



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

**LIFE SCIENCES P2
EXEMPLAR 2012**

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 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 answer 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. Answer the questions according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams and 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.

SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.9) in the ANSWER BOOK, for example 1.1.10 D.

1.1.1 Which of the following is an abiotic component?

- A Vegetation
- B Animals
- C Orange trees
- D Water

1.1.2 Which of the following describes a community within an ecosystem?

- A All the animals in an area
- B All the plants in an area
- C All the plants and animals in an area
- D The total number of one species in an area

1.1.3 Refer to the features listed below:

- (i) Large surface area
- (ii) In close contact with tissue cells
- (iii) Thin walled

Which combination of features applies to the capillary network?

- A (i) and (ii) only
- B (ii) and (iii) only
- C (i) and (iii) only
- D (i), (ii) and (iii)

1.1.4 The five-kingdom system proposed by Whittaker uses the following taxa to classify organisms:

- A Monera, Protista, Fungi, Plantae, Animalia
- B Eubacteria, Protista, Fungi, Plantae, Animalia
- C Bacteria, Archae, Eukaryotes, Plantae, Animalia
- D Archaeobacteria, Protista, Eukaryotes, Plantae, Animalia

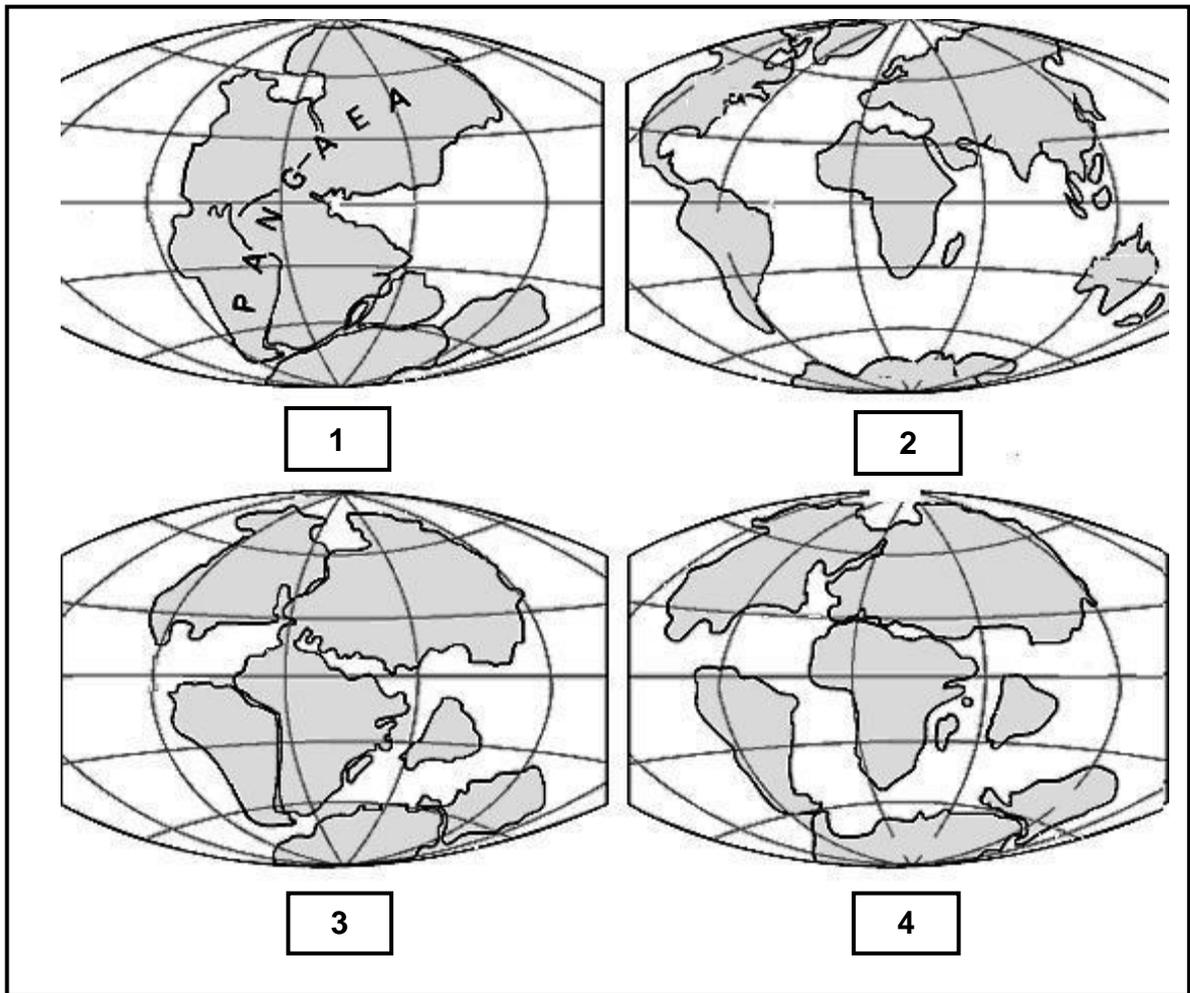
- 1.1.5 As part of an ecological study the biomass of organisms in a community was estimated. The table below shows the biomass.

