NATIONAL SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2019

LIFE SCIENCES P2

MARKS: **150**

TIME: **2½ hours**

* X L F S E 2 *

This question paper consists of 16 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. Present your answers according to the instructions of each question.
6. Do 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 may 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 (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 A chamber in the heart with thick muscular walls that pumps blood through the aorta.

A Right atrium
B Left atrium
C Right ventricle
D Left ventricle

1.1.2 A blood vessel that takes blood to the kidneys.

A Hepatic artery
B Renal artery
C Mesenteric artery
D Iliac artery

1.1.3 Specialised conducting tissue in the heart also known as the pacemaker of the heart.

A Sino-atrial node
B Atrioventricular node
C Sympathetic nerve
D Parasympathetic nerve

1.1.4 The fluid part of blood is called …

A plasma.
B tissue fluid.
C lymph.
D blood.

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

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

1.1.6 A general group of plants adapted to grow in extremely dry regions are referred to as …

A hydrophytes.
B mesophytes.
C xerophytes.
D desert plants.

1.1.7 Study the list below and answer the question that follows:

(i) Hot summers with high rainfall, cold winters with heavy frost
(ii) Big Five
(iii) Sandy soil lacking nutrients
(iv) Plants are mostly grasses and small shrubs

Which of the above statements apply to the Savannah biome?

A (i) and (ii)
B (ii) and (iii)
C (i), (ii) and (iii)
D (i), (ii), (iii) and (iv)

1.1.8 What would you advise a farmer looking for a location to plant crops that require large amounts of sunlight, nutrient rich soil and good drainage?

A Plant on a north facing slope in soil consisting mainly of loam
B Plant on a north facing slope in sandy soil
C Plant on a south facing slope in soil consisting mainly of loam
D Plant on a south facing slope in soil with good clay content

1.1.9 Scientists have suggested that the trees in the Amazon jungle generate their own clouds and rain. This is most likely caused by …

A precipitation.
B evaporation.
C condensation.
D transpiration.

1.1.10 Which of these does NOT represent the importance of wetlands?

A A wide range of coastal habitats like lagoons and estuaries
B Provide regular water supply and help reduce the effect of droughts
C Low biodiversity
D High water table and soil with high water-holding ability

(10 x 2) (20)

1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question number (1.2.1–1.2.8) in the ANSWER BOOK.

