education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 10

LIFE SCIENCES P2

NOVEMBER 2024

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 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.

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 1.1.8) in your ANSWER BOOK, for example 1.1.9 D.

1.1.1 Which of the following is a biotic component?

A Soil
B Water
C Atmosphere
D Animals

1.1.2 The animal organ that pumps the blood to the rest of the body is known as …

A vein.
B heart.
C vena cava.
D artery.

1.1.3 The death of all individuals of a species in the world is known as …

A extinction.
B speciation.
C mortality.
D survival.

1.1.4 The correct sequence of the energy flow in terms of trophic levels, is:

A Primary consumers, producers, secondary consumers, tertiary consumers
B Producers, primary consumers, secondary consumers, tertiary consumers
C Tertiary consumers, producers, secondary consumers, primary consumers
D Secondary consumers, primary consumers, producers, tertiary consumers

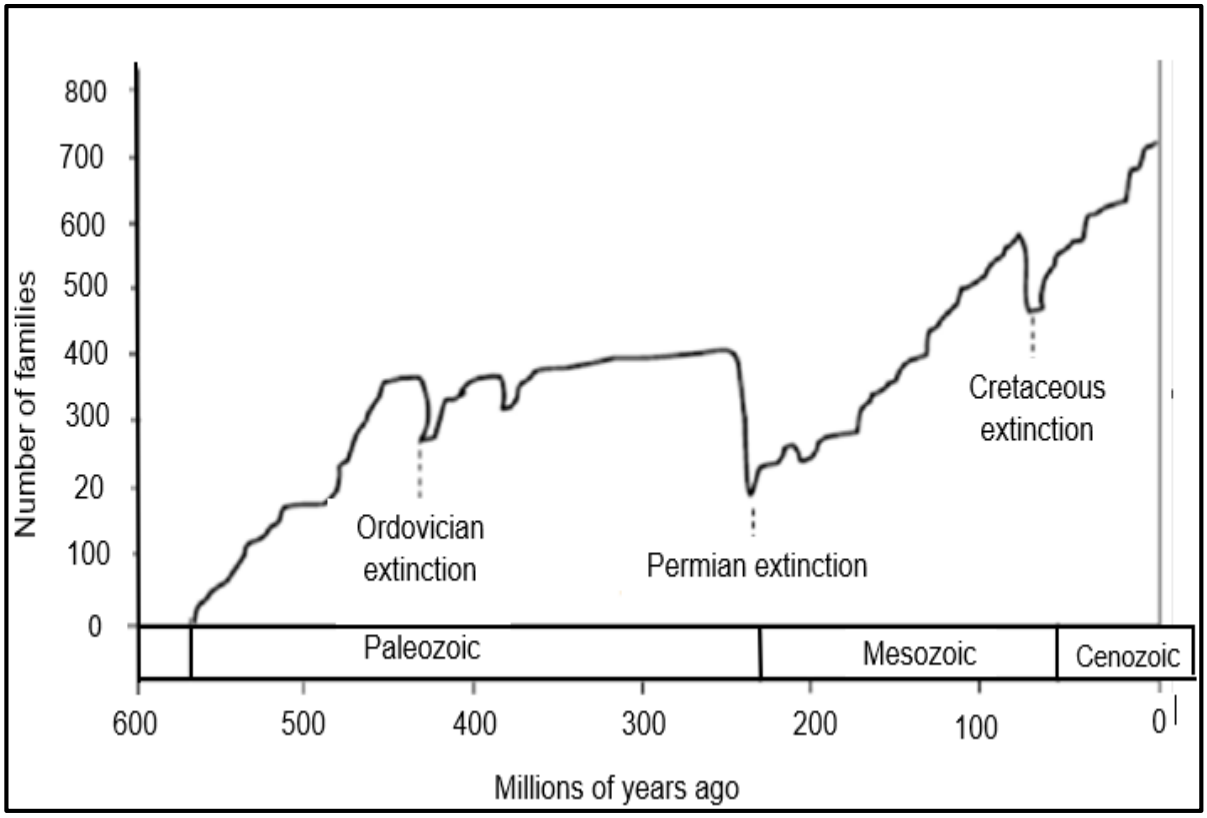
1.1.5 A long geological period of a drastic decrease in temperature of the earth's surface and the atmosphere.