ORGANISM	BIOMASS (kg)
R	50
S	10
T	250
U	200
V	3 000
W	75

From the data above, which ONE of the following would be a probable food chain?

- A S → W → U → V
B T → V → R → S
C U → T → W → R
D V → T → W → S
- 1.1.6 A person who studies fossils is a/an ...
- A archaeologist.
B palaeontologist.
C anthropologist.
D radiologist.
- 1.1.7 Which system of classification gives every species a two-part name?
- A Taxonomic system
B Hierarchical system
C Two-kingdom system
D Binomial system

QUESTIONS 1.1.8 and 1.1.9 are based on the diagrams below.



1.1.8 The diagrams above illustrate ...

- A tectonic plates.
- B continental drift.
- C asteroid impact.
- D volcanic activity.

1.1.9 The correct sequence of events during the above process is ...

- A 4, 3, 2, 1.
- B 1, 3, 4, 2.
- C 1, 2, 3, 4.
- D 1, 4, 3, 2.

(9 x 2) (18)

- 1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1–1.2.10) in the ANSWER BOOK.
- 1.2.1 Plants that are adapted to live in dry habitats
- 1.2.2 A group of food chains arranged to show how feeding of organisms is connected
- 1.2.3 All the substances having a pH less than 7
- 1.2.4 The inelastic membrane that forms a layer around the heart
- 1.2.5 An operation performed to redirect blood away from a blocked portion of a coronary artery by attaching a small vein taken from the leg or arm
- 1.2.6 The height above sea level
- 1.2.7 The variety of living organisms on Earth
- 1.2.8 The representation of a timescale that shows the history of life on Earth
- 1.2.9 Limestone caves, north-west of Johannesburg, where the largest amount of hominid fossils in the world is found
- 1.2.10 The death of all individuals of a species in the world (10 x 1) **(10)**

- 1.3 Indicate whether each of the descriptions 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 (1.3.1–1.3.11) in the ANSWER BOOK.

