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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

UMLAZI DISTRICT

GRADE 10

LIFE SCIENCES P2

NOVEMBER 2025

MARKS: 150

TIME: 2 ½ Hours

This paper consists of 15 pages

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INSTRUCTIONS:

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. Make 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 must use a non-programmable calculator, protractor and a compass, where necessary.
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 - D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The chamber of the heart that has the thickest muscular wall is the ...

A left atrium.

B right atrium.

C left ventricle.

D right ventricle.

1.1.2 The *Aloe ferox* plant grows well on a north-facing slope in the southern hemisphere where it is …

A warm and moist.

B warm and dry.

C cool and moist.

D cool and dry.





1.1.3 The five-kingdom system of classification was proposed by …

A Mayer.

B Pasteur.

C Whittaker.

D Darwin.

1.1.4 The intermediate fossil that shared both reptile and bird characteristics was called …

A coelacanth.

B *Archaeopteryx.*

C trilobite.

D *Rhizobium etli.*

1.1.5 The original landmass that started to break up about 248 mya is known as …

A Laurasia.

B Pangaea.

C Gondwanaland.

D Sodwana Bay.

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1.1.6 Part of the biosphere which consists of soil and rocks is called the …

A lithosphere.
B geosphere.
C atmosphere.
D hydrosphere.

1.1.7 Plants adapted to live in moderate conditions are called …

A hydrophytes.
B xerophytes.
C gametophytes.
D mesophytes.

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1.1.8 The double membrane that encloses and protects the heart is called the …

A periosteum.
B pericardium.
C lumen.
D pleura.



1.1.9 Which one of the following indicates the pathway of systemic circulation?

A heart → body → heart
B heart → lungs → heart
C heart → body → lungs
D heart → lungs → body

1.1.10 Which one of the following is the correct order in the classification of organisms?

A Kingdom, Class, Genus, Species, Phylum
B Kingdom, Phylum, Class, Order, Family
C Phylum, Class, Genus, Kingdom, Species
D Class, Phylum, Genus, Species, Kingdom

(10 x 2) **(20)**

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1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question numbers (1.2.1 to 1.2.10) in the ANSWER BOOK.

1.2.1 Blood vessel that allows for the entry and exit of substances through its walls.

1.2.2 Non-living factors in an ecosystem.

1.2.3 The height above sea level.

1.2.4 Period around 543 mya during which there was a rapid increase in the number of species on Earth. downloaded from Stanmorephysics

1.2.5 The layer of gases surrounding the Earth.

1.2.6 The kingdom consisting of organisms without a nuclear membrane.

1.2.7 Permanent disappearance of a species.

1.2.8 The gas required by all organisms for cellular respiration.

1.2.9 The organic material in soil formed during decomposition of organisms.

1.2.10 Period of inactivity by animals in response to low environmental temperatures.

(10 x 1) (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 1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Form in which plants require nitrogen.	A. nitrites B. nitrates
1.3.2 Feeds off dead organic matter.	A. decomposer B. saprophyte
1.3.3 Contains features of two different taxonomic groups.	A. transitional fossil B. trace fossil
1.3.4 Plays a role in the water cycle.	A. evaporation B. condensation
1.3.5 Person who studies fossil.	A. archaeologist B. palaeontologist

(5 x 2) **(10)**

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1.4 Study the table below and answer the questions that follow.

	Taxonomic group	Total SA species	% of Global species
A	Plants	21700	7
B	Reptiles	363	5
C	Birds	858	9
D	Mammals	300	5

1.4.1 Two kingdoms feature in the information listed in the table above.

(a) Identify the Kingdom to which taxonomic groups B, C and D belong. (1)

(b) Tabulate TWO differences between the TWO kingdoms. (5)

1.4.2 Both kingdoms are "Eukaryotes." Explain the term *eukaryote*. (3)

1.4.3 Identify the Kingdom to which mushrooms and yeast belong. (1)

(10)