A Ice age
B Global warming
C Drought
D Climate change

1.1.6 Variety of life forms that exist on earth

A Ecosystem
B Population
C Biodiversity
D Biome

QUESTIONS 1.1.7 and **1.1.8** are based on the diagram below.



1.1.7 The diagram above represents the …

A line graph.
B geological time scale.
C pedigree diagram.
D ordovician extinction graph.

1.1.8 In which era did the mass extinction cretaceous occur?

A Paleozoic era
B Mesozoic era
C Cenozoic era
D Permian extinction (8 x 2) **(16)**

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 1.2.7) in the ANSWER BOOK.

1.2.1 A blood vessel that supplies the heart tissues with oxygen and glucose

1.2.2 About 250 million years ago all continents were joint to one large continent known as …

1.2.3 The height of the land above the sea level

1.2.4 Part of the earth where living organisms occur and is a global sum of ecosystems

1.2.5 The position of an area in relation to the sun

1.2.6 A group of food chains arranged to show how feeding of organisms is connected

1.2.7 The process of finding out the ages of rocks and fossils using radioactive elements (7 x 1) **(7)**

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 to 1.3.4) in the ANSWER BOOK.

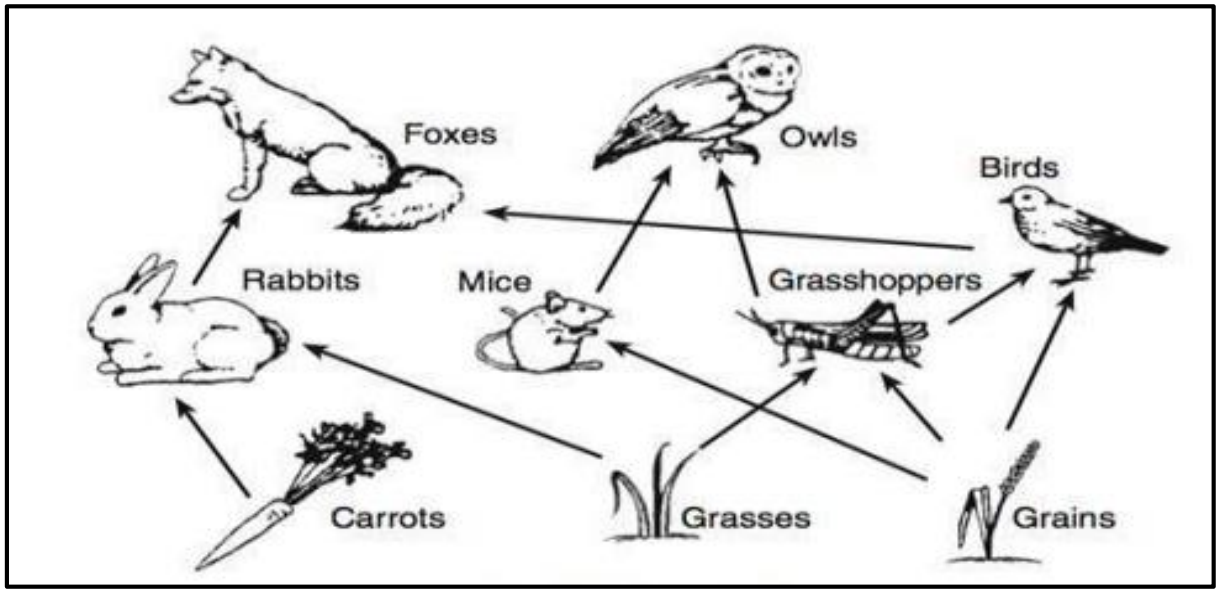
	COLUMN I	**COLUMN II**
1.3.1	To which kingdom does the lion belong	A: Animalia B: Plantae
1.3.2	Pumps the deoxygenated blood from the body to the lungs	A: Right ventricle B: Left ventricle
1.3.3	Type of fossil dating wherein sediment is laid down on top of each other and the oldest rock will be below the upper layers	A: Relative dating B: Radiometric dating
1.3.4	Abiotic factors	A: Light B: Temperature