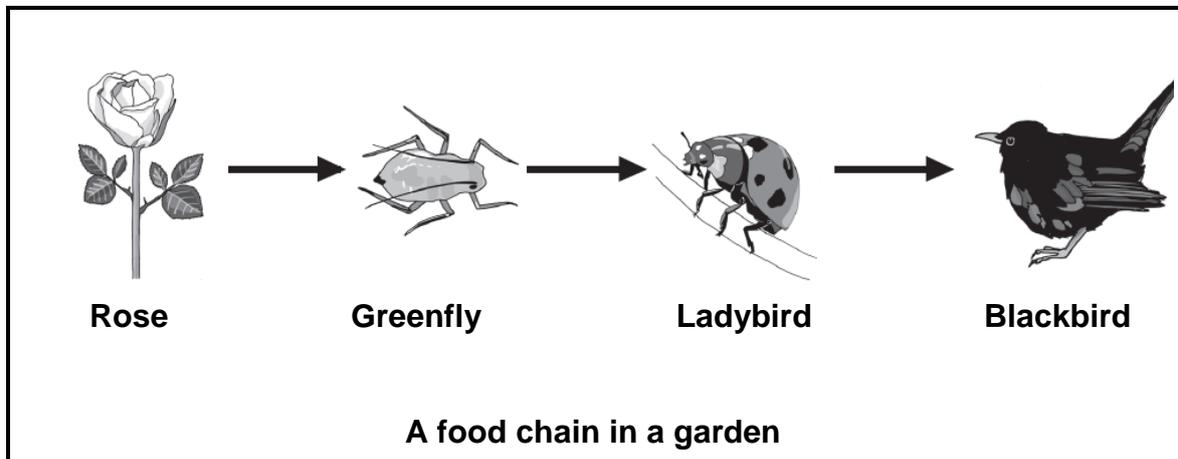
COLUMN I		COLUMN II
1.3.1	The position of an area in relation to the sun	A: Aspect B: Slope
1.3.2	Organisms that feed on dead or decaying matter	A: Saprophytes B: Carnivores
1.3.3	A place which is occupied by an organism in an ecosystem and the interaction with it and other organisms	A: Habitat B: Niche
1.3.4	The part of the Earth where life is found	A: Atmosphere B: Hydrosphere
1.3.5	The loss of water in vapour form	A: Transpiration B: Evaporation
1.3.6	When carbon dioxide is removed from the atmosphere	A: Respiration B: Photosynthesis
1.3.7	Species found only in one specific area and nowhere else in the world	A: Indigenous B: Endemic
1.3.8	The type of organism regarded as a link between fish and amphibians	A: Dinosaur B: Coelacanth
1.3.9	A fossil that has characteristics of organisms belonging to two different taxa	A: Transitional fossils B: Cast fossils
1.3.10	Early land plants in the Grahamstown area	A: Club mosses B: Archaeobacteria
1.3.11	Possible cause of the sixth mass extinction	A: Climate change B: Human impact

(11 x 2)

(22)**TOTAL SECTION A:****50**

SECTION B**QUESTION 2**

2.1 The diagram below represents a food chain in a garden.



2.1.1 Name the organism above that represents the following:

- (a) Herbivore (1)
- (b) Producer (1)

2.1.2 A rose bush contains 1 000 kJ/m²/year of energy and only 10% of this energy is passed on at each trophic level of the food chain. How much energy will be passed on to the blackbird? Show ALL your calculations. (4)

2.1.3 If all the greenflies in this garden were removed, explain what would happen to the populations of the following:

- (a) Rose plants (2)
 - (b) Ladybirds (2)
 - (c) Blackbirds (2)
- (12)**

- 2.2 Three soil samples, taken from different regions, were analysed for air content, permeability to water and humus content. The results obtained are shown in the table below.

SOIL SAMPLE	A	B	C
Air content (%)	30	10	60
Permeability to water (ml of water passing through 100 g of soil per minute)	20	5	70
Humus content (%)	25	10	5

- 2.2.1 According to the results above, which soil sample (A, B or C) would be as follows:

- (a) Loam (1)
- (b) Clay (1)
- (c) Sand (1)

- 2.2.2 Explain the disadvantages for the plants growing in soil sample B with regard to the permeability to water. (2)

- 2.2.3 Name TWO factors relating to the composition of soil sample B that resulted in its low permeability to water. (2)

- 2.2.4 State TWO advantages of a higher percentage of humus for the soil. (2)

(9)

2.3 Read the passage below and answer the questions which follow.

The Cape floral kingdom is the smallest of the world's floral kingdoms. It is home to more endemic and indigenous plants than in any other region in South Africa. Approximately 70% of the 9 000 plant species in this area are found nowhere else in the world.

