Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2018

LIFE SCIENCES P2

MARKS: **150**

TIME: **2½ hours**

This question paper consists of 17 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) on the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The part of the biosphere which consists of land is known as the ...

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

1.1.2 Organisms that become inactive during winter are said to …

A aestivate.
B hibernate.
C migrate.
D insulate.

1.1.3 A sea can be regarded as a(an) … biome.

A aquatic
B terrestrial
C freshwater
D desert

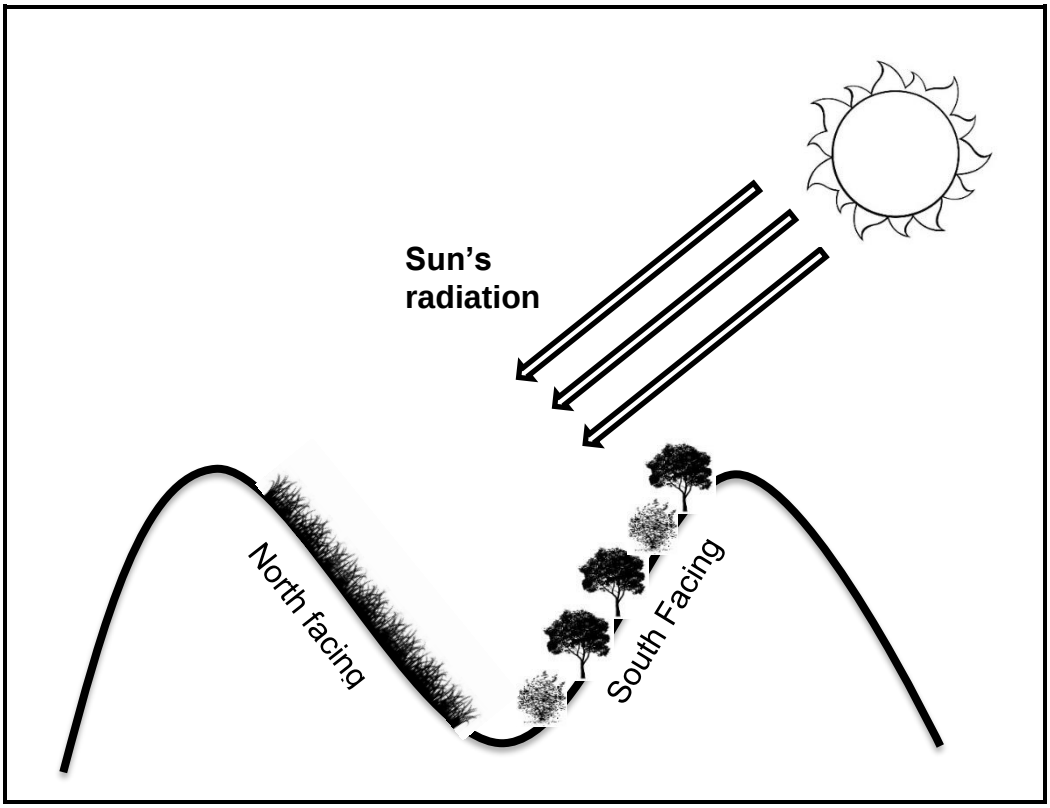
1.1.4 Which of the following is NOT associated with the lymphatic system?

A Low pressure
B High concentration of metabolic waste
C Transports digested fats
D High oxygen concentration

1.1.5 Which of the following combinations of soil types shows an increase in water holding capacity from lowest to highest?

	Lowest water holding capacity	→	Highest water holding capacity
A	sand	clay	loam
B	clay	sand	loam
C	sand	loam	clay
D	clay	loam	sand

QUESTIONS 1.1.6 and 1.1.7 refer to the diagram below.



1.1.6 Which physiographic factor is illustrated in the diagram above?

A Aspect
B Altitude
C Radiation
D Slope

1.1.7 The reason for less vegetation on the north facing slope is due to …

A plants that cannot tolerate sunlight.
B less rainfall.
C more sunlight and more evaporation of water.
D soil erosion.