(4 x 2) **(8)**

1.4 Organisms can be classified as eukaryotes and prokaryotes.

1.4.1 Tabulate THREE differences between eukaryotes and prokaryotes. **(7)**

1.5 The diagram below shows feeding relationships in an ecosystem.



1.5.1 Name the type of diagram shown. (1)

1.5.2 Define an *ecosystem.* (2)

1.5.3 Explain the changes that may result in the ecosystem if the carrots, grasses and grains are removed from the area. (2)

1.5.4 Draw a food pyramid to show three different trophic levels of organisms in the diagram above. (4)

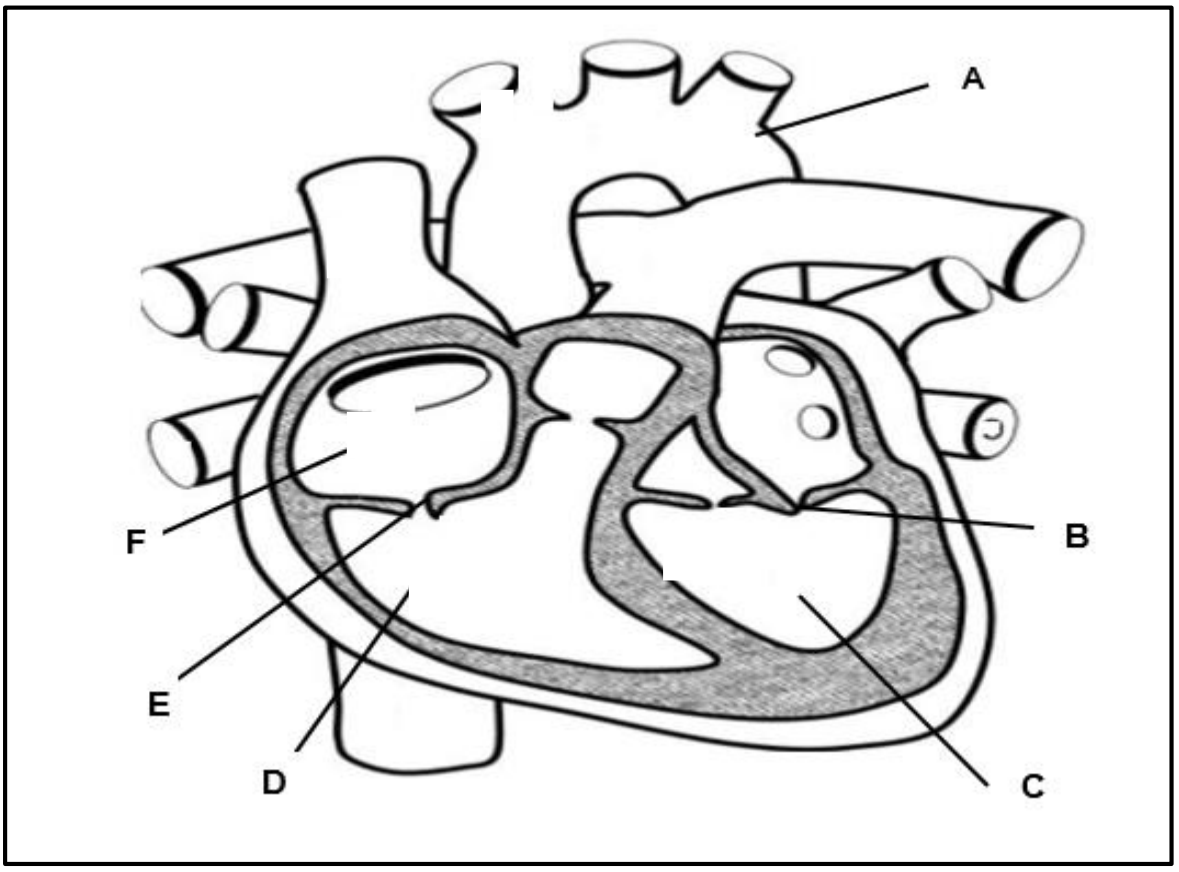
1.5.5 Make a simple schematic diagram to show any THREE possible food chains from the diagram. (3)
(12)