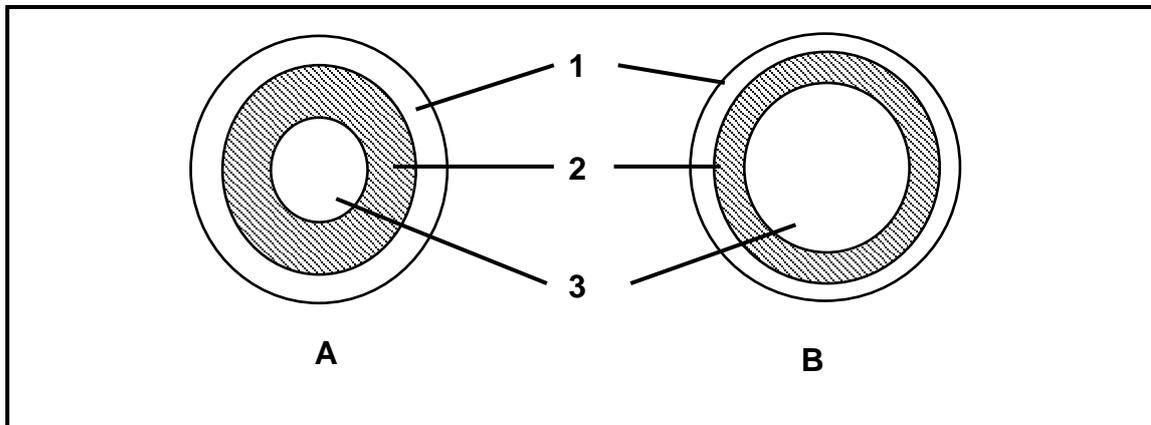
The vegetation of this biome, which is mostly small bushes, grows in nutrient poor soil. They also survive the long dry summer conditions, as well as frequent fires.

The flora of the Cape is threatened, amongst others, by alien vegetation, as well as habitat destruction by humans. Already numerous species are extinct from this biome. Hence, its conservation is a national conservation priority.

In a bid to save this biome, there are several projects aiming at encouraging responsible travel to natural areas in order to conserve the environment, as well as improving the well-being of local communities.

- 2.3.1 What is the name of the biome in the extract above? (1)
- 2.3.2 Define a *biome*. (1)
- 2.3.3 Give TWO reasons for the habitat destruction by humans. (2)
- 2.3.4 Give TWO possible reasons why humans need to conserve nature. (2)
- 2.3.5 Calculate the total number of species that are endemic to this biome. Show your working. (3)
- 2.3.6 Name the type of tourism mentioned in the passage. (1)
- 2.3.7 Name TWO ways in which the local communities benefit from the type of tourism mentioned in QUESTION 2.3.6. (2)
- (12)**