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

(i) Mammals
(ii) Photosynthetic bacteria
(iii) Unicellular eukaryotic organisms
(iv) Accumulation of oxygen in the atmosphere

The correct sequence of events that took place on early earth is …

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

1.1.9 Which of the following is NOT a cause of the 'Sixth Mass Extinction'?

A Conservation
B Burning of fossil fuels
C Poaching
D Habitat destruction

1.1.10 Which TWO climatic factors directly affect the distribution of world biomes?

A Temperature and altitude
B Temperature and latitude
C Altitude and precipitation
D Temperature and precipitation

(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 The study of fossils

1.2.2 Original land mass that started to break up 200 mya

1.2.3 Abiotic factors related to the soil

1.2.4 Organisms not able to produce their own food but rely on other organisms for food

1.2.5 A well-defined area in which there is close interaction between plants, animals and the environment

1.2.6 A land area such as a swamp that is saturated with water, either permanently or seasonally

1.2.7 Refers to height above sea level

1.2.8 Organisms responsible for decay and found at all trophic levels except the first

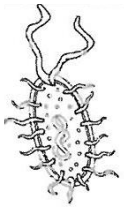
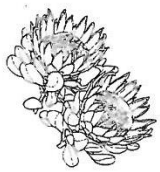
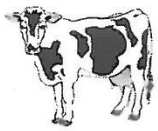
(8 x 1) (8)

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 in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Fossil evidence that the Karoo and other parts of South Africa were once covered in water	A: Trilobites B: Ammonites
1.3.2	Results in the increase of biodiversity	A: Carbon dioxide B: Glaciation
1.3.3	Adaptation to living in water	A: Gills B: Thick cuticle

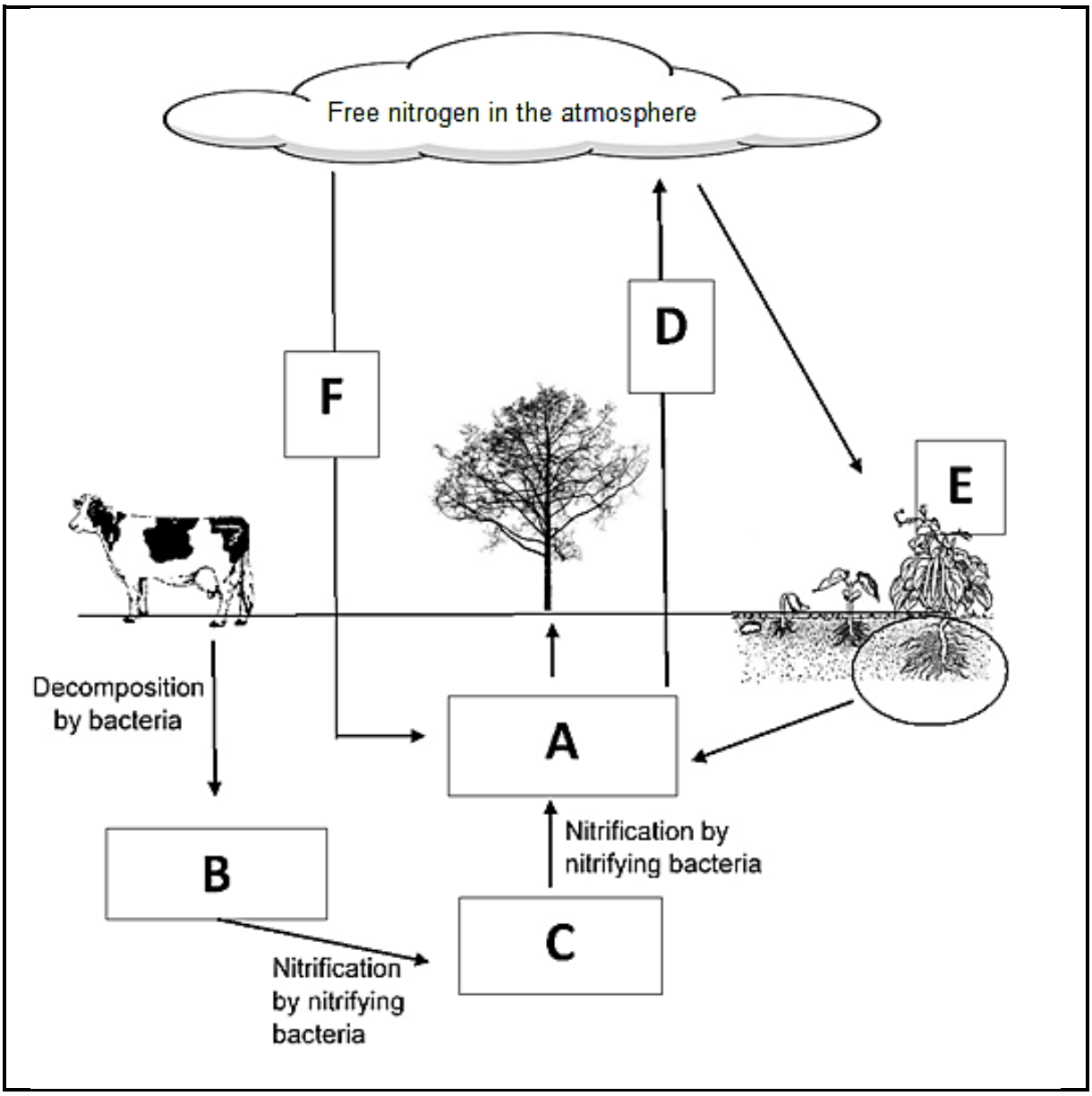
(3 x 2) (6)