TOTAL SECTION A: [50]

SECTION B

QUESTION 2

2.1 The diagram below shows the structure of a heart.



2.1.1 Identify the parts labelled **A, B** and **C**. (3)

2.1.2 Give a **LETTER** and a **NAME** of the part that:

(a) Receives blood from the superior vena cava. (2)

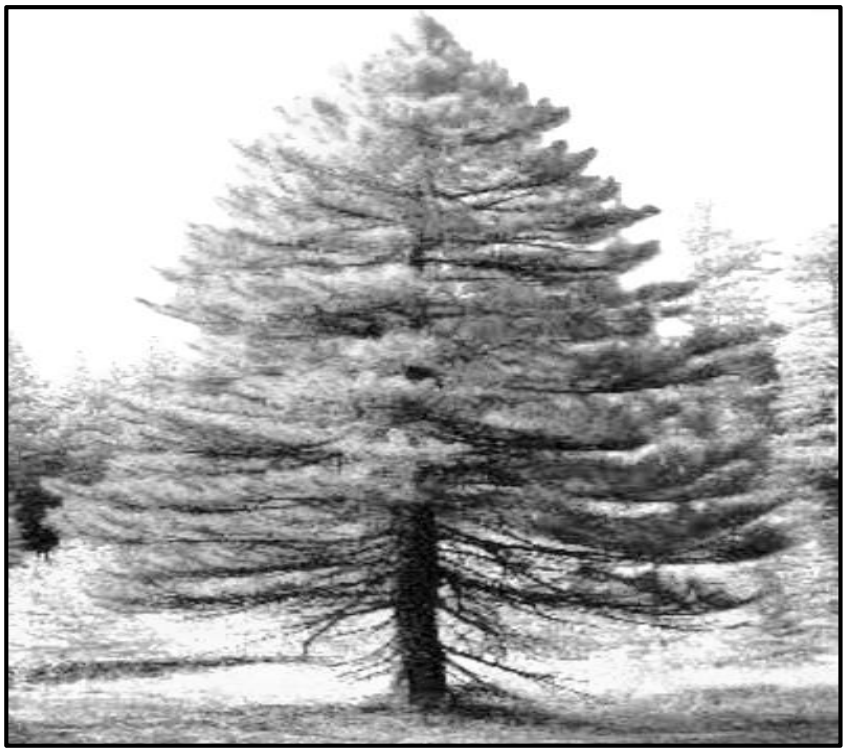
(b) Prevents backflow of blood from the right ventricle into the right atrium. (2)

2.1.3 Explain why the wall of part **C** is thicker than that of part **D**. (2)

2.1.4 Explain the meaning of a double, closed circulatory system. (2)

2.1.5 Describe the heart events of cardiac cycle during the general diastole. (5)
(16)

2.2 A plant commonly known as a Pine tree is classified as follows:
Plantae, Pteridophyta, Gymnospermae, Corniferales, Pinaceae, *Pinus, ponderosa*



2.2.1 Give the name of the scientist and the type of system he used to name organisms using the genus and the species. (2)