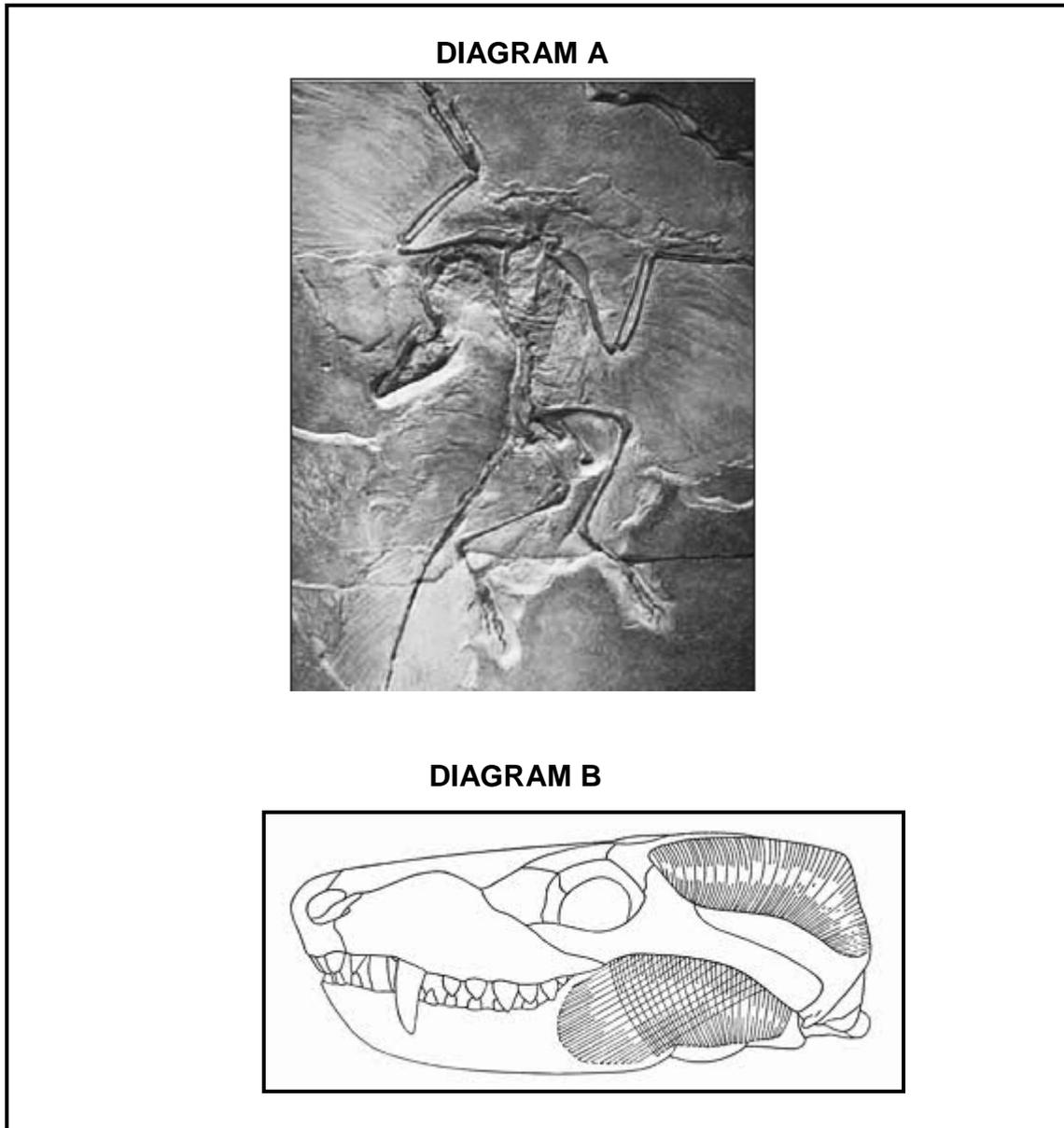
- 2.4 Study the diagrammatic representation below showing a transverse section through a vein and an artery.



- 2.4.1 Which diagram (A or B) represents an artery? (1)
- 2.4.2 Explain your answer to QUESTION 2.4.1. (2)
- 2.4.3 Which blood vessel (A or B) has valves? (1)
- 2.4.4 Provide the labels for the parts numbered:
- (a) 1 (1)
- (b) 2 (1)
- (c) 3 (1)
- (7)**
[40]

QUESTION 3

- 3.1 Study the two fossils (Diagram A and Diagram B) which were discovered and classified as transitional fossils.