1.2.1 A blood circulatory system where blood stays within the blood vessels

1.2.2 Blood vessels made up of a single layer of epithelium

1.2.3 A phase in the cardiac cycle when the whole heart relaxes

1.2.4 The measure of how acidic or alkaline a substance is

1.2.5 Animals where body temperature depends on the environmental temperature

1.2.6 The term for when an organism becomes inactive during winter

1.2.7 Feeding levels of different organisms within an ecosystem

1.2.8 The form in which nitrogen is absorbed by plants through their roots

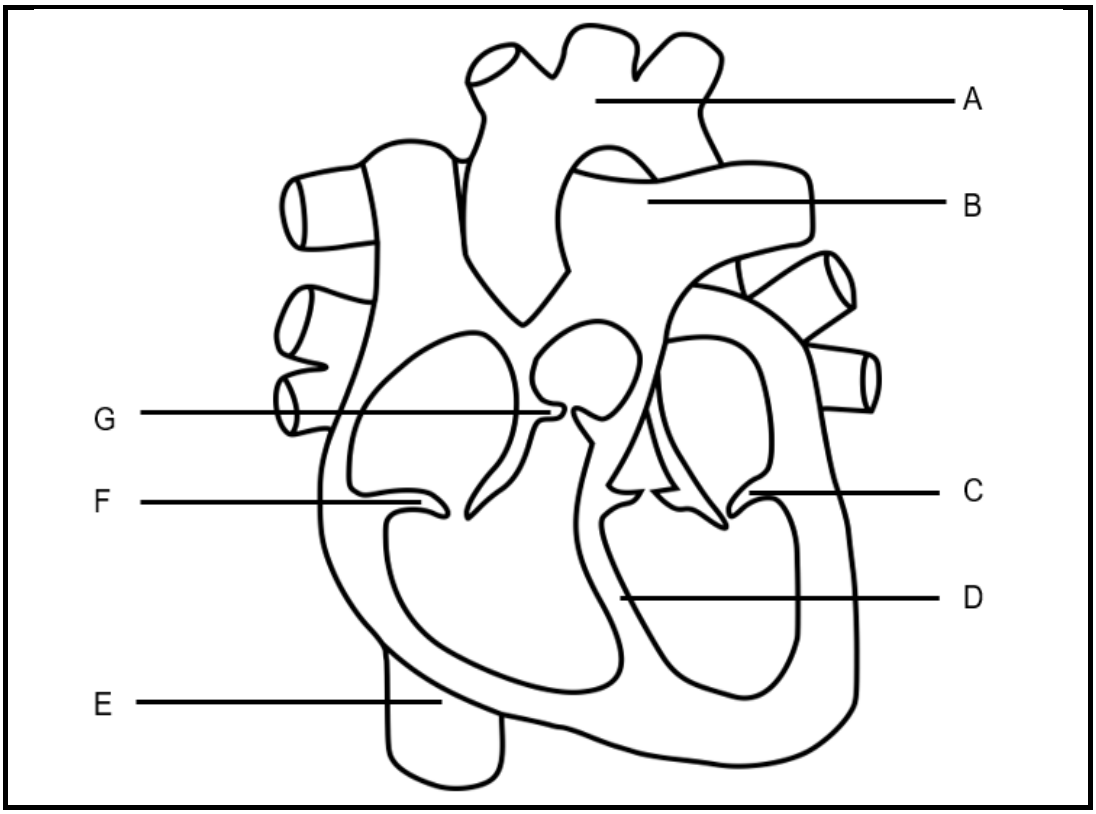
(8 x 1) (8)

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 (1.3.1–1.3.3 in the ANSWER BOOK.)

	COLUMN I	COLUMN II
1.3.1	A blood vessel that carries oxygenated blood	A: Pulmonary artery B: Superior vena cava
1.3.2	An abiotic factor relating to soil	A: Physiographic B: Edaphic
1.3.3	Organisms that cannot produce their own food	A: Heterotrophic B: Decomposers

(3 x 2) (6)

1.4 The diagram below shows the structure of the human heart.



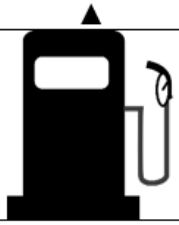
1.4.1 Identify parts **A**, **B** and **G**. (3)

1.4.2 Give the LETTERS ONLY of the parts that prevent the backflow of blood into the atria. (2)

1.4.3 Name the part that brings blood from the lower half of the body back to the heart. (1)

1.4.4 Give the LETTER and NAME of the part that prevents oxygenated and deoxygenated blood from mixing. (2)

1.5 The table below shows the different amounts of CO_2 entering the atmosphere (▲) and being removed from the atmosphere (▼). The numbers represent billions of tons of CO_2 per year.

ATMOSPHERE						
120 ▼	60 ▲	60 ▲	1.1 ▲	8.4 ▲	90 ▼	90 ▲
						
Vegetation		A	B	C	Oceans	
LITHOSPHERE					HYDROSPHERE	

1.5.1 Identify the sources of CO_2 in the atmosphere represented by:

(a) A (1)

(b) B (1)

(c) C (1)

1.5.2 Vegetation contributes 60 billion tons of CO_2 to the atmosphere annually. Which biological process is responsible for this? (1)