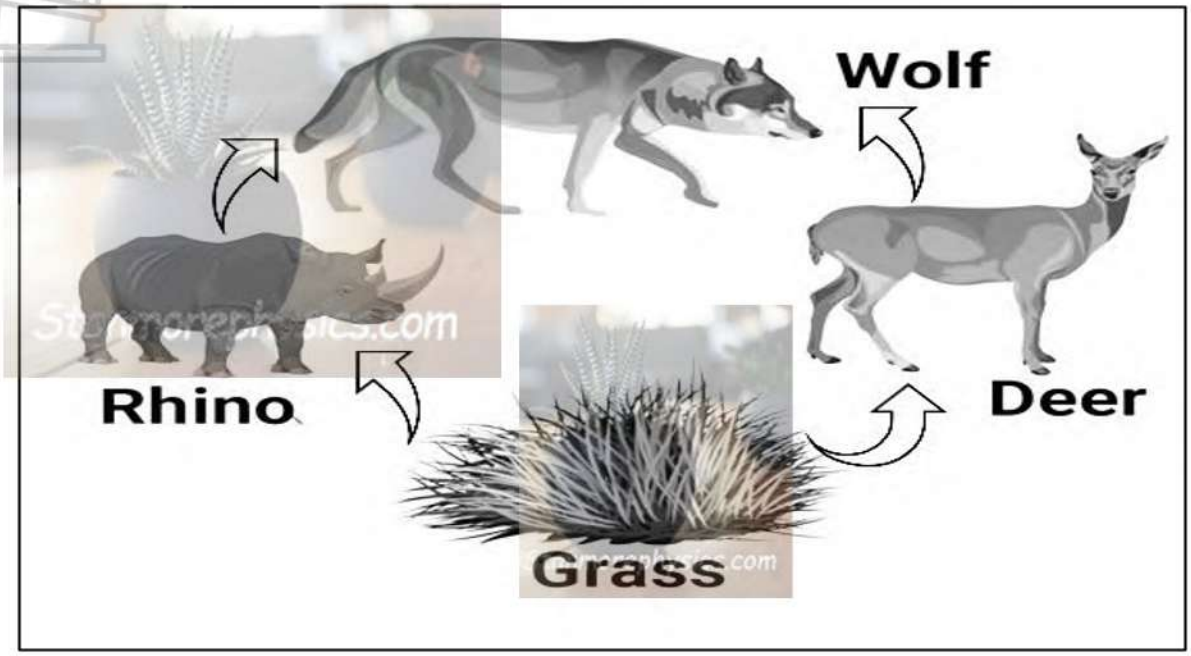
TOTAL SECTION A: [50]

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SECTION B

QUESTION 2

2.1 Study the diagram below that represents feeding relationships in an ecosystem and answer the questions that follow.



2.1.1 Identify ONE primary consumer. (1)

2.1.2 Name the organism that contains the most amount of energy. (1)

2.1.3 Identify the secondary consumer. downloaded from Stanmorephysics (1)

2.1.4 Explain why the organism named in QUESTION 2.1.3 is called a "consumer". (2)

2.1.5 A group of poachers encroached on the above ecosystem which resulted in the loss of all the rhinos.

(a) Define the term *poaching.* (2)

(b) Explain how the above food chain will be affected by the disappearance of the rhinos. (3)

(10)

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2.2 Over a period of several months an ecotourist recorded the following activities of the wildlife in a particular habitat.

1. *Young shoots of a crop of bean plants covered with greenflies (aphids) sucking food from the stems.*
2. *Saw a large bird (hawk), which usually catches mice, swoop to take a small yellow bird clinging to a bean stem. Noticed that these small birds often visit the bean field to eat some of the aphids or butterflies.*
3. *Flowers of beans being visited by many different species of butterfly.*
4. *Mice seen nibbling at some dispersed bean seeds.*
5. *Spider's web constructed between two bean plants with 5 large black flies caught in it. Rotting body of a mouse nearby attracting similar flies.*

2.2.1 Construct a food pyramid that represents the feeding relationships between the aphid, bean plants and yellow birds. (3)

2.2.2 Explain why there are usually no more than four feeding levels in a food chain. (3)

(6)

2.3 Study the information below and answer the questions that follow.

There are different ways of classifying organisms. The two-name system is used internationally to identify organisms.
Examples:
Humans are called *Homo sapiens.*
The lion is *panthera leo*.
Bacillus cereus causes food poisoning.
Bacillus anthracis causes anthrax.

2.3.1 The two-name system is used internationally to identify organisms.

(a) Provide a term used to describe the two-name system of classifying organisms. (1)

(b) Name the taxonomist who devised the two-named system used for classifying organisms. (1)

2.3.2 Give ONLY the species name for humans. (1)

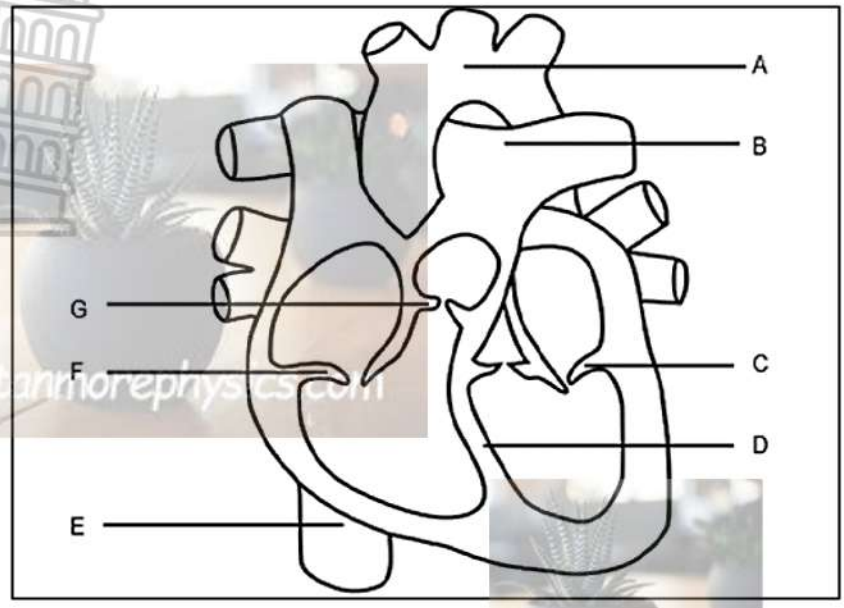
2.3.3 One of the scientific names listed is written incorrectly. Write the scientific name in its the correct form. (1)

2.3.4 Provide TWO reasons why *B. cereus* and *B. anthracis* are related. (2)

(6)

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2.4 Study the diagram of the internal structure of the heart and answer the questions that follow.