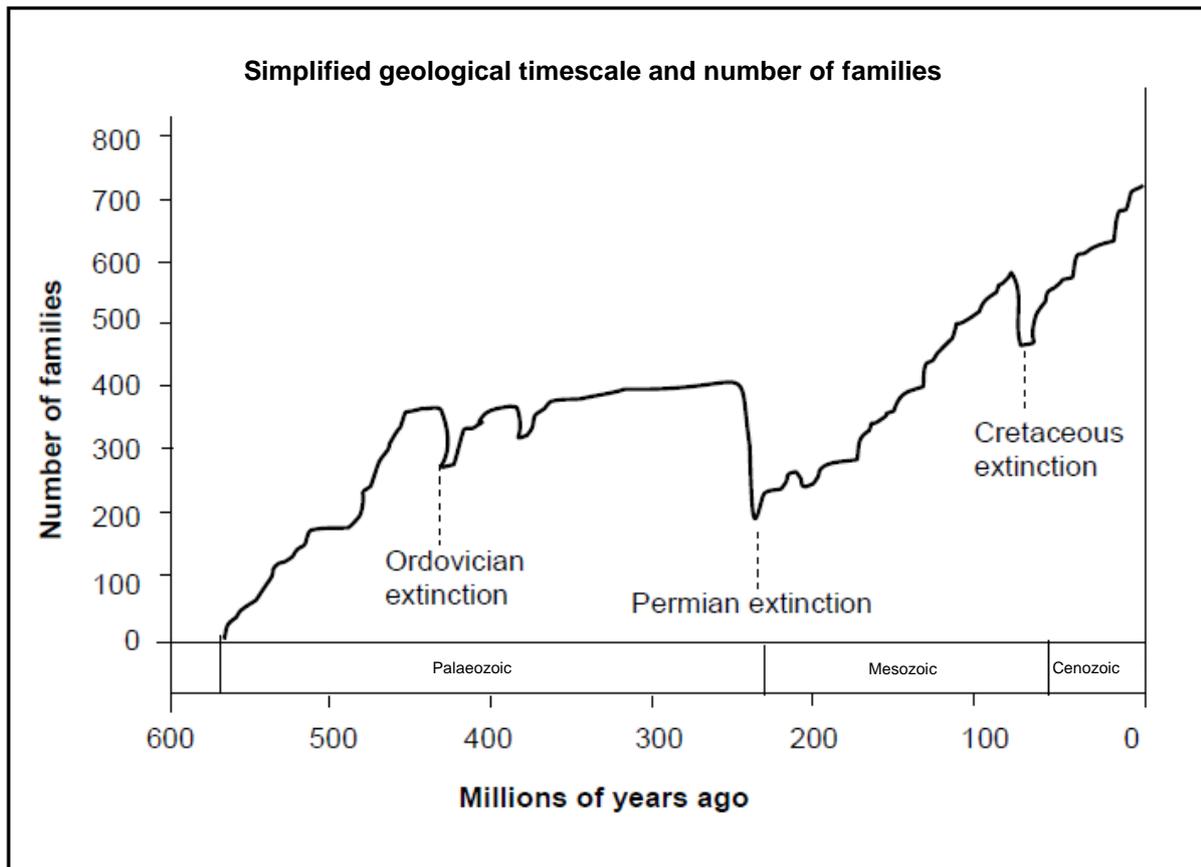
- 3.1.1 What is the scientific name of the prehistoric bird in Diagram A? (2)
- 3.1.2 Explain why scientists concluded that this prehistoric bird is a transitional fossil. (4)
- 3.1.3 Describe how this fossil could have been formed. (4)
- 3.1.4 Name the organism illustrated by Diagram B and state where it was found in South Africa. (2)
- (12)**

- 3.2 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

- 3.2.1 Name TWO types of methods used to determine the age of fossils. (2)
- 3.2.2 Calculate the value of:
- (a) X (2)
- (b) Z (2)
- 3.2.3 Explain why it would not be possible to date a fossil which existed 80 million years ago using the decay of carbon-14. (2)
- 3.2.4 Give TWO reasons why there are gaps in the fossil records. (2)
- (10)**

- 3.3 Study the graph below which shows the major extinction events and answer the questions that follow.



- 3.3.1 When did the Cenozoic era begin? (2)
- 3.3.2 Which mass extinction took place towards the end of the Palaeozoic era? (1)
- 3.3.3 Approximately how many families of species died out at the end of the Palaeozoic era? Show ALL working. (3)
- 3.3.4 Explain why the number of families of organisms rapidly increased after each mass extinction. (3)
- (9)**

- 3.4 The following questions are based on the extinction of dinosaurs on Earth.
- 3.4.1 What evidence do scientists use to show that dinosaurs once existed on Earth? (1)
- 3.4.2 How long ago did the dinosaurs become extinct? (2)
- 3.4.3 Describe a hypothesis that has been proposed for the extinction of many species, including the dinosaurs, during the time mentioned in QUESTION 3.4.2. (6)
(9)
[40]
- TOTAL SECTION B: 80**

SECTION C

QUESTION 4

Describe pulmonary circulation (the blood flow between the heart and the lungs) and explain how the heart is suited to perform its function.

Content: (17)
Synthesis: (3)

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

TOTAL SECTION C: 20
GRAND TOTAL: 150