+ Memo

Hillcrest High School

Time: 2½ hours

November 2017
Max. Marks: 150

Gr. 10 Life Science
PAPER 2

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. Write neatly and legibly.
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. Only draw diagrams or flow charts when asked to do so.
8. The diagrams in this question paper are NOT all drawn to scale.
9. Do NOT use graph paper.
10. Non-programmable calculators, protractors and compasses may be used.

SECTION A

QUESTION 1

1.1 Various possible answers are provided for each question. Write the letter only of the correct answer next to the corresponding number.

1.1.1 A pacemaker inserted into the heart during an operation performs the function of the:

A. Atrio-ventricular node
B. Septum
C. Sino-aterial node
D. Bicuspid and tricuspid valves

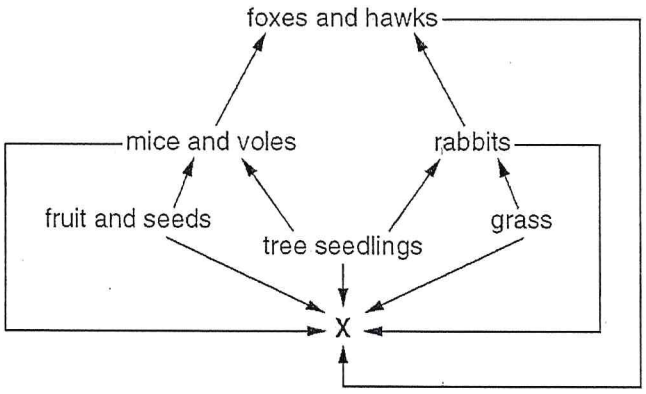
1.1.2 Oxygen moves into tissues from the blood through the:

A. Capillaries
B. Arteries
C. Veins
D. Lymph ducts

1.1.3 What is the original source of energy that flows through a food chain?

A- Carbon dioxide
B- Glucose
C- Oxygen
D- Sunlight

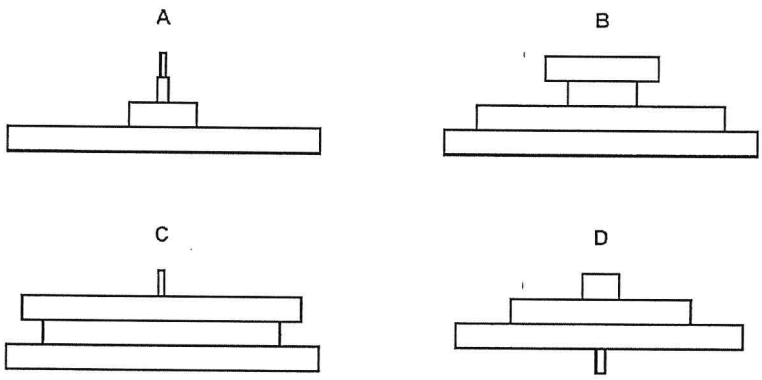
1.1.4 The diagram shows a food web.



Which type of organism is X?

A. Carnivore
B. Decomposer
C. Herbivore
D. Producer

1.1.5 A sparrow hawk eats small birds that feed on caterpillars. Caterpillars feed on plant leaves. Which diagram shows the pyramid of biomass for this food chain?



1.1.6 Scientists define evolution as

A. an explanation of the origin of life.
B. just a controversial theory.
C. how species have changed over time.
D. a form of intelligent design.

1.1.7 What are the remains of living organisms called?

A. Strata
B. Fossils
C. Evolution
D. Minerals

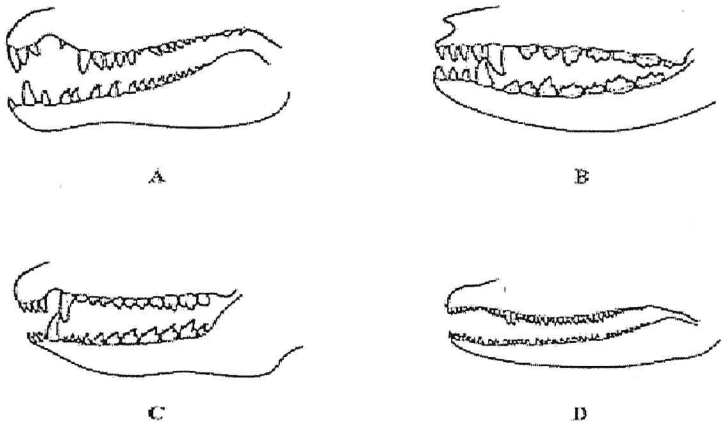
1.1.8 According to the fossil record, 99% of organisms that lived on Earth are