1.4 According to the Five-Kingdom system of classification, each of the organisms shown below belongs to a different Kingdom. Complete the table by filling in the missing words. Write down only the question number (1.4.1–1.4.10) and the answer, for example 1.4.11 Animalia.

Organism					
Kingdom	**1.4.1**	Protista	Fungi	**1.4.2**	Animalia
Genus		Paramecium	Agaricus	Protea	Bos
Species		caudatum	Bisporus	Cynaroides	Taurus
Prokaryote or Eukaryote	**1.4.3**	**1.4.4**	Eukaryote	Eukaryote	**1.4.5**
Unicellular or Multicellular	**1.4.6**	Unicellular or Multicellular	Multicellular	**1.4.7**	Multicellular
Method of Feeding	Autotrophic and heterotrophic	Autotrophic, Heterotrophic and Saprophytic	**1.4.8**	**1.4.9**	
Scientific name		**1.4.10**			

(10 x 1) (10)

1.5 Study the diagram showing the nitrogen cycle below and answer the questions that follow.



1.5.1 Name the nitrogenous compound represented by labels **A**–**C**. (3)

1.5.2 Name the process labelled **D** by which nitrogen is returned to the atmosphere. (1)

1.5.3 Name the plants labelled **E** that form a symbiotic relationship with nitrogen-fixing bacteria. (1)

1.5.4 Name the weather phenomenon labelled **F** that is responsible for forming nitrates in the atmosphere. (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Read the passage below and answer the questions that follow.

Doctors tell us to stay away from foods high in saturated fat, like butter, eggs and meat, because they are responsible for heart disease.

But what if that's wrong? Dr Stephen Sinatra, a cardiologist who's been practising for over 30 years and the author of *The Great Cholesterol Myth*, thinks it's wrong.

Sinatra explained that since half of all patients hospitalised for heart disease have high cholesterol, that means the other half do not.

He says heart disease is caused by inflammation inside blood vessels, which is caused by numerous things. Eating too much sugar is at the top of the list. Sugar damages arteries, increases blood pressure, and ages your organs. We are aware that sugar is found in soda drinks and candy but it is also found in food such as bread and pasta.

Sinatra advises replacing all that sugar with vegetables and fats. He also highly recommends eating unsaturated fats such as nuts, avocados, fish, and olive oil. He promotes saturated fats like butter, unprocessed meat and coconut oil.

However, we should not confuse saturated fats with trans fats. Trans fats are man-made fats and are in most processed foods. Trans fats help prolong the food's shelf life. Unfortunately, trans fats are molecularly similar to plastic! They wreak havoc on your body, especially your heart.

[The passage above has been adapted from an article by Lorie Johnson, a CBN News Medical Reporter (December 2012).
The original article was titled: *Cholesterol Myth: What really causes heart disease*?]

