why are these 'biological washing powders' more effective than ordinary washing powders at removing the types of stains made by egg, chocolate, blood and gravy? (3)
- (b) Explain why it is unusual for an enzyme to have an optimal temperature of 60°C. (3)
- (8)**

2.4 The diagrams below represents an animal cell



2.4.1 Give only the **LETTER** and **NAME** of the part that:

- (a) Controls the movement of substances into and out of the cell (2)
- (b) Facilitate transport of large molecules within the cell (2)

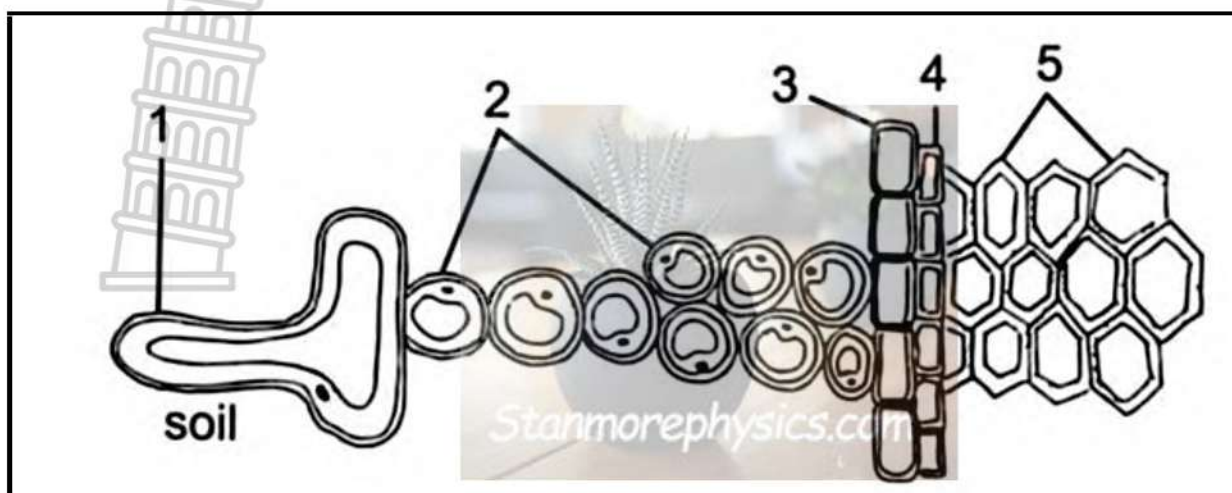
2.4.2 State TWO functions of part labelled **C**

2.4.3 Give TWO visible reason why the above diagram is NOT a plant cell (2)

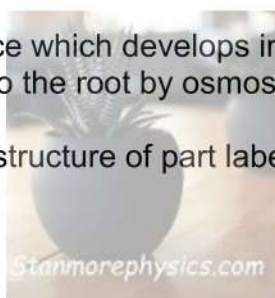
2.4.4 Explain the consequence to the cell if part **E** fails to function (3)

(11)

2.5 Diagram below show a cross section of through an angiosperm root



- 2.5.1 List the NAMES of tissues through which water passes until it reaches the xylem in the correct order. (4)
- 2.5.2 Describe how water enters the structure numbered 1 from the soil (6)
- 2.5.3 Explain TWO ways in which structure numbered 5 is suited for its function (4)
- 2.5.4 Name the force which develops in the root as a result of the absorption into the root by osmosis (1)
- 2.5.5 Describe the structure of part labelled 2 (3)
- (18)