A. endangered.
B. surviving.
C. mutating.
D. extinct.

1.1.9 Evidence for past events that have occurred during Earth's ancient history are recorded in

A. history books.
B. written timelines.
C. fossils within rocks.
D. clothes people wore

1.1.10 The diagrams below show fossil mandibles of ancestors of the cat



Which is the correct order of the jawbones from the oldest to the youngest?

A. D → C → A → B
B. D → B → A → C
C. D → A → C → B
D. D → C → B → A

(10x2=20)

1.2 Provide the correct term for the following :

1.2.1 The lining that surrounds the heart.

1.2.2 Groups of living factors found in an environment.

1.2.3 All water bodies on Earth.

1.2.4 A group of biotic and abiotic factors in an area.

1.2.5 Organisms that are meat eaters.

1.2.6. Biome that contains trees and grass in the Limpopo province.

1.2.7 Major type of soil that is acidic and contains no humus.

1.2.8 The circulation of nitrogen in nature through food chains and food webs.

1.2.9 Groups of plants associated with limited water availability.

1.2.10 Earth's historic timescale

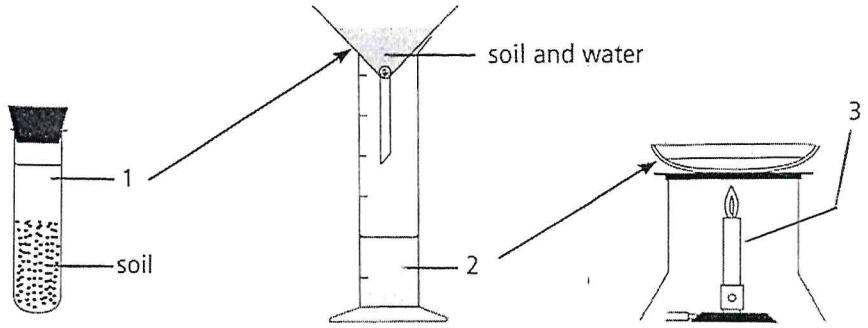
1.2.11 Ancient continent that contained Africa. (11)

1.3 **Indicate whether each of the statements in Column A applies to A only, B only, Both A and B or none of the items in Column B. Write A only, B only, both A and B or none next to the question.**

Column A		Column B
Species found only in one specific area and nowhere else in the world.	A.	Indigenous
	B.	Endemic
The type of organism regarded as a link between fish and amphibians	A.	Dinosaur
	B.	Coelacanth
A fossil that has characteristics of organisms belonging to two different taxa	A.	Transitional fossils
	B.	Cast fossils
Early land plants in the Grahamstown area	A.	Club mosses
	B.	Archaebacteria
Possible cause of the sixth mass extinction	A.	Climate change
	B.	Human impact

(5x2=10)

1.4 **The diagram below illustrates various stages of an experiment to show that soil contains mineral salts. Answer the questions based on it.**



1.4.1 Identify the parts numbered 1 to 3. (3)

1.4.2 State the purpose of the following:
i) 1
ii) 3 (2)

1.4.3 Name the processes represented by B. (1)

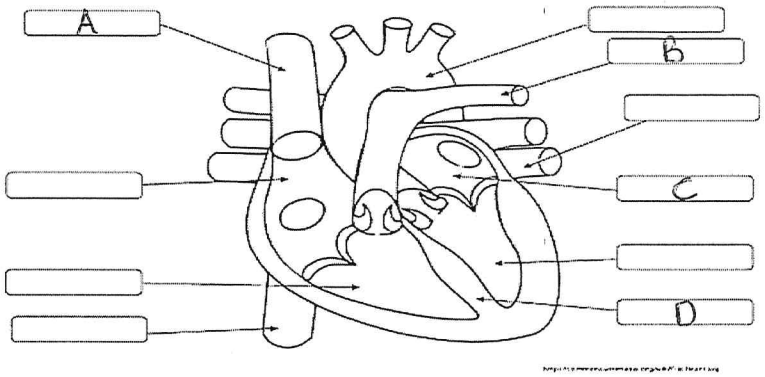
1.4.4 Briefly explain how the abiotic factors of aspect and altitude can affect plant growth. (2)