1.5.3 According to the table, what is the net amount of CO_2 that enters the atmosphere each year? (3)

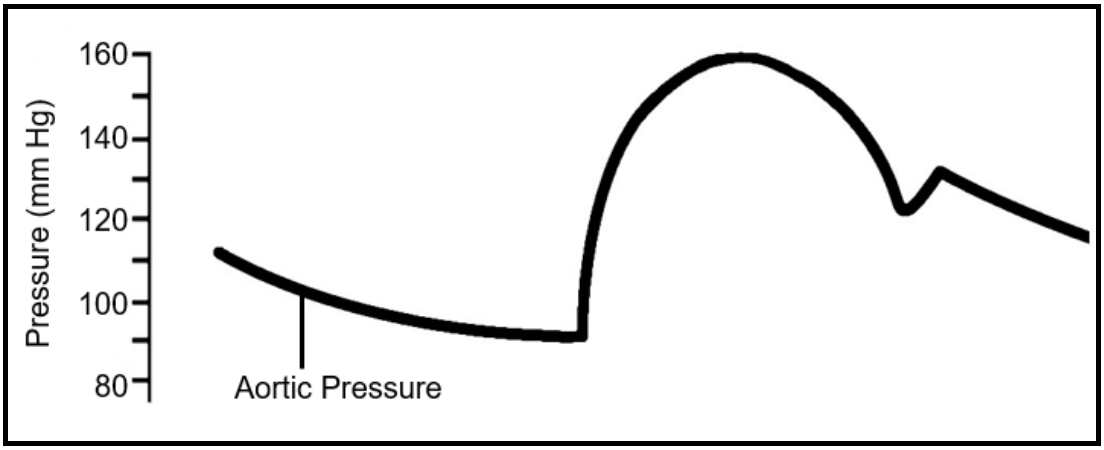
1.5.4 Name the world-wide phenomenon of increasing temperatures that is being caused by excess CO_2 in the atmosphere. (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below shows aortic pressure during the cardiac cycle.
Normal blood pressure is said to be $\frac{120}{80}$ which is the systolic pressure over the diastolic pressure. The systolic pressure is the highest pressure that the blood in the aorta reaches, while the diastolic pressure is the lowest pressure that the blood in the aorta drops to.



2.1.1 Using the information in the diagram above, work out this person's blood pressure. (3)

2.1.2 Would you say that this person has low, normal or high blood pressure? (1)

2.1.3 Describe what causes a stroke. (3)

2.1.4 Name TWO risk factors for having a stroke. (2)
[9]

2.2 The map below shows one of South Africa's biomes and an image of a Karoo Dwarf Chameleon.

2.2.1 Identify the biome on the map shown by the highlighted region **A**. (1)

2.2.2 Describe the climate of this biome. (3)

2.2.3 What general type of vegetation might you expect to find in this biome? (2)

2.2.4 Imagine you are a scientist working at a university close by this region. Someone brings you a Karoo Dwarf Chameleon which they found. It looks like it has not had food in a while and will need to be cared for before it can be released back into the wild.

The Karoo Dwarf Chameleon is a small reptile, usually 8–15cm in length. Like other chameleons it can change colour to camouflage itself.

Explain how you would set up a terrarium (an enclosed glass container for keeping plants and/or animals), to keep it alive for long enough to regain its health. (2 x 2) (4)

2.3 Bob decided to see how light intensity affects flower buds opening in a particular species of plant known as Watsonias.

He built four outside enclosures for the Watsonias. The first one was covered with one layer of green shade cloth. The second one was covered with two layers, the third one with three layers and the fourth one with four layers.

Watsonias flower in spring to early summer so Bob did his experiment in October with flowers that he bought from the nursery.

In each enclosure Bob put five identical pots of Watsonias. Each pot had a single Watsonia plant which was 20 cm high and had no open flowers. Each enclosure was placed on his lawn in full sun. At the end of each week he counted the total number of flowers open in each enclosure and recorded his results.

His results are show in the table below.

Number of flower buds opening on Watsonia plants in four different enclosures over four weeks in October

Enclosure No.	Week 1	Week 2	Week 3	Week 4
1 (25% shade)	4	7	17	29
2 (50% shade)	2	5	9	15
3 (75% shade)	0	3	4	7
4 (100% shade)	0	0	0	3

2.3.1 What is the:

(a) Dependent variable? (1)

(b) Independent variable? (1)