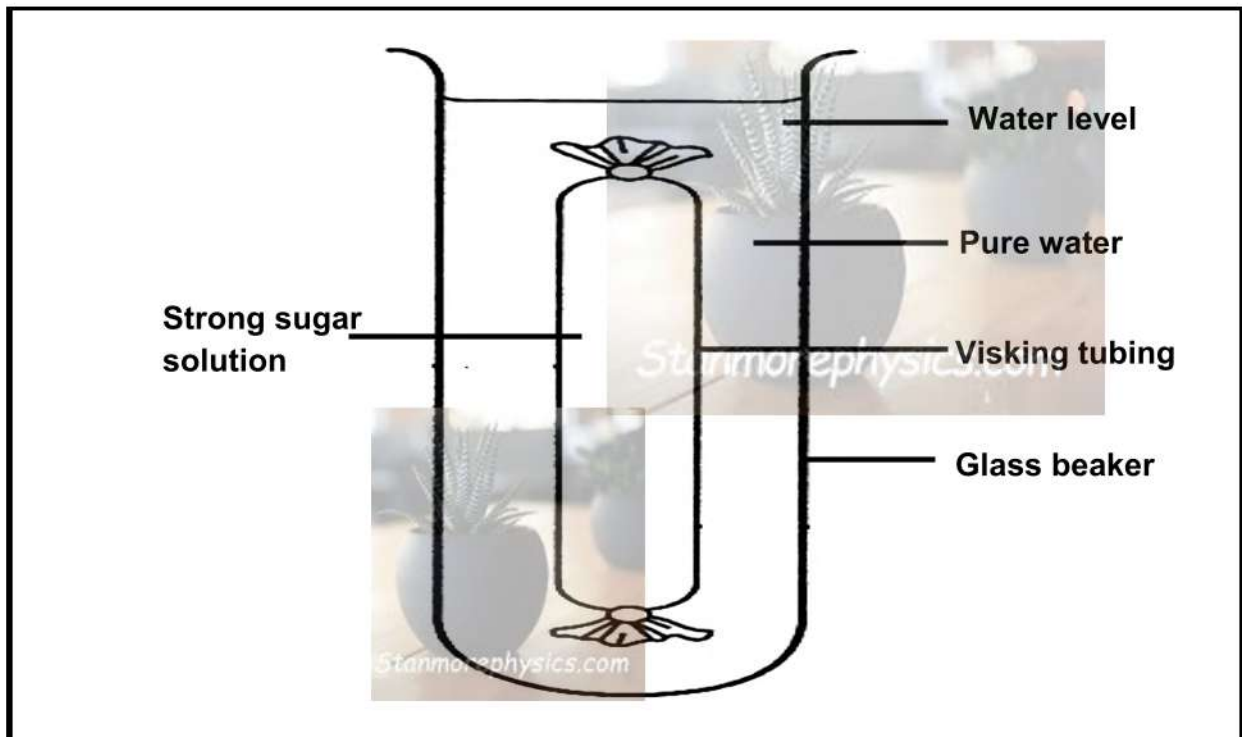
TOTAL QUESTION 2 [50]

QUESTION 3

3.1 Grade 10 learners set up the apparatus below in the school laboratory using visking tubing.(visking tubing allows water to move in and out like the cell membrane of the cell).

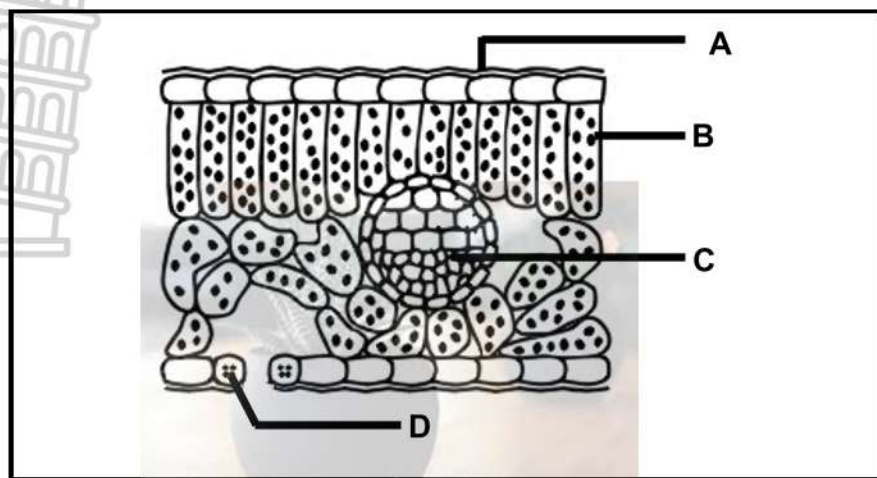
The learners:

- Recorded the level of the water in the beaker at the beginning.
- After 2 hours there was a change in the level of water in the glass beaker and the solution in the visking tubing.