1.4.5 Name one constant variable. (1)
[9]

SUBTOTAL SECTION A: 50 MARKS

SECTION B

Question 2.1 – Study the diagram of the Heart below and answer the following questions



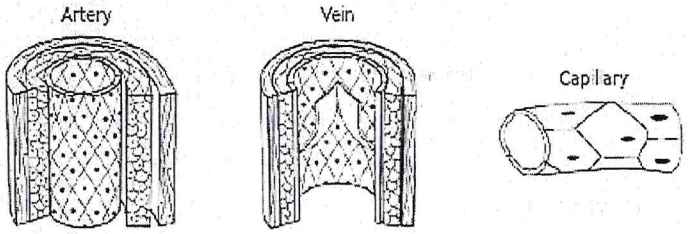
2.1.1 Provide labels for A, B, C and D (4)

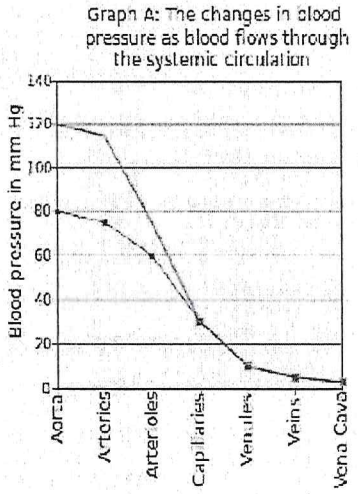
2.1.2 Name the artery that supplies blood to the heart muscles. (1)

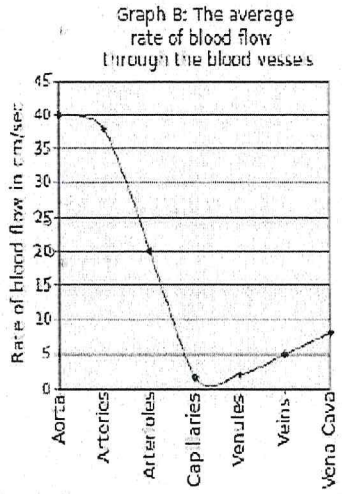
[5]

QUESTION 2.2

8. Study the diagrams below illustrating the structure of different types of blood vessels. Graph A shows the average blood pressure in different blood vessels in the human body, while graph B indicates the rate of blood flow in the different blood vessels.







2.2.1 Tabulate three structural differences between an artery and a vein (4)

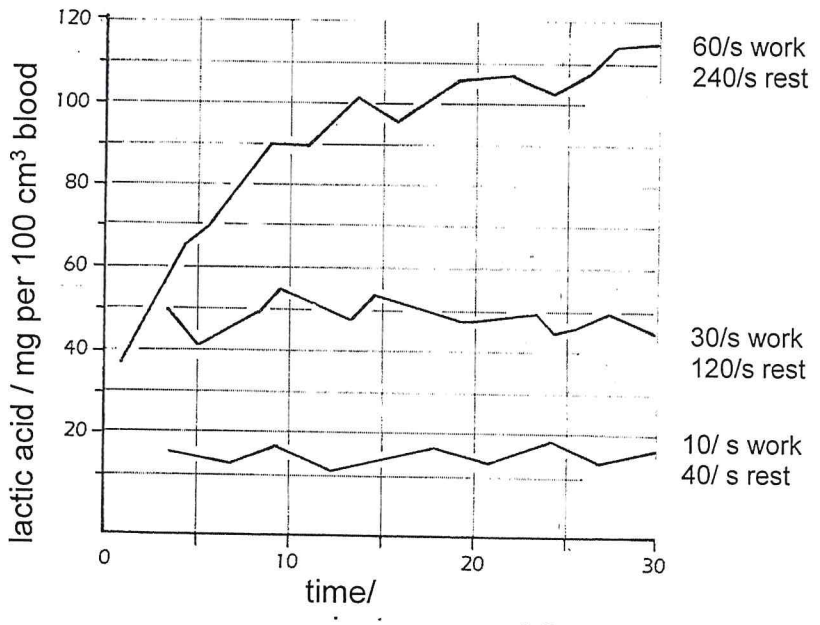
2.2.2 Study graph B and give a reason why the rate of blood flow in the capillaries is very low. (1)