2.3.2 Name ONE thing that Bob could do to ensure the validity of his experiment. (1)

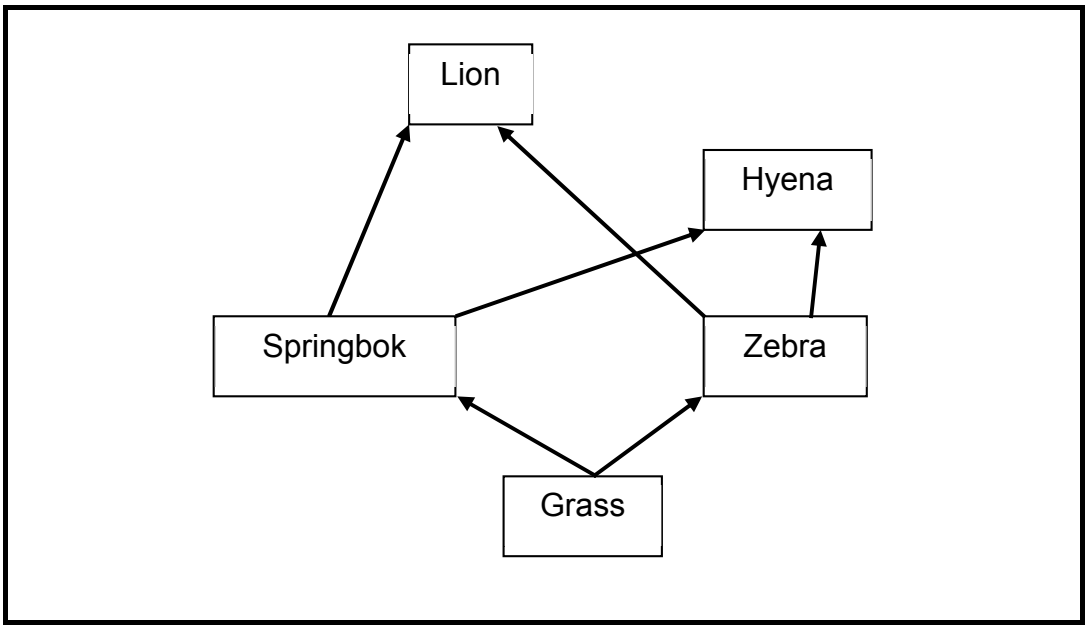
2.3.3 How could Bob have set up a control for his experiment? (2)

2.3.4 Calculate the percentage increase in numbers of open flowers for Enclosure 2 from week 2 to week 3. (3)

2.3.5 What can Bob conclude from his results? (2)

2.3.6 Draw a bar graph of Week 4 of Bob's results. (6)

2.4 The diagram below shows a food web.



2.4.1 Name the organism above that represents a …

(a) producer. (1)

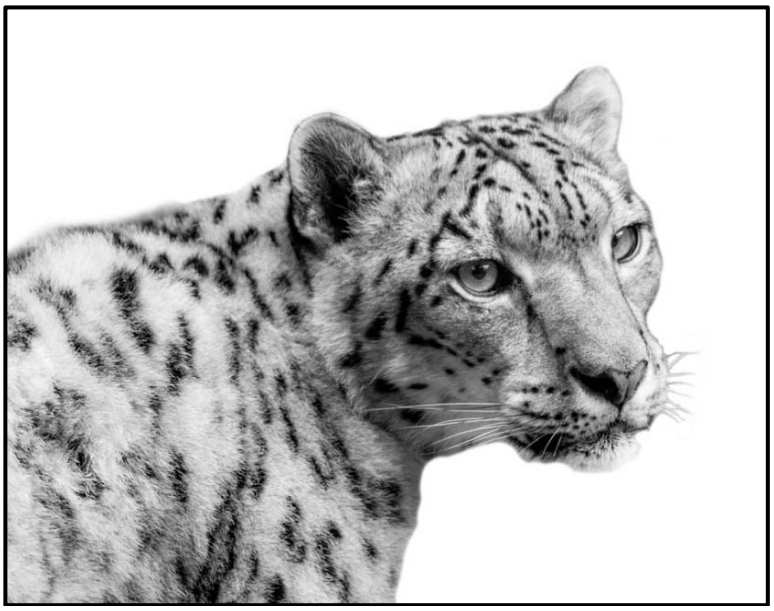
(b) primary consumer. (1)

