LIMPOPO

PROVINCIAL GOVERNMENT

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF

EDUCATION

NATIONAL

SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES FORMAL TEST 3

20 September 2023

MARKS: 60

TIME: 1 hour

This question paper consists of 10 pages including the cover page

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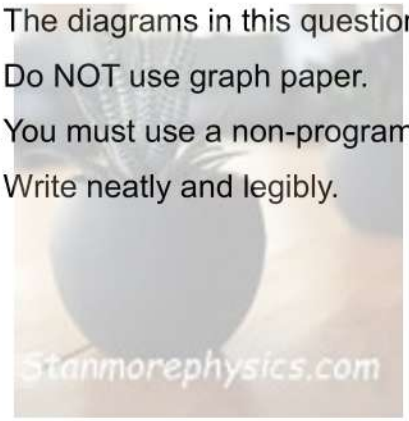
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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. Choose the correct answer and write only the letter (A-D) next to the question number (1.1.1 to 1.1.3) in the ANSWER BOOK, for example 1.1.4.D

1.1.1 Oxygen moves into the tissues as the blood is flowing through the:

A Arteries

B Capillaries

C Veins

D Arteries and veins

1.1.2. Which row in the table below correctly shows the change in concentrations of oxygen and carbon dioxide in the blood as it passes through the lungs

	Concentration in blood	
	Oxygen	Carbon dioxide
A	increases	decreases
B	increases	increases
C	decreases	decreases
D	decreases	increases

1.1.3 The table below displays the blood groups of 200 students. What percentage of students have blood type A?

Blood group	Number of students
O	94
A	84
B	16
AB	6

A 42%

B 45%

C 84%

D 90%

(3x2) **(6)**

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 1.2.4) in your ANSWER BOOK.

1.2.1. The circulatory system that starts in capillaries and ends in capillaries and carries blood in a single direction

1.2.2. The valve between the right atrium and right ventricle

1.2.3. Scientist who studies fossils

1.2.4. The fluid component of blood

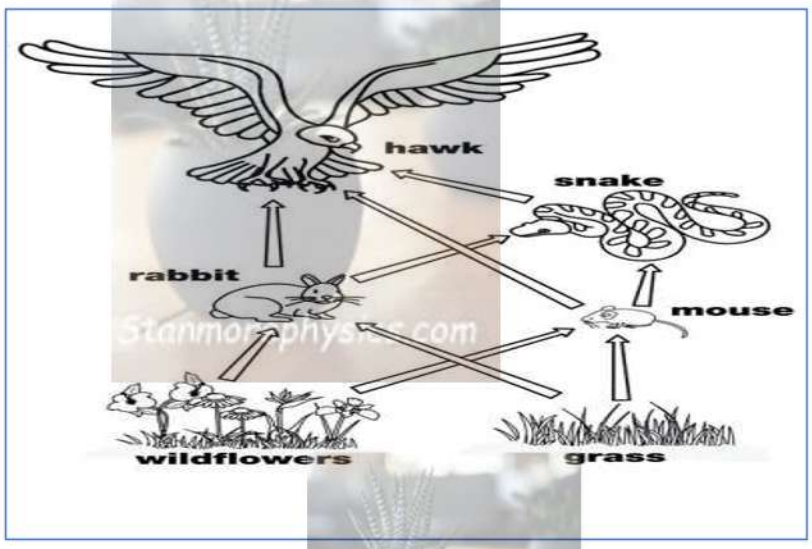
(4 x 1) **(4)**

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.	Method used to determine the age of a fossil	A. Radiometric dating B. Relative dating
1.3.2.	Relaxation of the heart muscle	A Diastole B Accelerans nerve

(2x2) **(4)**

1.4. The diagram below illustrates a feeding relationship of different animals in an ecosystem. Study the diagram and answer the questions that follow.



1.4.1 What is the name of this type of a diagram? (2)

1.4.2. Identify an organism in the diagram which is a:

a) Herbivore (1)

b) Tertiary consumer (1)

1.4.3. Briefly explain the role of decomposers in the ecosystem where the above food chain occurs (2)

(6)