- 3.1.1 State the process that is being illustrated by the learners (1)
- 3.1.2 Explain the reason why learners recorded the level of water in the beaker at the beginning (2)
- 3.1.3 State and explain the reason why molecules like sugars will not pass through the cell membranes (2)
- 3.1.4 Describe the changes that were expected in the level of the strong sugar solution in the visking tubing and pure water in the glass beaker (5)
- (10)

3.2 The diagram below show a cross section of a leaf



3.2.1 Identify part **A**

(1)

3.2.2 Explain how the following parts assist the leaf to perform its function of photosynthesis

(a) **B**

(2)

(b) **C**

(2)

(c) **D**

(2)

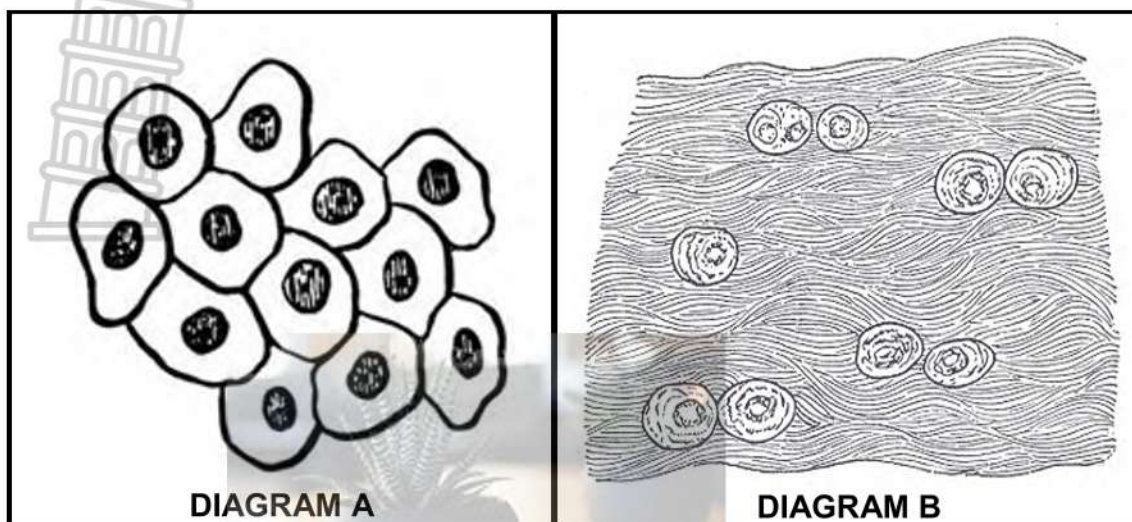
3.2.3 Explain the consequences to the plant if part **B** and part **D** have fewer chloroplast

(3)

(10)



3.3 Diagrams below show animal tissues



3.3.1 Identify diagram:

(a) **A**

(1)

(b) **B**

(1)

3.3.2 State the TWO functions of **diagram A**

(2)

3.3.3 Describe the structure of **diagram B**

(2)

3.3.4 State ONE place where **diagram B** is found in humans

(2)

(7)

3.4 Grade 10 learners conducted an investigation to determine the effect of exercise on heart beat

The heart beat also indicates fitness level of a person

The following procedure was followed:

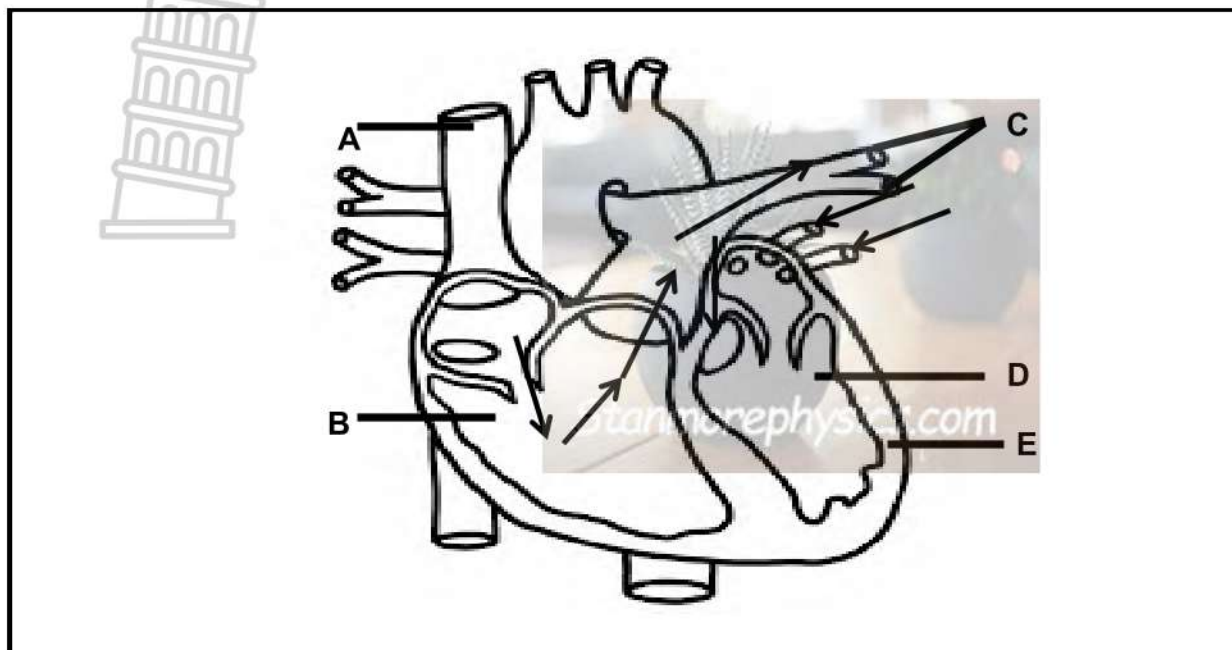
- Three learners of the same age and gender were chosen
- Their heart beat was taken and recorded before the investigation starts
- They were all allowed to jump for a minute and their pulse rates were recorded
- The time for jumping was increased by a minute up to five minutes per individual
- The average of their results was calculated and recorded