2.2.2 To which Kingdom, Order and Family does the Pine tree belong? (3)

2.2.3 Write the scientific name of the Pine tree. (2)

2.2.4 The five-kingdom system is the most common classification system that was proposed by Robert Whitaker in 1969.

In light with the above statement give 5 kingdoms that were proposed by Robert Whitaker. (5)
(12)

2.3 Read the extract below.

> The Cape floral kingdom is the smallest of the world's floral kingdoms. It is home to more endemic (species that occur in one region and nowhere else in the world) 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 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 does endemic species mean? (1)

2.3.2 Which biome is discussed by the extract above? (1)

2.3.3 What did the conservation group do in order to save this biome? (2)

2.3.4 Calculate the total number of species that are endemic to this biome. Show your working. (3)

2.3.5 Describe the type of climate and vegetation found at this biome. (3)
(10)

2.4 Study the table below that shows the decay of carbon-14 over time.

DECAY OF CARBON-14							
Years from the present	0	5730	11460	17190	22920	**A**	34380
Number of half-lives elapsed	0	1	2	3	4	5	6
Percentage of original carbon-14 remaining	100	50	25	**B**	6.25	3.125	1.56

2.4.1 Name ONE type of a method used to determine the age of fossils other than carbon-14 dating. (1)

2.4.2 Find the value of:

(a) **A** (2)

(b) **B** (2)

2.4.3 Explain why it would not be possible to date a fossil which existed 80 million years ago using the decay of carbon-14. (2)

2.4.4 Describe how carbon-14 decay/radiometric dating is performed. (5)
(12)

[50]

QUESTION 3

3.1 The table below shows the results of a study that investigated the effect of temperature and light on the yield of potatos in two greenhouses on a farm.

TEMPERATURE ^{O}C	AVERAGE YIELD OF POTATOS PER PLANT (KG)	
	LOW LIGHT LEVELS	HIGH LIGHT LEVELS
5	0,5	0,5
10	1,5	2,5
15	3	5
20	3,6	8,5
25	3,5	7,8
30	2,5	6,2

3.1.1 State TWO steps the investigator may have taken into consideration during the planning stage of the investigation. (2)

3.1.2 Identify the:

(a) Independent variable (1)

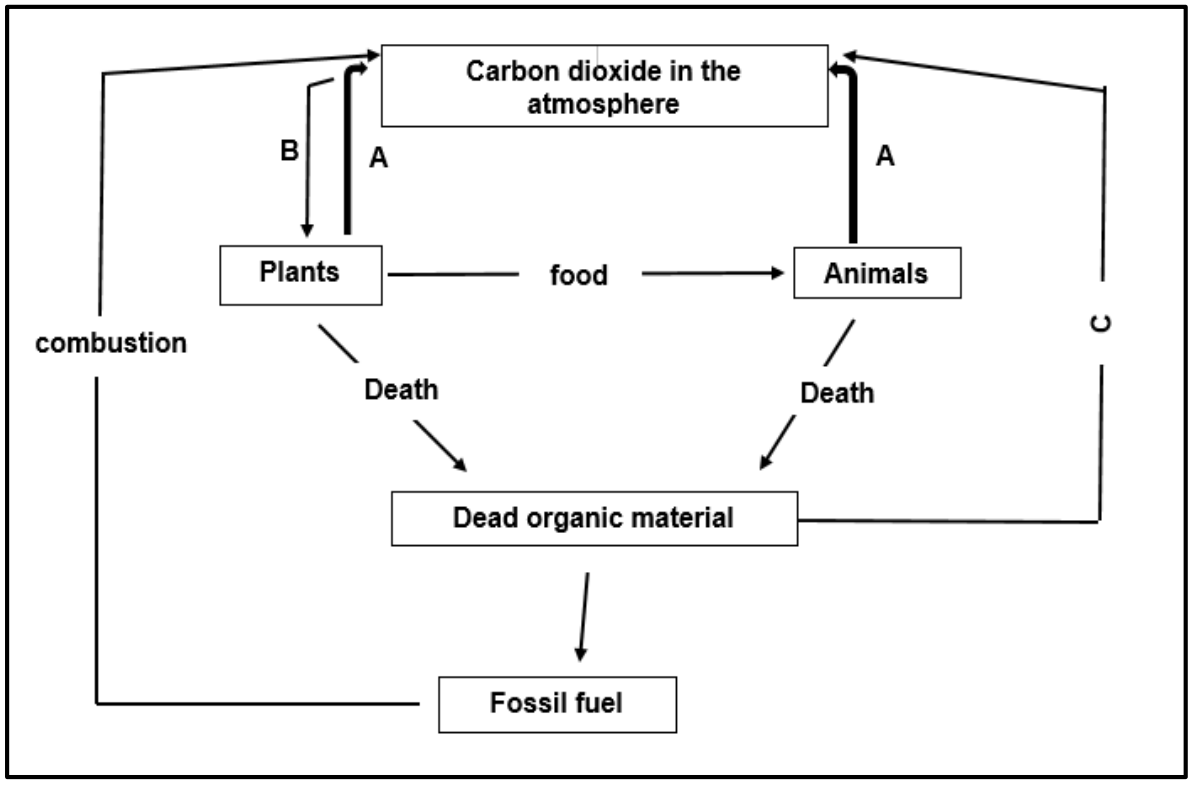
(b) Dependent variable (1)