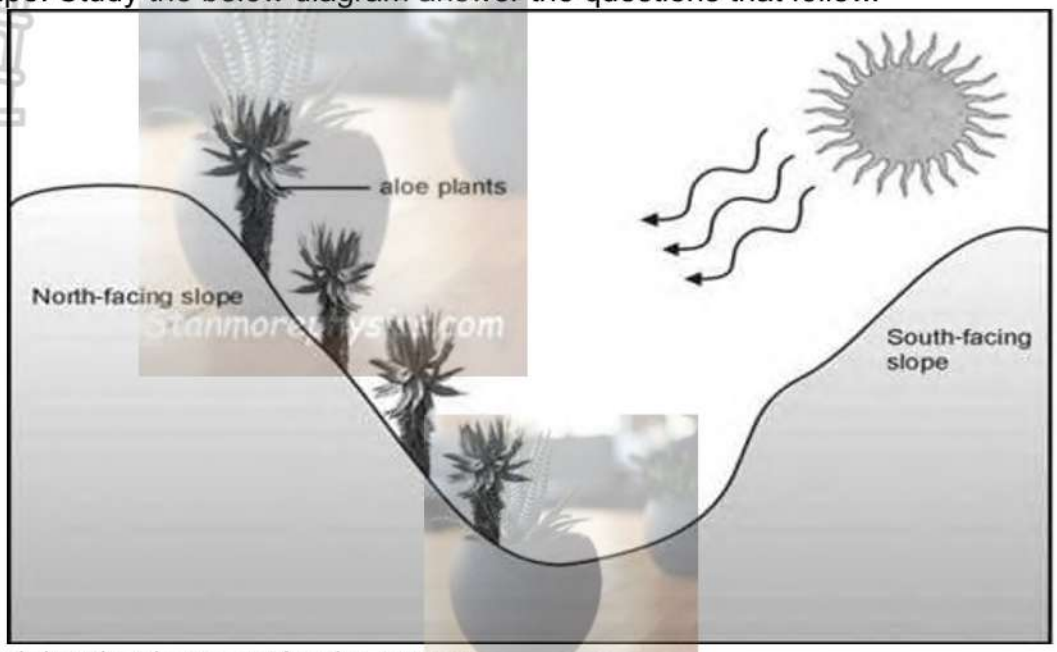
[20]

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2.1. Aloes generally grow on rocky north-facing slopes, especially in the Eastern Cape. Study the below diagram answer the questions that follow.



2.1.1 Explain what is meant by the terms:

(a) Aspect (1)

(b) Altitude (1)

2.1.2. Why do aloes prefer to grow on North facing slope rather than South facing slope? (2)

2.1.3. Give TWO abiotic factors that can be seen in the above diagram (2)

2.1.4. Explain TWO structural adaptations of the leaves of aloe plants to its xerophytic mode of life. (2)

(8)

2.2. The table below shows the results of an investigation which measured the average global carbon dioxide levels in the atmosphere over a five-year period

Year	Carbon dioxide level (parts per million)
2004	376,0
2005	377,0
2006	379,5
2007	381,0
2008	383,5

2.2.1 What is the dependent variable in the above investigation? (1)

2.2.2. Calculate the increase in carbon dioxide from 2004 to 2008.
Show all calculations. (2)

2.2.3. Describe how an increase in carbon dioxide levels can lead to climate change (4)

2.2.4. Your carbon footprint is the amount of carbon dioxide you release into the atmosphere during your daily activities.
Suggest THREE human activities which would cause an increase in the carbon footprint in the atmosphere. (3)

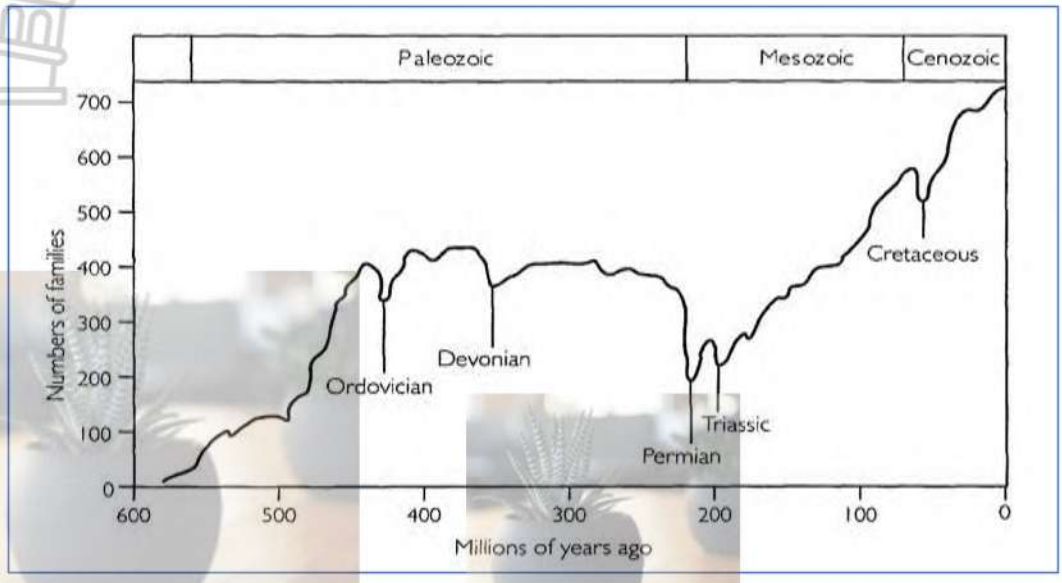
2.2.5. How would you decrease your carbon footprint.? Mention TWO ways (2)

(12)

[20]

QUESTION 3

3.1. The diagram below represents a simplified geological time-scale showing how the number of families (groups of related species) has changed over a period of time.