2.4.1 Identify the structures labelled:

(a) B. (1)

(b) D. (1)

2.4.2 State ONE function of the valve labelled F. (2)

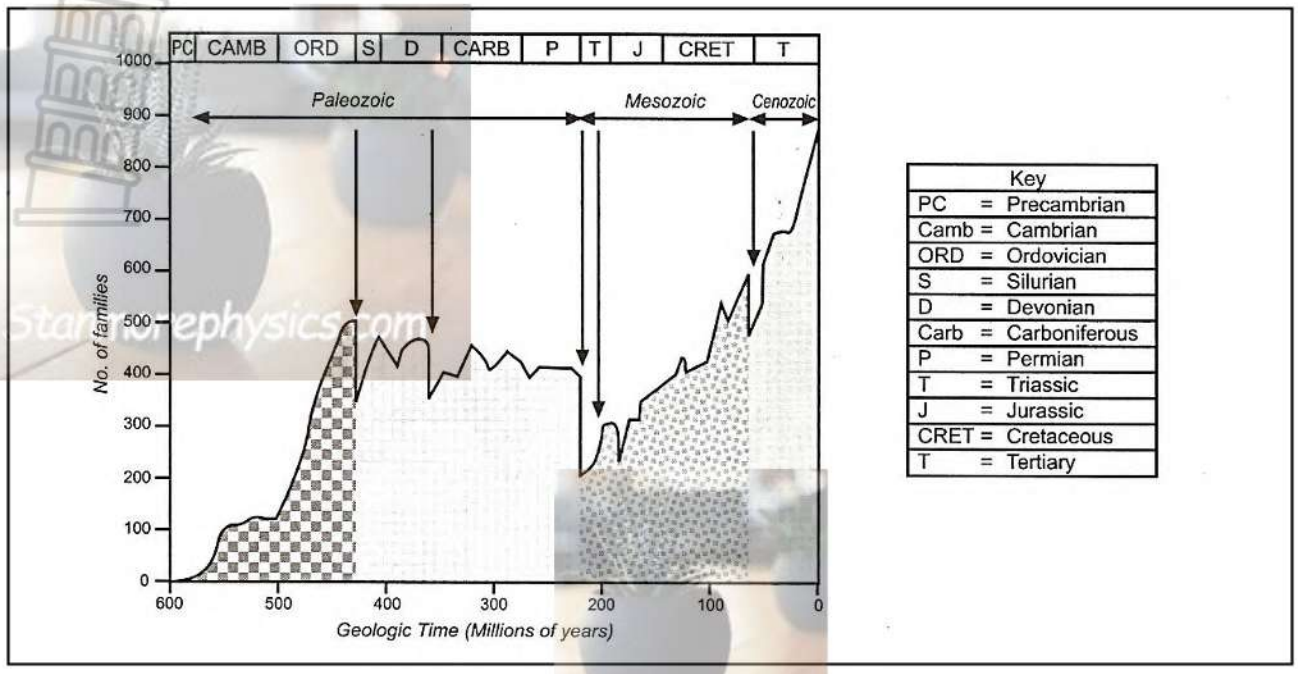
2.4.3 Describe the events that occur during VENTRICULAR SYSTOLE. (4)

2.4.4 Explain how an individual would be affected if part labelled D developed a hole. (2)

(10)

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2.5 Study the geological time scale below and answer the questions that follow.



2.5.1 When did the Mesozoic era start? (1)

2.5.2 List THREE periods belonging to the Palaeozoic Era. (3)

2.5.3 Scientists have discovered an early mammal fossil called *Megaconus* which was nicknamed "Jurassic Squirrel."
Scientists estimated that it was alive exactly in the middle of the Jurassic period.

PERIOD	mya
Cretaceous	140-65
Jurassic	190-140
Triassic	250-190

Show by means of calculations how long ago *Megaconus* existed. (2)

2.5.4 During the Palaeozoic era many land plants and trees evolved.
What significant impact could these plants have made to the environment? (2)

2.5.5 The dinosaurs became extinct at the end of the Cretaceous Period. Scientists suggested that this may have been caused by a volcanic eruption.
Explain fully how the eruption could have caused this extinction. (5)

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2.5.6 Humans are responsible for the sixth mass extinction.