3.1.3 State TWO ways in which the scientists could have improved the reliability of the investigation. (2)

3.1.4 Plot bar graphs on the same system of axes showing the results of the average yield of the potatos from 20 ^{o}C to 30 ^{o}C for both light levels. (6)

(12)

3.2 The diagram below shows the flow chart of a particular cycle.



3.2.1 Identify the type of cycle represented by the flow chart above. (1)

3.2.2 Identify processes labelled:

(a) **C** (1)

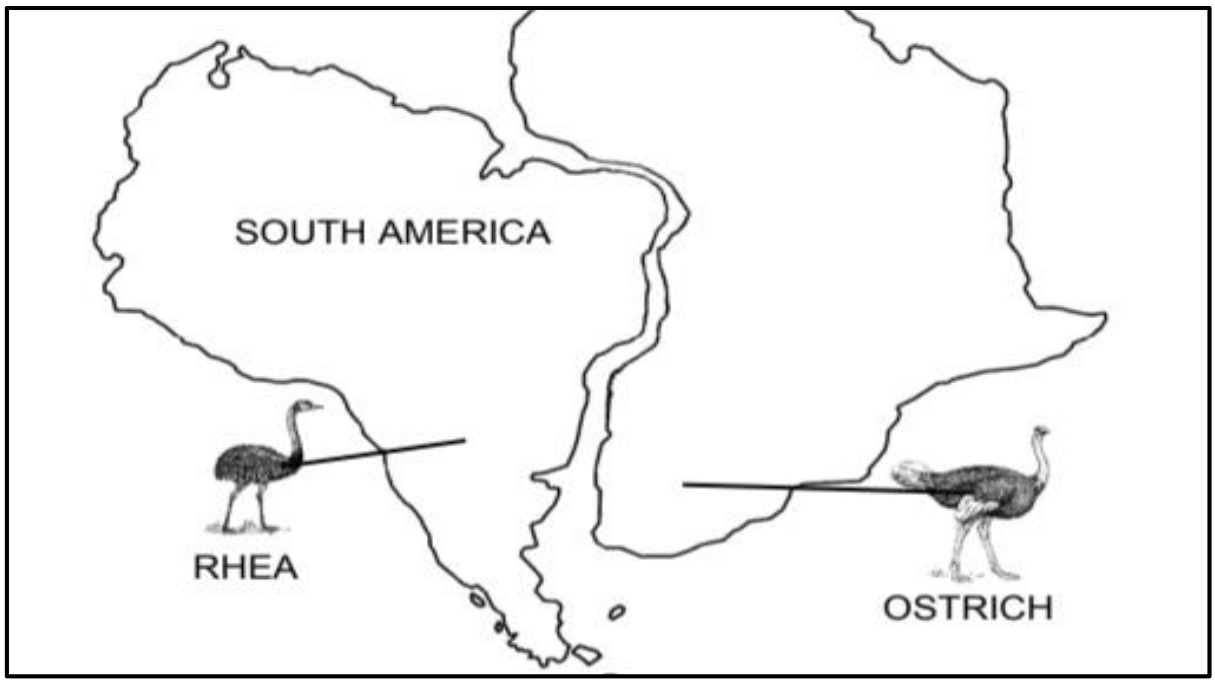
(b) **A** (1)