3.1.1 How many mass extinctions took place since the creation of the earth? (2)

3.1.2. Which mass extinction took place towards the end of the Palaeozoic era? (1)

3.1.3. Which era had the longest duration? (1)

3.1.4. Name TWO factors or events known to have caused mass extinctions. (2)

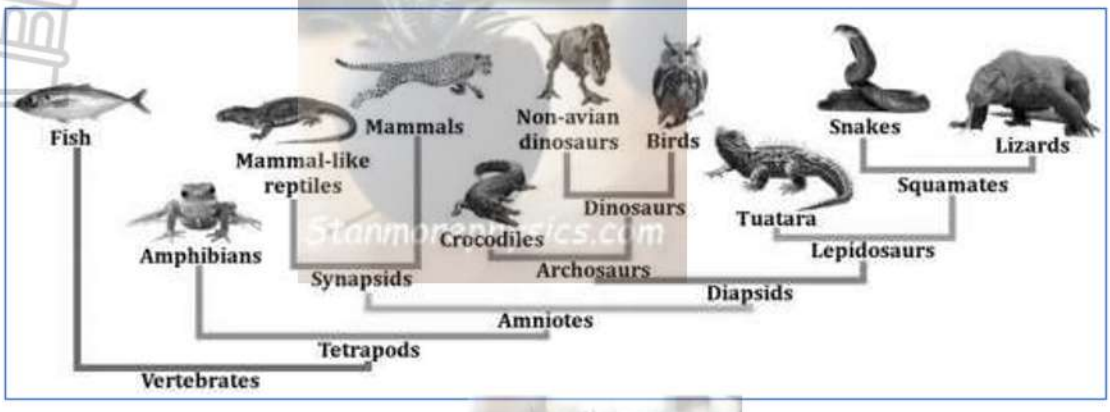
3.1.5. When did the Triassic extinction take place? (1)

3.1.6. Which extinction was the biggest in terms of the number of families that went extinct? (1)

3.1.7. Scientists believe that we are currently experiencing the sixth mass extinction. What could be thought to be the cause of this mass extinction? (1)

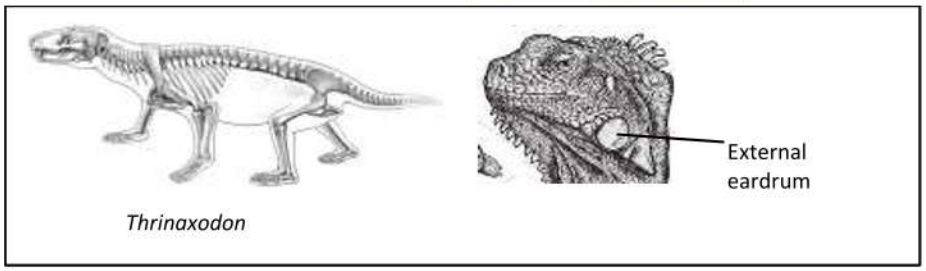
(9)

3.2. According to classification of vertebrates, some ancient reptiles developed into mammals and other reptiles developed into birds. Study the classification diagram below of reptile related families and answer the questions that follow.



3.2.1 Which group of vertebrates was the ancestor of mammals and mammal-like reptiles according to the diagram above? (1)

3.2.2. The Thrinaxodon is a mammal-like reptile with the following features: Strong limbs for burrowing, Teeth, External eardrum, Hair , Warm blooded metabolism, Laying eggs, body lifted from the ground



. (a) Give ONE typical reptile– like feature of Thrinaxodon (1)

(b) Provide TWO typical mammal-like features of Thrinaxodon (2)

3.2.3. Archaeopteryx was a bird-like reptile that went extinct about 150 million years ago and had the following features: Small teeth, Feathers, Vertebrae in the tail, Claws on forelimbs, Hollow bones, Wings, Laying eggs, Beak

(a) Archaeopteryx had features of both reptiles and birds. Name TWO typical bird-like features of this fossil (2)

(b) State ONE typical reptile-like feature of Archaeopteryx. (1)

(c) What is the biological term used to describe a fossil that shows characteristics of two different families and seen as "in-between" e.g. Archaeopteryx? (1)

3.2.4. Suggest THREE human impacts on biodiversity and natural environment. (3)

(11)

[20]