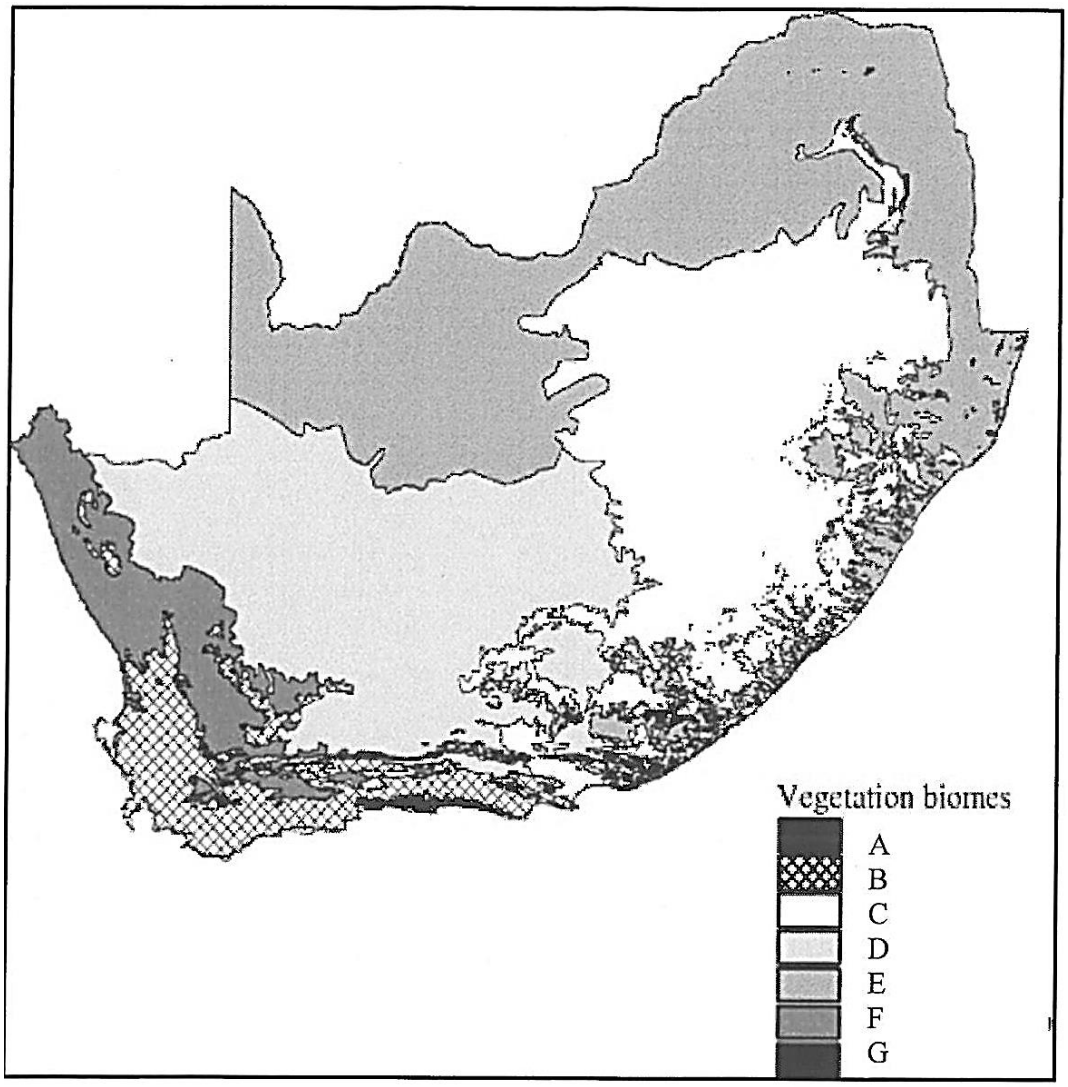
2.1.1 Name TWO types of food that Dr Sinatra says should be avoided as they cause inflammation inside the arteries. (2)