2.2.3 What is the systolic and diastolic pressure in the aorta? (graph A) (1)

2.2.4 Provide a conclusion for Graph A. (2)
[8]

QUESTION 2.3

The graph shows the levels of lactic acid in the blood during a 30-minute period of work. In each case the total amount of work done was the same but the periods of work and rest differed



2.3.1 How do the three patterns of work differ from each other? (3)

2.3.2 Name the independent variable. (1)

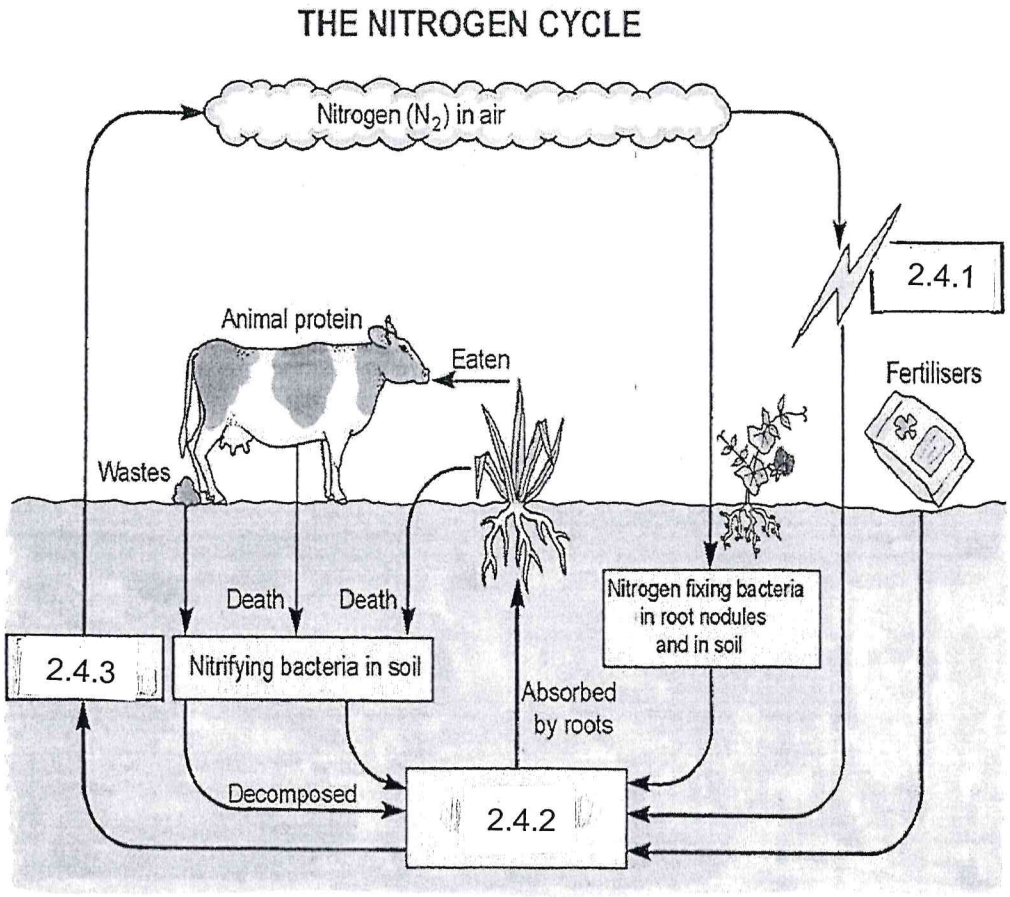
2.3.3 Name one way that will make this experiment more reliable. (1)

2.3.4 Which pattern of work produces the lowest concentration of lactic acid? (1)

2.3.5 Some physiologists think that fatigue is related to levels of lactic acid in the blood. If they are right, which pattern of work is likely to be the least tiring? (1)