TOTAL SECTION B: 40

GRAND TOTAL: 60

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GRADE 10

LIFE SCIENCES FORMAL TEST 3

20 SEPTEMBER 2023

MARKING GUIDELINE

MARKS: 60

These MARKING GUIDELINES consist of 06 pages including the cover page.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2023

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**
   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 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**
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 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 B ✓✓
1.1.2 A ✓✓
1.1.3 A ✓✓

(3x2) **(6)**

1.2.1 Hepatic portal system ✓
1.2.2 Tricuspid valve ✓
1.2.3 Palaeontologist ✓
1.2.4 Plasma ✓ (4x1) **(4)**

1.3.1 Both A and B ✓✓
1.3.2 A ✓✓ (2x2) **(4)**

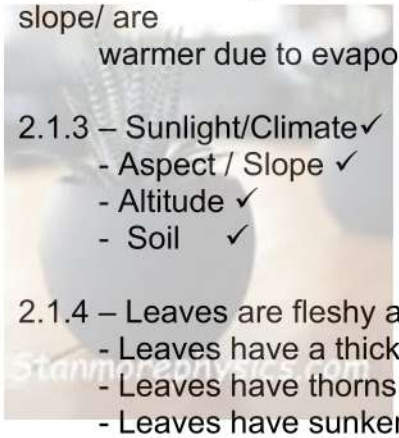
1.4.1 Food web ✓✓
1.4.2 a) Rabbit/ Mouse ✓
b) Hawk ✓
1.4.3 Decomposers break down dead plants and animal matter into substances that plants need to make more food ✓✓ **(6)**

[20]
TOTAL SECTION A: 20

SECTION B
QUESTION 2

2.1.1 a) Aspect is the direction that the slope is facing ✓ (1)
b) Altitude is the height above sea level ✓ (1)

2.1.2 North facing slope receives more direct sunlight✓ and is drier than the South-facing slope/ are
warmer due to evaporation✓ (2)



2.1.3 – Sunlight/Climate✓
- Aspect / Slope ✓
- Altitude ✓
- Soil ✓ (Any 2x1) (2)

2.1.4 – Leaves are fleshy and thick✓ – to reduce transpiration rate. ✓
- Leaves have a thick cuticle ✓– to reduce transpiration rate. ✓
- Leaves have thorns on them ✓– to reduce transpiration rate✓.
- Leaves have sunken stomata ✓– to reduce transpiration rate ✓

(Any 1x2) (2)

(8)

2.2.1 Carbon dioxide level ✓ (1)

2.2.2 383,5 – 376,0 = 7,5 ✓parts per million* (* COMPULSORY) ✓ (2)

2.2.3 – An increase in carbon dioxide in the atmosphere absorbs the heat energy / acts as a blanket ✓
- trapping the heat and preventing it from escaping into outer space ✓
- The Earth's temperature therefore rises ✓
- This is called global warming ✓
- Thus leading to climate change ✓ (4x1) (4)

2.2.4 – Burning of wood / fossil fuels for heat ✓
- Deforestation for agriculture, factories, papers, etc ✓
- Driving motor vehicle ✓
- Using electricity from coal-power station ✓ (Any 3x1) (3)

2.2.5 – Use common transport ✓
- Walk instead of driving ✓
- Use less electricity ✓
- Reduce / re-use / recycle ✓ (Any 2 x1) (2)

(12)

[20]

QUESTION 3

3.1.1 5 ✓ (1)

3.1.2 Permian ✓ (1)

3.1.3 Palaeozoic ✓ (1)

3.1.4 - Volcanic activity ✓
- Asteroid / comet impact ✓
- Climate change ✓
- Glaciation / drop in sea level ✓ (Any 2 x 1) (2)

3.1.5 200 mya* ✓ (1)

3.1.6 Permian ✓ (1)

3.1.7 Exploitation of the environment by humans ✓ (1)

(9)

3.2.

3.2.1 Synapsid ✓ (1)

3.2.2(a). External eardrum / laying eggs ✓ ANY (1)

3.2.2(b) - Teeth ✓
- Hair ✓
- Warm blooded metabolism ✓
- Body lifted from the ground ✓ ANY (2)

3.2.3(a) Feathers✓ / hollow bones✓ / wings/beak ✓ ANY TWO (2)

3.2.3(b) Small teeth✓ / vertebrae in tail✓ / claws on front limbs ✓ ANY ONE (1)

3.2.3(c) Missing link / transitional fossil. ✓ (1)

3.2.4 – Destruction of habitat ✓
- pollution, leading to climate change ✓
- planting of invasive or alien plants ✓
- Over- exploitation of resources. ✓ ANY THREE (3)

(11)

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[20]

TOTAL SECTION B: 40
GRAND TOTAL 60