(a) Name the major cause of this current mass extinction. (1)

(b) Describe TWO ways in which human activities have threatened biodiversity. (4)

(18)

[50]

QUESTION 3

3.1 A scientist investigated the water-holding capacity of sand, loam and clay.

The following procedure was carried out:

- 50g of each soil type was placed in identical funnels lined with the same type of filter paper. downloaded from Stanmorephysics
- 100ml of water was added to all 3 samples at the same time.
- The filtrates were collected in 100ml measuring cylinders.

The results are shown in the table below.

Time (in minutes)	Volume of filtrate (in ml)		
	Sand	Loam	Clay
2	10	5	0
4	20	10	0
6	35	20	0
8	50	35	0
10	65	45	10
20	75	55	12
40	75	60	14
60	75	65	16

3.1.1 State the aim of this experiment. (2)

3.1.2 List TWO planning steps for this investigation. (2)

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3.1.3 Identify the:

(a) independent variable. (1)

(b) dependent variable. (1)

(c) TWO controlled variables. (2)

3.1.4 How did the scientist determine the dependent variable? (1)

3.1.5 Using the results from the table:

(a) determine which soil type will be most suitable for gardening. (1)

(b) Explain your answer to QUESTION 3.1.5 (a). (2)

3.1.6 State TWO ways in which the investigator could improve the reliability of this investigation. (2)

(14)

3.2 Read the extract below and answer the questions that follow.

The fynbos vegetation is unique to South Africa. Approximately 70 % of the 9000 plant species are endemic. This vegetation grows in the Southern western parts of the Western Cape. The vegetation of this biome grows in nutrient-poor soil. They survive long, dry summer conditions and frequent fires. Flora of the Cape is threatened by alien vegetation and habitat destruction by humans. Already, many species have become extinct. Hence, its conservation is a national priority.

3.2.1 Name the biome referred to in the extract above. (1)

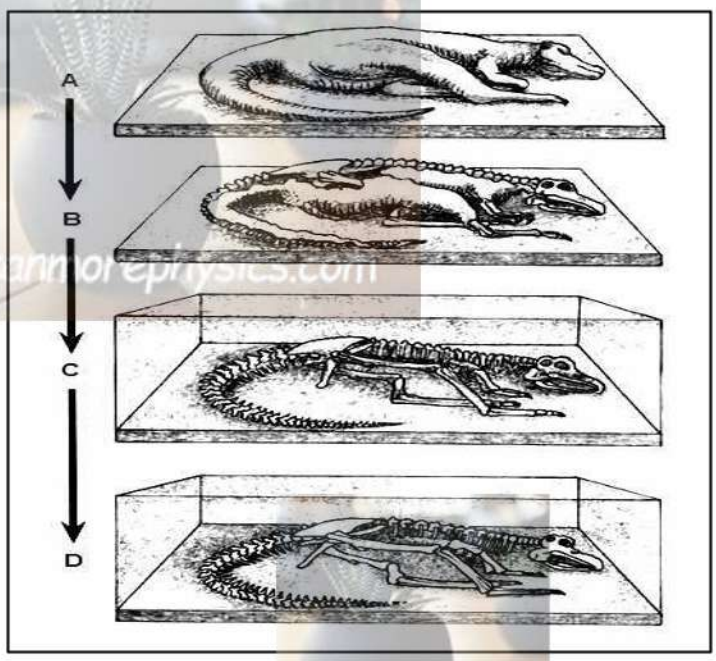
3.2.2 Explain what is meant by the term *endemic.* (2)

3.2.3 Discuss TWO strategies that the government could implement to reduce the problem of habitat destruction. (4)

(7)