[7]

2.4 The diagram represents the nitrogen cycle. Study the diagram and answer the following questions.



Fill in the missing labels (in your answer booklet) for:

i) 2.4.1
ii) 2.4.2
iii) 2.4.3 (3)

2.4.4 What part do the following play in the nitrogen cycle?

i) nitrifying bacteria (2)

ii) nitrogen-fixing bacteria (2)

iii) the plants (2)

2.4.5 Explain the importance of the decomposers in a food chain. (2)

2.4.6 What do the plants and animals need nitrogen for? (1)

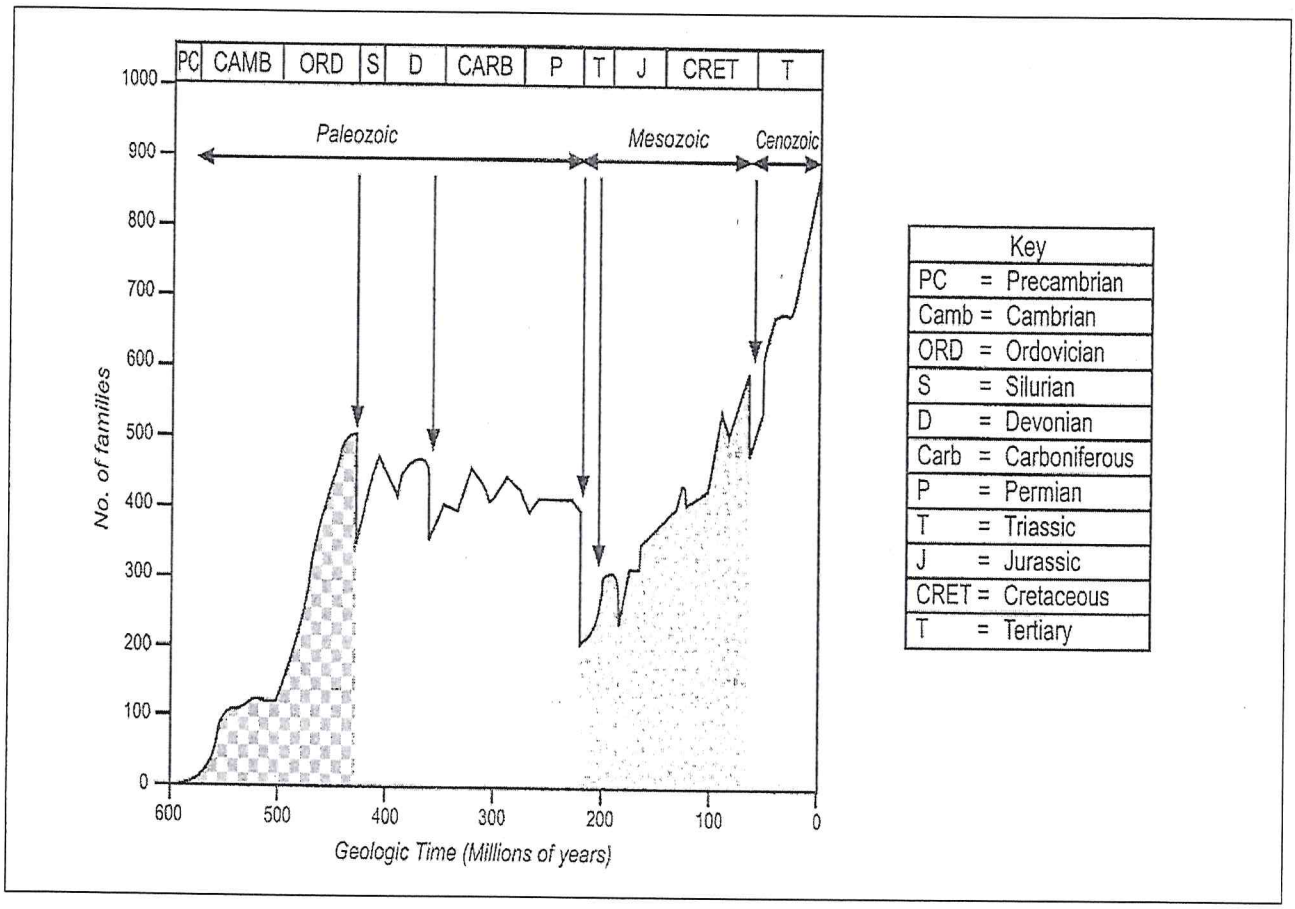
[12]

2.5 For plants and animals to be successful in the different biomes in South Africa they need to adapt to the specific conditions. Describe in a paragraph how the impala antelope has adapted to suit the grassland biome.