(c) **B** (1)

3.2.3 Explain how process A produces carbon dioxide. (2)

3.2.4 Briefly describe the type of cycle identified in QUESTION 3.2.1. (4)
(10)

3.3 The diagram below shows how South America and Africa were once joined in the past.



3.3.1 Name the phenomenon that lead to the world to have separated continents. (1)

3.3.2 In which continent is Ostrich found? (1)

3.3.3 What is the unique characteristic that is common for Rhea and Ostrich? (1)

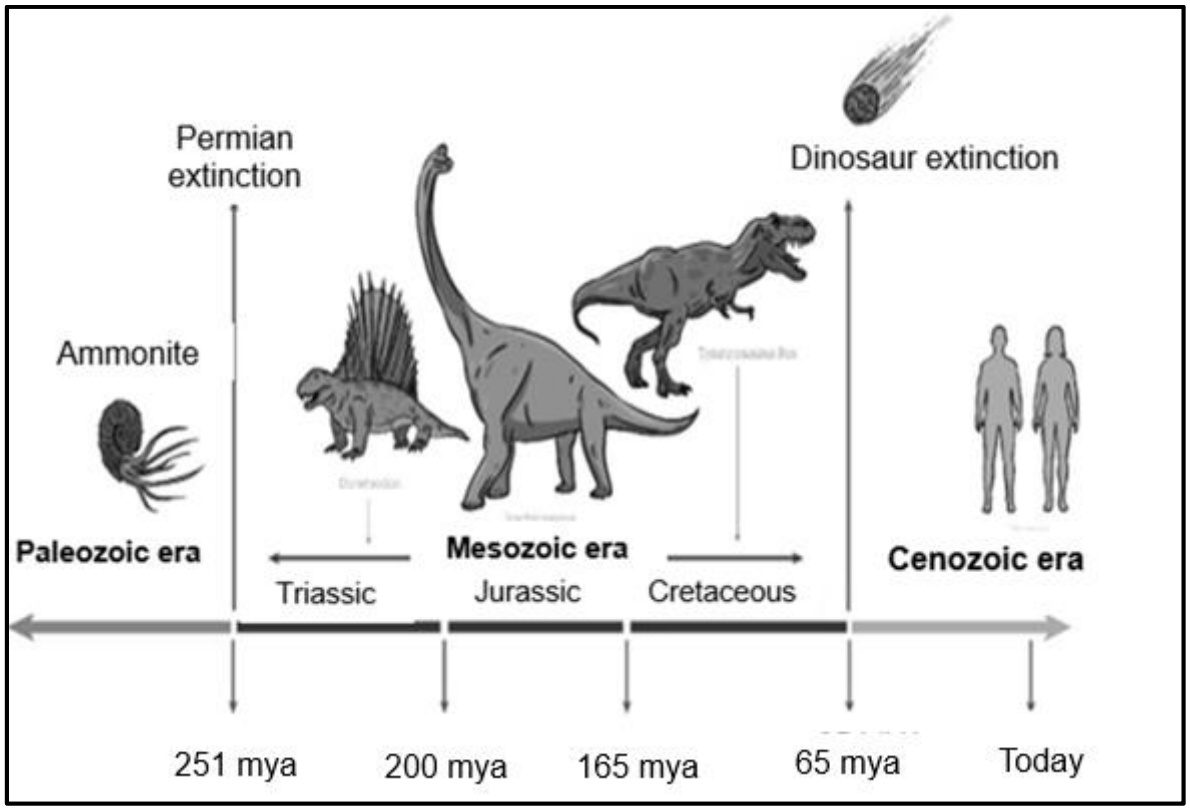
3.3.4 What do we call the study of the distribution of existing and extinct organism in different geographical areas? (1)