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



3.3.1 Define the term *fossil.* (1)

3.3.2 Name the type of rock in which fossils are formed. (1)

3.3.3 Name TWO methods used to determine the age of a fossil. (2)

3.3.4 Explain why there are gaps in the fossil records. (2)

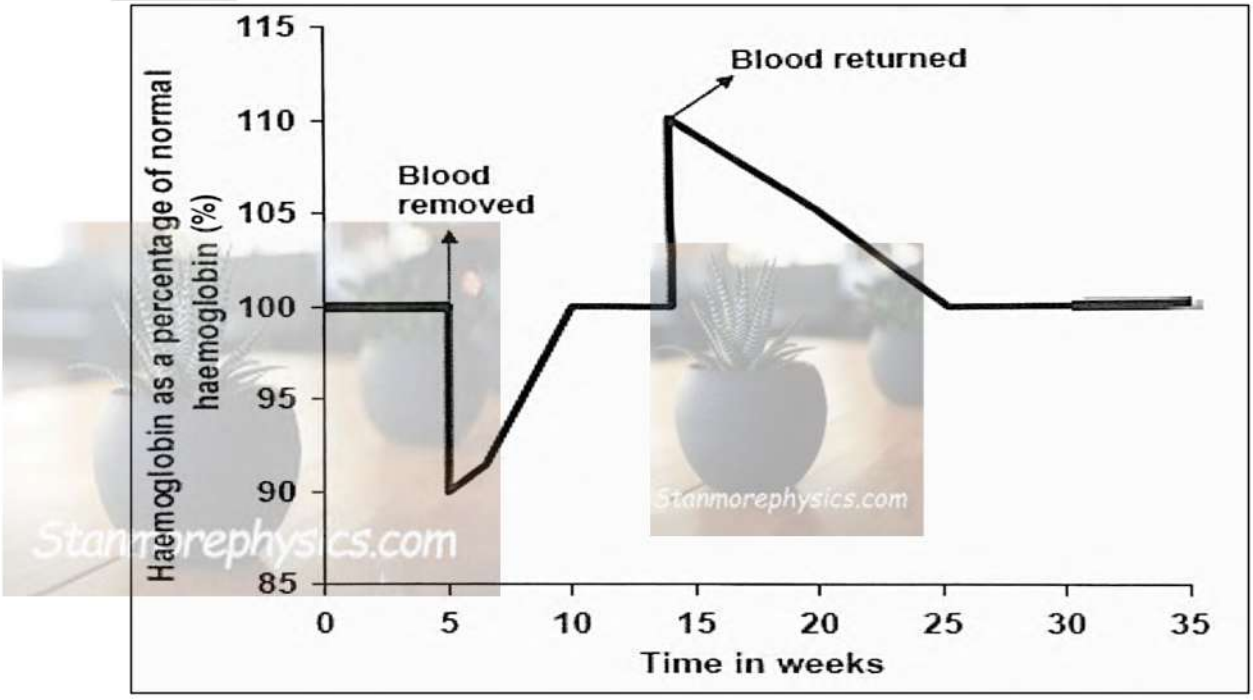
3.3.5 Using the diagrams A-D above, describe how the fossil forms. (3)

(9)

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3.4 In the Olympic Games held in Athens in 2004, a long-distance athlete had 500ml of his blood removed, stored, and returned to his body before he competed in the marathon. This increased the haemoglobin content in his blood. This practice, known as *Blood Doping,* has been banned by officials downloaded from Stanmorephysics.

The graph below shows the blood haemoglobin content of the athlete over 35 weeks.



3.4.1 In which week was the blood removed from the athlete's body? (1)

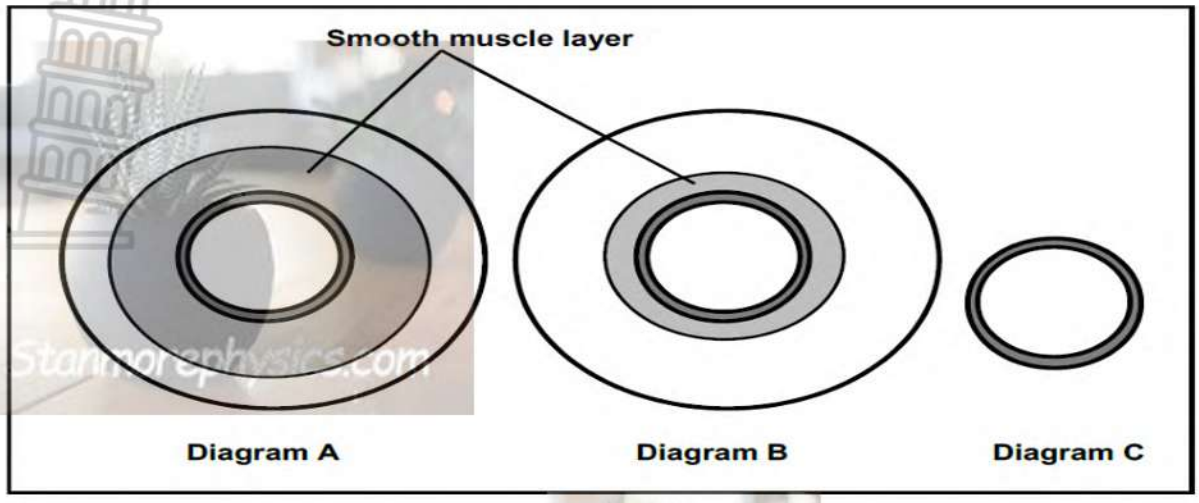
3.4.2 How long did it take for the athlete's haemoglobin level to return to normal after the blood had been removed? (1)

3.4.3 Explain what advantage this athlete would have compared to an athlete who did not undergo *blood doping*. (3)

(5)

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3.5 Diagrams A, B and C below represent 3 types of blood vessels.



3.5.1 Identify the blood vessels A and B. (2)

3.5.2 Explain why the blood vessel in Diagram A has a thicker smooth muscle layer. (2)

3.5.3 List ONE structural feature of the blood vessel in Diagram C. (1)

3.5.4 Compare the composition of blood in the pulmonary artery and the pulmonary vein. (2)
(7)

3.6 During a systole (contraction of the heart), the aorta experiences an increase in blood pressure.

TIME (s)	BLOOD PRESSURE (mmHg)
0.0	80
0.1	90
0.2	95
0.3	100
0.4	110

3.6.1 Calculate the difference in pressure in the aorta between 0.2s and 0.4s. (2)

3.6.2 Draw a line graph to represent the data in the table above. (6)
(8)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150

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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

UMLAZI DISTRICT

GRADE 10

LIFE SCIENCES P2
NOVEMBER 2025
MARKING GUIDELINE

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MARKS: 150

TIME: 2 ½ Hours

These marking guidelines consists of 10 pages.