[3]

QUESTION 3

3.1 **The graph below shows how the number of families of species has changed over time. The arrows indicate periods of mass extinctions. Using the graph below, answer the following questions:**



3.1.1 Explain the term Biogeography. (2)

3.1.2 When did the Mesozoic era start? (2)

3.1.3 Approximately what **percentage** of the different families of species died out at the end of the Palaeozoic era? Show ALL working (3)

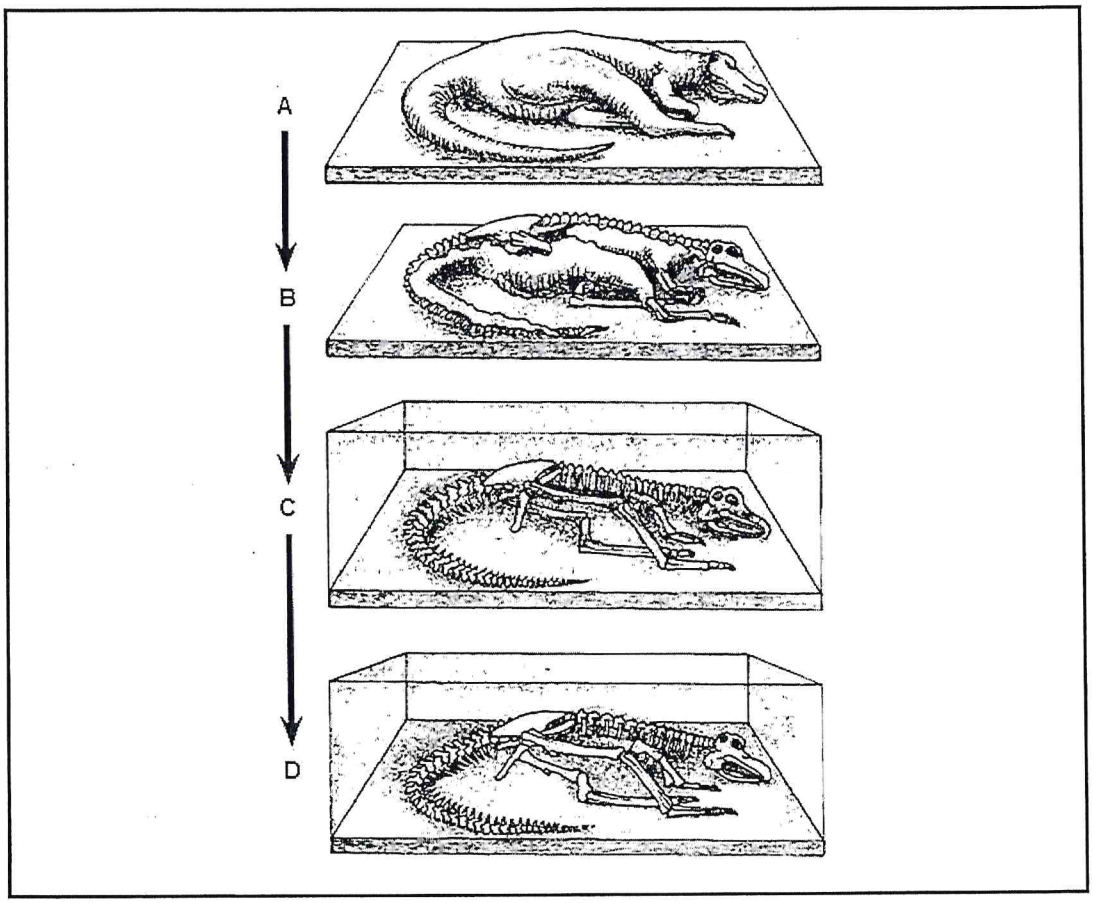
3.1.4 What happened to the number of families after each mass extinction? (1)