The table showing their results is shown below

Beats per minute (bpm)	Learner A	78	78	76	76	78	78
	Learner B	68	68	72	78	84	84
	Learner C	90	115	117	120	122	122
Time of exercise (min)		0	1	2	3	4	5

- 3.4.1 Identify the dependent variable (1)
- 3.4.2 List TWO planning steps for the above investigation (2)
- 3.4.3 State ONE factor that was kept constant during the above investigation (1)
- 3.4.4 Identify which learner is unfit. Explain your answer (2)
- 3.4.5 State what did the learners do to ensure their result were reliable (1)
- 3.4.6 Plot a line graph to represent learner C results (6)
- (13)

3.5 The diagram below shows a structure of a human heart



3.5.1 Identify part **A** (1)

3.5.2 Give ONLY the letter of the part that transport deoxygenated blood to the lungs (1)

3.5.3 Explain how part **E** assist part **D** to perform its function (3)

3.5.4 Tabulate TWO differences of the blood composition that passes part **B** and part **D** (5)
(9)

TOTAL QUESTION 3 [50]

TOTAL SECTION B [100]

GRAND TOTAL [150]



**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

**LIFE SCIENCES
COMMON TEST
JUNE 2023
MARKING GUIDELINE**

MARKS: 150

Stanmorephysics.com

N.B This marking guideline consist of 10 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.

12. **If common names are given in terminology**
13. Accept, provided it was accepted at the national memo discussion meeting.
If only the letter is asked for but only the name is given (and vice versa)
14. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.
15. **Be sensitive to the sense of an answer, which may be stated in a different way.**
16. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
17. **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 B✓✓

1.1.2 C✓✓

1.1.3 A✓✓

1.1.4 C✓✓

1.1.5 D✓✓

1.1.6 D✓✓

1.1.7 C✓✓

1.1.8 A✓✓

1.1.9 D✓✓

1.1.10 D✓✓

10X2 (20)

1.2 1.2.1 Spindle fibres ✓

1.2.2 Transpiration✓

1.2.3 Casparian✓ bands/strips

1.2.4 Foramen magnum✓

1.2.5 Axial skeleton✓

1.2.6 Translocation ✓

1.2.7 Meristematic✓

1.2.8 Iodine solution✓

1.2.9 Palate ✓

1.2.10 Cartilage✓

10x1 (10)

1.3 1.3.1 Both A and B only✓✓

1.3.2 B only✓✓

1.3.3 None ✓✓

1.3.4 Both A and B✓✓

4x2 (8)

1.4 1.4.1 (a) C✓ – Interphase✓

(b) D✓ - Metaphase✓

(c) A ✓ - Anaphase✓

(d) B✓ - Telophase✓

(2)

(2)

(2)

(2)

1.4.2 C,D,A,B✓✓

(2)

1.4.3 (a)4✓ /Four

(b)2✓ /Two

(1)

(1)

(12)

TOTAL QUESTION 1 [50]**TOTAL SECTION A [50]**

SECTION B**QUESTION 2**

- 2.1 2.1.1 Lung cancer easily spread to other parts of the body ✓ since it does not have symptoms at an early stage (1)

(Mark first ONE only)

- 2.1.2 Radiotherapy ✓ (2)
 - chemotherapy ✓
 - surgery ✓
 - targeted therapy ✓

(Mark first TWO only)