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PRINCIPLES RELATING TO MARKING LIFE SCIENCES

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

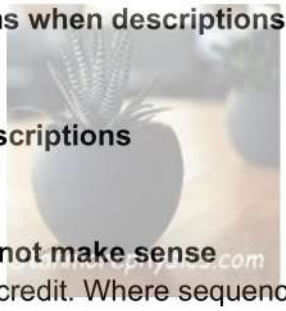
2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

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

4. **If comparisons are asked for and descriptions are given**
   Accept if 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-recognized abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of 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 recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.

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

14. **If only letter is asked for and only name is given (and vice versa)**
    No credit

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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 captions.

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears 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.



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QUESTION 1

1.1.1 C ✓✓
1.1.2 B ✓✓
1.1.3 C ✓✓
1.1.4 B ✓✓
1.1.5 B ✓✓
1.1.6 A ✓✓
1.1.7 D ✓✓
1.1.8 B ✓✓
1.1.9 A ✓✓
1.1.10 B ✓✓ **(10 x 2) (20)**

1.2.1 capillary ✓
1.2.2 abiotic ✓
1.2.3 altitude ✓
1.2.4 cambrian ✓
1.2.5 atmosphere
1.2.6 Monera ✓
1.2.7 extinction ✓
1.2.8 oxygen ✓
1.2.9 humus ✓
1.2.10 hibernation ✓ **(10 x 1) (10)**

1.3.1 B only ✓✓
1.3.2 Both A and B ✓✓
1.3.3 A only ✓✓
1.3.4 Both A and B
1.3.5 B only ✓✓ **(5 x 2) (10)**

1.4.1 (a) Animalia ✓ (1)

(b) **Table** ✓

Kingdom Plantae	Kingdom Animalia
1. Autotrophs/ contain chlorophyll✓	1.Heterotrophs/ no chlorophyll✓
2. Has a cell wall✓	2.No cell wall ✓

(5)

1.4.2 True nucleus ✓✓ with membrane bound organelles✓ (3)

OR

Nuclear material ✓is surrounded by a nuclear membrane✓ with membrane-bound organelles✓

1.4.3 Fungi ✓ (1)

(10)

TOTAL SECTION A: [50]

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SECTION B

QUESTION 2

2.1.1 deer✓ / rhino✓ (any one) (1)

2.1.2 grass✓ (1)

2.1.3 wolf✓ (1)

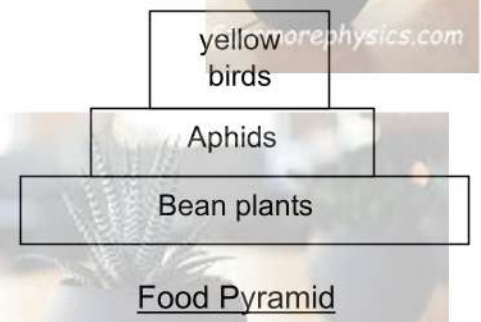
2.1.4 The consumer is unable to make its own food ✓✓ / (cannot photosynthesize) (2)

2.1.5 (a) Illegal hunting ✓/ killing/ capturing of organisms for bushmeat ✓ or body parts. downloaded from Stanmorephysics (2)

(b)
- The deer population will decrease ✓ rapidly as the wolf only has the deer✓to feed on.
- Grass will be overpopulated✓/ increase
- The wolf population could decrease✓as their available food source decreases✓ /may leave the area in search of food. ✓

(any 3 x 1) (3)
(10)

2.2.1



Food Pyramid

* (accept triangular shape with L1 being the widest part/base)

Correct Caption	1 mark
Correct Shape	1 mark
Organisms in the correct order	1 mark

(3)

2.2.2
- Energy is lost at each trophic level. ✓* **(compulsory mark)**
- Less energy is passed onto to next trophic level ✓
- Energy will be used for the organism's own metabolism i.e. energy used for reproduction ✓ movement /digestion/ defaecation/ growth
- Hence, no more energy is available for the existence and sustainability of the fifth trophic level. ✓ (1 + any 2) (3)

(6)

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2.3.1 (a) binomial nomenclature√ ✓ (accept binomial system) (1)

(b) Carolus Linnaeus√ ✓ (accept Carl Linnaeus) (1)

2.3.2 *sapiens* ✓ (1)

2.3.3 *Panthera leo* ✓ (1)

2.3.4 Both belong to the same genus ✓ hence, share similar characteristics ✓ (2)

(6)

2.4.1 (a) pulmonary artery ✓ (1)

(b) septum ✓ (1)