2.4.2 Explain what may happen if the hyena was removed from this ecosystem. (3)

[40]

QUESTION 3

3.1 The snow leopard is classified as follows:
Animalia, Chordata, Mammalia, Carnivora, Felidae, Panthera, Uncia



3.1.1 To which Order and Family does the snow leopard belong? (2)

3.1.2 Correct the errors in the snow leopard's binomial (scientific) name. (2)

3.1.3 How many kingdoms of living organisms are there? (1)

3.1.4 The snow leopard is *eukaryotic*. What does this mean? (1)

3.1.5 Suggest which mode of nutrition and method of reproduction is common in snow leopards. (2)

3.1.6 Tigers, jaguars, lions and leopards belong to the same genus as snow leopards.

Name the type of two-step key that may be used to identify these cats. (1)

3.2 The table below shows a geological timescale.

ERA	PERIOD	MYA
Cenozoic	Quaternary	2
	Tertiary	65
Mesozoic	Cretaceous	140–65
	Jurassic	190–140
	Triassic	250–190
Palaeozoic	Permian	280–250
	Carboniferous	345–280
	Devonian	400–345
	Silurian	435–400
	Ordovician	515–435
	Cambrian	570–515

3.2.1 Scientists have discovered fossils of early humans in many locations in Africa. In which era and period would these fossils have been alive? (2)

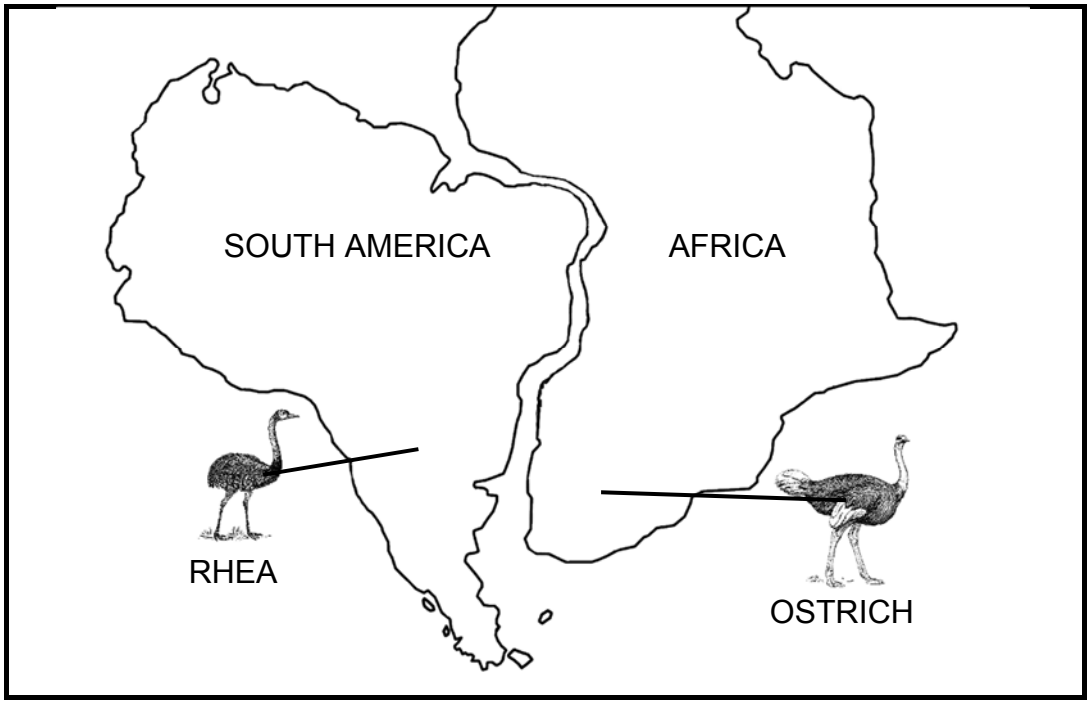
3.2.2 Scientists have recently discovered an early mammal fossil called *Megaconus*, which has been nicknamed 'Jurassic Squirrel'. Scientists estimate that it was alive exactly in the middle of the Jurassic period. Work out how many million years ago that was. (2)