- 2.1.3 - chemicals called carcinogen ✓
 - Too much ultraviolet radiation ✓
 - X-rays ✓
 - Radiation from nuclear power stations ✓
 - Viruses ✓
 - Inherited muted genes ✓

(Mark the first TWO only)

(2)

(5)

- 2.2 2.2.1 - Milk ✓
 - It has all the nutrients needed by the body ✓ (2)

- 2.2.2 (a) Bacon ✓ (1)
 (b) Butter ✓ (1)
 (d) Beans ✓ (1)
 (e) Butter ✓ (1)

- 2.2.3 Butter contains high amount of energy / 3230kj ✓ that will keep the children active at night ✓ (2)

**(8)**

- 2.3 2.3.1 Lock and key model (1)

- 2.3.2 Enzyme are specific to the substrate they act on (1)

- 2.3.3 (a)
 - Stains contain organic ✓ compound (lipids, carbohydrates and proteins).
 - Biological washing powders react with stains easily ✓
 - so can remove them due to the presence of ✓ enzymes/proteases. (3)

- (b)
 - Enzymes are sensitive to high temperatures ✓
 - They usually denature ✓ at temperatures of 40-45°C
 - and are not able to function at a temperature of 60°C ✓ (3)
(8)

- 2.4 2.4.1 (a) A ✓ - Cell membrane ✓ (2)
(b) D ✓ - Rough ER ✓ / Endoplasmic reticulum (2)

- 2.4.2 - Controls all the activities of the cell
- Carry hereditary characteristics
(Mark first TWO only) (2)

- 2.4.3 - It does not have cell wall ✓
- It does not have large vacuole ✓
- It does not have chloroplast ✓
(Mark first TWO only) (2)

- 2.4.4 - Cellular respiration will not take place ✓
- The cell will have no energy ✓
- And the cell will die ✓
Any 3 (3)

(11)

- 2.5 2.5.1 parenchyma cells ✓ → endodermis ✓ → pericycle ✓ → xylem ✓ (4)
(credit for CORRECT order only)

- 2.5.2 - water potential in the soil is higher ✓
than that of the cell sap in the vacuole ✓
- water diffuses ✓ from soil along a water potential gradient
- by osmosis ✓ through permeable cell wall and differentially
permeable cell membrane ✓ / plasmalemma / cytoplasm / tonoplast
- into the vacuole of root hair ✓
- absorption of water is a passive process ✓
- and the water potential of cell sap increases ✓
Any 6 (6)

- 2.5.3 - 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

(Mark first TWO only 2 x 2) (4)

- 2.5.4 Root pressure ✓ (1)

- 2.5.5 - Part 2 has a large vacuole ✓
- Has thin cell wall ✓
- Round to oval in shape ✓
- Has intercellular air spaces ✓
Any 3 (3)

(18)

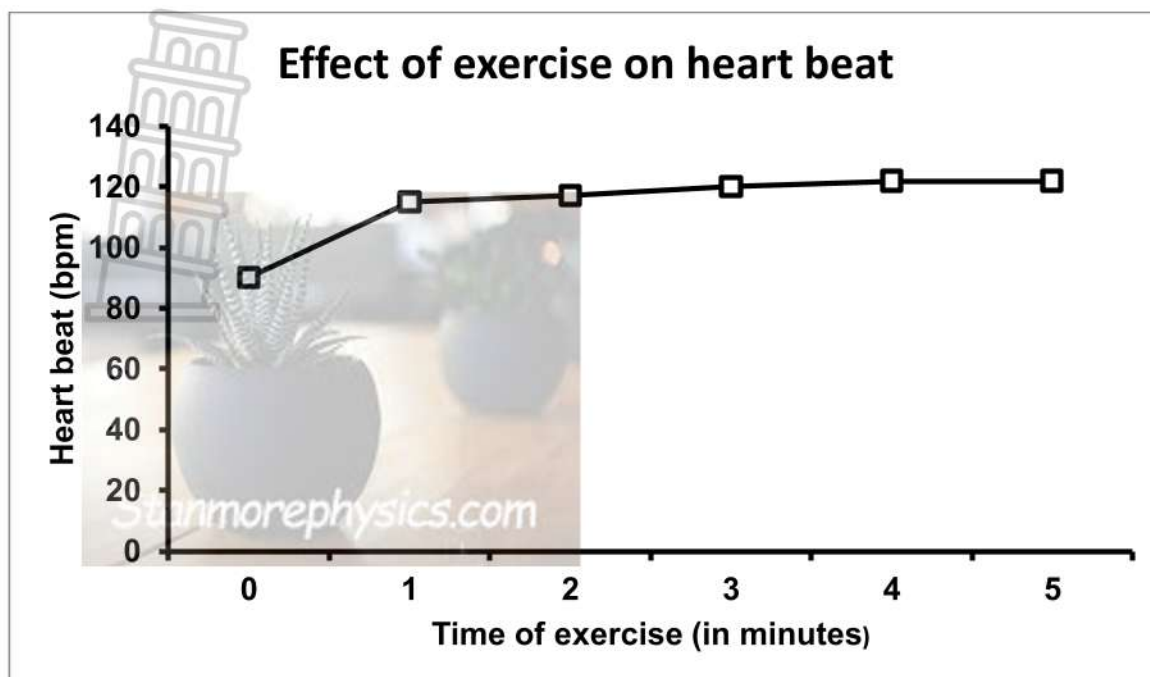
TOTAL QUESTION 2 [50]