3.1.5 Scientists have come to the conclusion that the dinosaurs became extinct about 65 million years ago. What is currently the most accepted theory for this mass extinction? (1)

3.1.6 Explain what the 'Sixth Extinction' is and describe some possible causes. (5)

[14]

3.2 Study the diagram below and answer the questions that follow:



3.2.1 Identify the phenomenon illustrated in the diagram. (1)

3.2.2 Under which conditions does the phenomenon in QUESTION 3.2.1 occur? (2)

3.2.3 Explain how the process mentioned in QUESTION 3.2.2 takes place. (4)
[7]

3.3 Study the table below that shows the decay of carbon-14 over time and then answer the questions that follow:

DECAY OF CARBON-14								
Years from the present	0	5 730	11 460	17 190	22 920	X	34 380	40 110
Number of half-lives elapsed	0	1	2	3	4	5	6	7
Percentage of original carbon-14 remaining	100	50	25	12,5	6,25	Z	1,56	0,78

3.3.1 Using the data from the Table on page 10, draw a bar-graph showing the **Number 0 to 4 half-lives elapsed** and the **percentage of original carbon-14** remaining. (5)

3.3.2 Name TWO types of methods used to determine the age of fossils. (2)

3.3.3 Calculate the value of:

a) X (2)

b) Z (2)

3.3.4 Explain why it would not be possible to date a fossil which existed 80 million years ago using the decay of carbon-40 (1)

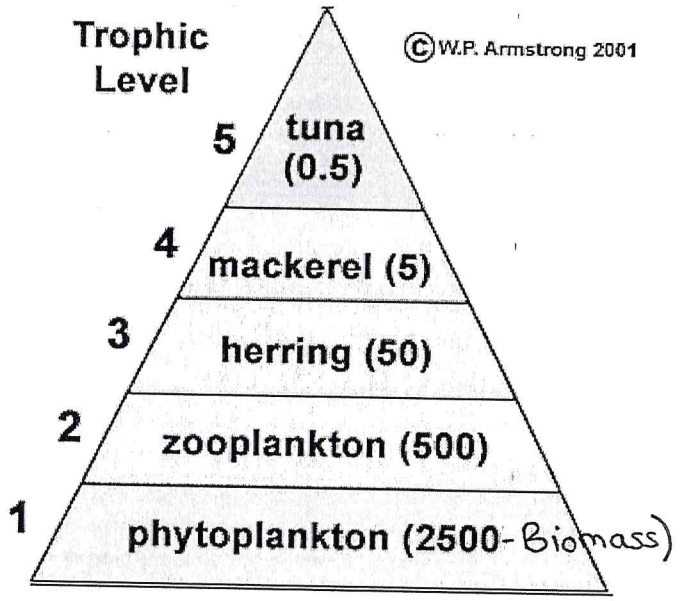
3.3.5 Give TWO reasons why there are gaps in the fossil records. (2)

[14]

3.4

3.4.1 Name the five kingdoms into which living organisms, according to Robert Whittaker can be divided. **[5]**

3.5 **Study the Ecological Pyramid below and answer the following questions**



3.5.1 Name the producer. (1)

3.5.2 What is the correct term for these different feed levels? (1)

3.5.3 What percentage of energy does the mackerel receive from the herring. (1)

3.5.4 If the zooplankton suddenly disappeared what would happen to:

a) the herring population (1)

b) the phytoplankton (1)

[5]

SUBTOTAL SECTION B: 80 MARKS

SECTION C

QUESTION 4 – Essay Question

In South Africa we have the advantage of having great biodiversity, which we should protect.
Write an essay on biodiversity, using the following subheadings:

- Define the terms: biosphere and biodiversity
- Name the different Biomes in South Africa
- Explain the importance of balanced ecosystems in maintaining biodiversity.

(20)

NOTE: NO marks will be awarded for answers in the form of diagrams or flow charts.

Content 17 marks + Synthesis 3 marks
SUBTOTAL SECTION C: 20 MARKS

PAPER TOTAL: 150 MARKS