3.3.5 Mention the two major super continents that South America and Africa belonged to. (2)

3.3.6 Birds like the Rhea and Ostrich are different species, yet they share many similar characteristics. Explain how such similar birds ended up on continents separated by a vast ocean. (4)

(10)

3.4 The diagram below shows geological events in millions of years ago (MYA).



3.4.1 Define *mass extinction*. (2)

3.4.2 When did the Dinosaur become extinct? (1)

3.4.3 In which Era did the Triassic, Jurrasic and Creataceous period belong? (1)

3.4.4 Explain how Dinosaurs might have became extinct. (3)

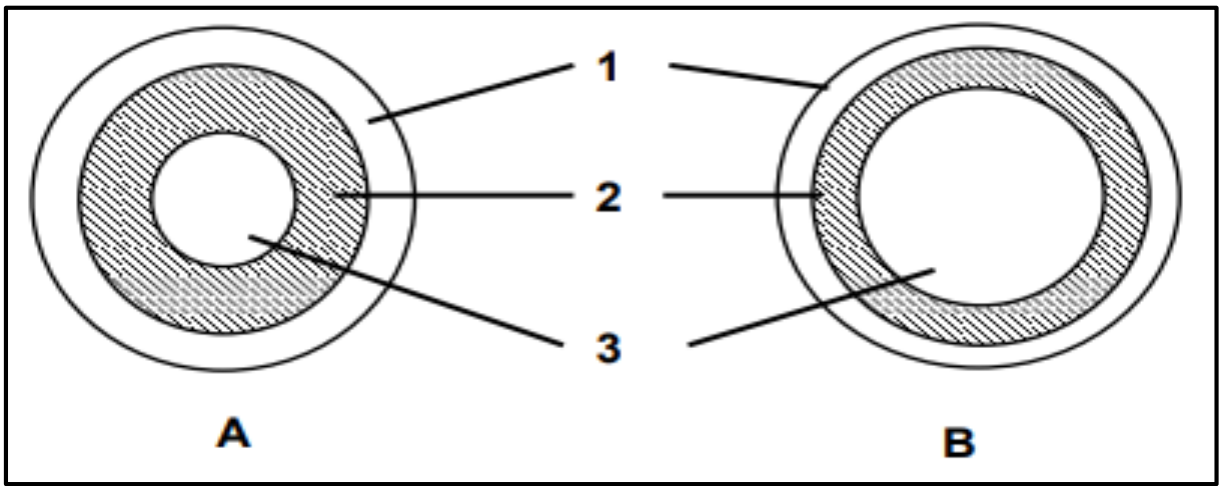
3.4.5 To which Era does the:

(a) Human beings live in (1)

(b) Sea animmone (ammonite) lived (1)

3.4.6 Which extinction took place toward the end of paleozoic era? (1)
(10)

3.5 The diagram below shows a transverse section through two different blood vessels.



3.5.1 Which diagram represents:

(a) Artery (1)

(b) Vein (1)

3.5.2 Explain your answer to QUESTION 3.5.1 (a) (2)

3.5.3 Which blood vessel (A or B) has valves? (1)

3.5.4 Provide the labels for the parts numbered:

(a) **3** (1)

(b) **2** (1)

(c) **1** (1)
(8)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150