QUESTION 3

- 3.1 3.1.1 Osmosis ✓ (1)
- 3.1.2 To have a reference point ✓ where they will compare the results ✓ (2)
- 3.1.3 They are large molecules ✓
Therefore they cannot pass through the selective permeable membrane ✓ (2)
- 3.1.4 - rise in the level of sugar solution ✓
- and decrease in water level in the beaker ✓
- due to water molecules moving from the beaker to visking tubing - from a region of high concentration ✓ /beaker
- to low concentration ✓ /solution in visking tubing
- through visking tubing ✓ /semi permeable membrane
Any 5 (5)
(10)
- 3.2 3.2.1 Cuticle ✓ (1)
- 3.2.2 (a) **B/** Palisade parenchyma cells have chloroplast ✓
-To make food ✓ (2)
- (b) **C/** Phloem carries manufactured food from the leaf ✓
-To all part of the body ✓ (2)
- (c) **D/** Guard cells regulate the amount of water vapour lost by plant during transpiration ✓
-Allow the diffusion of oxygen and carbon dioxide ✓ for photosynthesis
-and transpiration through stomata ✓ (2)
- 3.2.3 - There will be slow production of food ✓
- The cells won't have enough food to function ✓
- This can lead to some cells dying or the plant as a whole ✓ **Any 3** (3)
(10)

- 3.3 3.3.1 (a) Squamous epithelium ✓ (1)
(b) White fibrous tissue ✓ / fibrous cartilage (1)
- 3.3.2 -Protects underlying tissue ✓
-Allow gases like CO₂ and O₂ to pass through the alveoli of the lungs ✓
-Allows substances in solution to pass through the blood capillary walls ✓ (2)
(Mark the first TWO only)
- 3.3.3 -Fibrous connective tissue/diagram B contains dense network of collagen fibres ✓ that make it extremely strong ✓ **Any 2** (2)
- 3.3.4 - Tendons ✓ (1)
- ligaments ✓ (7)
(Mark first ONE only)
- 3.4 3.4.1 Heart beat ✓ (1)
- 3.4.2 -Seeking permission from participants ✓
-Deciding on the venue, time, duration of the investigation ✓
-Deciding on the recording tool ✓
-Deciding on the sample size ✓
(Mark the first TWO only) (2)
- 3.4.3 -Learners of the same age and gender ✓
-Time interval of exercise ✓ (1 minute increase)
(Mark the first ONE only) (1)
- 3.4.4 Learner C ✓*
His/ her heart beat is very high before and after exercise ✓
(*compulsory mark) (2)
- 3.4.5 They calculated the average ✓ (1)

3.4.6

**Marking Rubric:**

Feature	Mark allocation
Caption (C)	1
Correct type of graph(T)	1
Scale on both axis (S)	1
Labels on both axis (L)	1
Plotting (P)	1-5 points plotted correct: 1 All 6 points plotted correct: 2

(6)
(13)

3.5 3.5.1 Superior vena cava ✓ (1)

3.5.2 C ✓ (1)

3.5.3 Part E is thick muscular wall ✓
That provide powerful contractions to left ventricle ✓ /part D to pump
blood to all parts of the body ✓ (3)

3.5.4 ✓

Part B	Part D
Contains blood with high CO ₂ ✓ / carbon dioxide	Contains blood with low CO ₂ ✓ /carbon dioxide
Contains blood with Low O ₂ ✓ /oxygen	Contains blood with high oxygen ✓ /O ₂

(table 1 + 2 x 2) (5)

(10)

TOTAL QUESTION 3 [50]

TOTAL SECTION B [100]

GRAND TOTAL [150]