3.2.3 About 543 MYA an event known as the 'Cambrian Explosion' occurred. What happened during this event? (2)

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

3.2.5 All extinction events like the end of the dinosaurs were due to physical causes, yet humans are now causing extinction of various species at a higher rate than at any time in the past. Name this current mass extinction event and state TWO ways in which human activities are threatening biodiversity. (3)

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



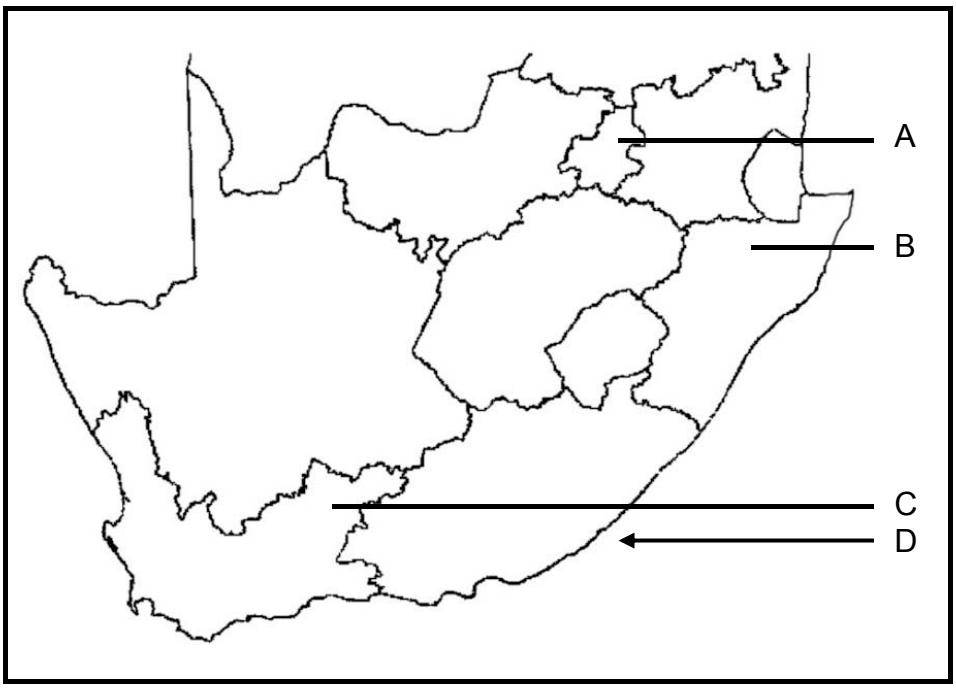
3.3.1 Which of the two major super continents did South America and Africa belong to? (1)

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

3.3.3 Flightless birds like the rhea and ostrich are different species, yet they share many similar characteristics. Explain how such similar birds that cannot fly ended up on continents separated by a vast ocean. (3)

3.3.4 Polar bears live in the North Pole, the Arctic, while penguins live in the South Pole, the Antarctic, both of which are very similar climates. Suggest a reason why penguins and polar bears do not live at both poles. (4)

3.4 The map below shows different sites where evidence of South Africa's rich fossil history may be seen.



3.4.1 From which National Heritage Site and set of caves at Point **A** were the fossil remains of humans found? (2)

3.4.2 Name TWO advantages that fossil sites, like those at Point **A**, have for the local people. (2)

3.4.3 Give the scientific name of the primitive plants found at Point **B** which are responsible for most of South Africa's coal deposits. (2)

3.4.4 Name the extinct arthropods with segmented bodies that were discovered at Point **C**. (1)

3.4.5 Which 'living fossil' was caught off the coast near East London at Point **D**? (1)

[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Give a detailed description of the process of how fossils form in sedimentary rocks and mention how the scientists could estimate the age of the fossils using relative dating. Also say how they might come to be discovered by scientists.

Content: (17)
Synthesis: (3)

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

TOTAL SECTION C: 20
GRAND TOTAL: 150