2.4.2 prevents the backflow of blood ✓✓ into right atrium (2)

2.4.3
- muscles of ventricles contract ✓
- bicuspid valve and tricuspid valves close✓
- semi-lunar valves in pulmonary artery and aorta open ✓
- blood pushed/ forced in the pulmonary artery and aorta out of ventricles✓ (4)

2.4.4
- There will be mixing of oxygenated and deoxygenated blood ✓,
- the organs would not get enough oxygenated blood ✓,
- causing cells and organs to be oxygen deficient ✓/may even cause death✓.downloaded from Stanmorephysics.com
- Deoxygenated blood would enter the left ventricle ✓
- and will be pumped back into cells ✓
- Accumulation of carbon dioxide is toxic to cells ✓ (any 2 x 1) (2)

(10)

2.5.1 220 mya✓ (accept 220-230 mya) (1)

2.5.2 Cambrian ✓ Ordovician✓ Silurian✓/ Devonian / Carboniferous / Permian
(Mark first THREE only) (any 3 x 1) (3)

2.5.3 $\frac{(190 + 140)}{2}$ ✓
= 165 mya ✓ (2)

2.5.4 Produced large amounts of oxygen✓ which increased the biodiversity of organisms✓ (2)

2.5.5
- Large amounts of dust and ash, poisonous gases✓after an eruption
- Could block out the sun's rays✓ leading to less photosynthesis✓ and therefore, less oxygen✓ and food✓
- It could also cause the cooling of the atmosphere✓
- Since the dinosaurs could not adapt✓ to the change in climate✓
- they became extinct (any 5 x1) (5)

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2.5.6 (a) Global warming✓ (1)

(b)
- Rapidly growing population ✓ -More land needed for agriculture/ to grow food /to build houses. ✓
- Pollution from industry/ agriculture ✓ – makes an area uninhabitable and therefore many species die out/leave the area. ✓
- Habitat destruction /clearing of forests/ filling in wetlands ✓- causes organisms to move out of their natural habitat/ die-✓ reducing the number of species. ✓
- Climate change/ global warming ✓- cause melting of ice caps and rising sea
- levels-✓ many species may not be able to adapt to changes and die out✓.
- Urban expansion/ building roads/ dams, highways may separate
- organisms from their population ✓ – reducing chances of reproduction. ✓ downloaded from Stanmorephysics
- Introducing alien species to an ecosystem -which outcompete indigenous species, ✓ reducing their (indigenous) varieties. ✓
- Harvesting natural resources at faster rates✓ –does not allow organisms enough time to reproduce to replace lost organisms. ✓

(any 2 x 2) (4)

(18)

[50]

QUESTION 3

3.1.1 To investigate/determine the water holding capacity ✓of sand, loam and clay✓. (2)

3.1.2
- Decide on the amount of soil to use
- Decide on the types of soil to use
- Decide on recording tool
- Decide on the type / size of filter paper to be used
- Decide on the type / size of funnels to be used
- Decide on the type / size of measuring cylinders paper to be used
- Decide on the amount of water to use
- Decide on a venue/ time (any 2 x1) (2)

3.1.3 (a) type of soil ✓ (1)

(b) water holding capacity / water retention✓ (1)

(c)
- same quantity/ 50g of soil used per soil sample
- same type/size of funnels ✓
- same type/size measuring cylinder
- same type/size filter paper
- 100ml water/ same amount added to each soil sample ✓
- water added to each sample at the same time✓ (any 2 x 1) (2)

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3.1.4 By determining the volume of water that did not filter through the soil✓.

OR

Initial volume – filtrate = water holding/ retention capacity (1)

3.1.5 (a) Loam✓ (1)

(b) Loam has a medium /moderate water holding capacity ✓✓ (2)

3.1.6 Repeat the experiment many times ✓ and calculate the average
Increase the sample size✓ (2)

(14)

3.2.1 Fynbos✓ (1)

3.2.2 Plant and animal species found in a particular place only ✓ and nowhere else in the world✓ (2)

3.2.3
- Create awareness through education✓- to promote sustainable use of resources✓
- Stricter laws/fines to be imposed ✓ to deal with offences ✓
- Create and manage protective areas✓- to conserve endemic species✓
- Support community- based projects ✓ that are involved in conservation efforts ✓
- Monitor sustainable agriculture ✓ and take firm action against industries/
- parties that are responsible for habitat destruction✓
- Monitor population growth ✓which impacts food consumption/ habitat loss✓
- Reforestation/ land restoration projects can be implemented✓ - to repair damages to habitats ✓ (any 2 x 2) (4)

(7)

3.3.1 A fossil is the preserved remains✓ of organism found in rocks. (1)

3.3.2 sedimentary rock ✓ (1)

3.3.3 radiometric dating ✓ and relative dating ✓ (2)

3.3.4
- Fossils may not be discovered✓
- Conditions needed for fossilization may not be suitable✓
- Existing fossils may be destroyed by erosion/ tectonics✓
- Fossils may not be discovered✓
- Soft bodied fossils may not have been preserved ✓ (no hard shells, bones) (any 2 x 1) (2)

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3.3.5 Formation of fossils (3)

- Animal dies and sinks to the bottom and is covered with sand and silt√
- Soft parts quickly decay and the hard parts remain√
- Sediments soon begin to pile over the animal and rapid burial is essential for fossilization. √
- Over time minerals seep into the ones replacing the organic part of the bone √
- Pressure builds up on the lower sediments as more sediment accumulate. √
- Slowly the sediments and bones are turned into rock. √

(9)

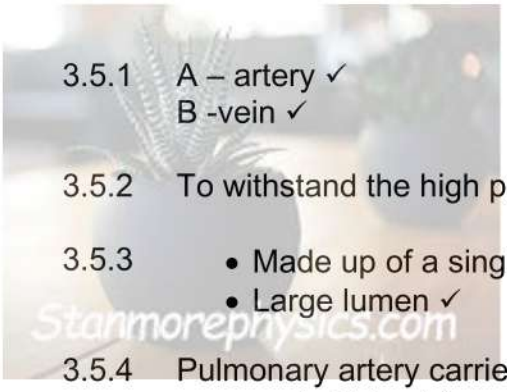
3.4.1 Week 5 ✓ (1)

3.4.2 Five weeks✓ / 5 weeks (1)

3.4.3 The athlete will have more haemoglobin ✓ to carry more oxygen to the muscles. ✓
More energy is available for the athlete during the race. ✓ (3)

(5)





3.5.1 A – artery ✓
B -vein ✓ (2)

3.5.2 To withstand the high pressure✓of the blood✓ travelling within it (2)

3.5.3
- Made up of a single layer of epithelial cells✓
- Large lumen ✓ (any 1 x1) (1)

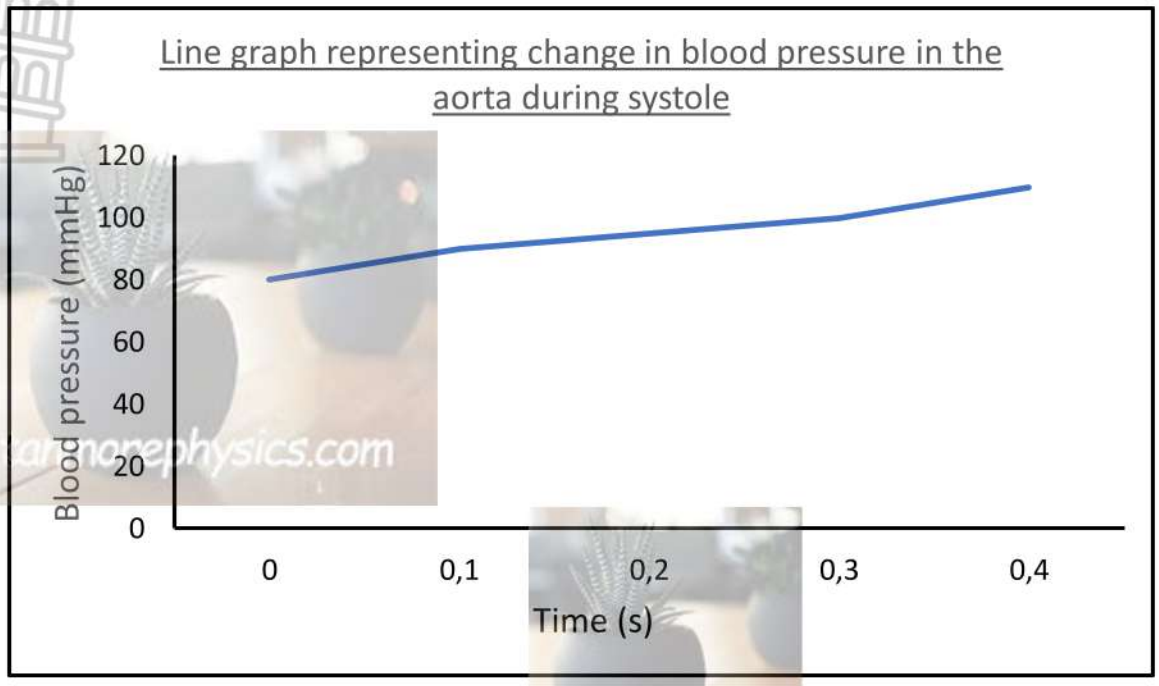
3.5.4 Pulmonary artery carries deoxygenated bold ✓ and pulmonary vein carries oxygenated blood✓ (2)

(7)

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3.6.1 110s – 95 ✓ s = 15 ✓ s (2)

3.6.2



Correct Caption	1 mark
Correct label for X & Y axis	1 mark
Correct scale for X & Y axis	1 mark
Correct type of graph	1 mark
Plotted points: all 5 points correct 1 – 4 points correct	2 marks 1 mark

(6)

(8)

[50]

TOTAL SECTION B: 100

GRAND TOTAL: 150