2.1.2 What type of fat is NOT naturally found in food? (1)

2.1.3 How is Dr Sinatra's theory about the cause of heart disease different from what most people believe? (2)

2.1.4 Describe how fatty deposits laid down in the arteries can lead to a heart attack. (3)

2.2 Study the map of South Africa below showing the different biomes and then answer the questions that follow.



2.2.1 Define the term *'biome'*. (2)

2.2.2 Name biomes **C** and **D**. (2)

2.2.3 Give the LETTER ONLY of the biome where:

(a) We would find fynbos vegetation (1)

(b) You would see the 'Big Five' (1)

2.2.4 Describe the climate of the fynbos biome. (2)

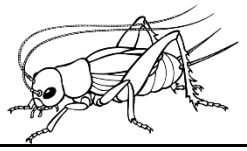
2.2.5 Give ONE difference between the soils of forests and those of grasslands. (2)

2.2.6 Biome **F** is the Succulent Karoo. Explain ONE adaptation that allows plants to survive here. (2)

2.3 Esethu and Christine read the extract below in a magazine.

HOW IS A CRICKET'S CHIRP RELATED TO TEMPERATURE?

Crickets are insects. Like all living things they have many chemical reactions going on inside their bodies, such as reactions that allow muscles to contract to produce chirping. Crickets, like all insects, are cold blooded and take on the temperature of their surroundings. This affects how quickly these chemical reactions that allow muscles to contract can occur.



They decided to conduct an experiment. They took 4 wooden boxes and placed 1 cricket in each box. Each box was also fitted with a temperature-controlled heater. These boxes were labelled A, B, C and D. The heater in box A was set at 10 °C, box B was set at 15 °C, box C at 20 °C and box D at 25 °C.

Each box was left for 30 minutes for the crickets to get used to the temperature. They then recorded the number of chirps per minute. These results are shown in the table below.

Temperature (°C)	Chirps per minute
10	40
15	75
20	105
25	140

2.3.1 Write a suitable aim for the investigation. (2)

2.3.2 Name TWO factors that Esethu and Christine need to control to make their investigation more valid. (2)

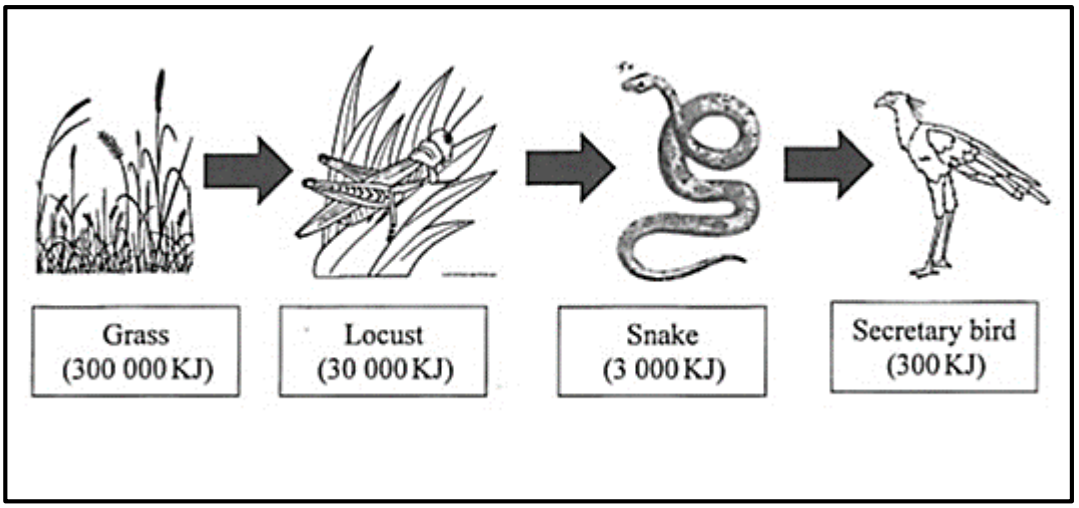
2.3.3 Draw a line graph to represent the data shown in the table above. (6)

2.3.4 How could Esethu and Christine improve the reliability of their investigation? (2)

2.3.5 In which season would you expect to hear more cricket chirping? Give a reason for your answer. (2)

2.3.6 Crickets are more active at night. What is the term used for animals that are active at night? (1)

2.4 Study the food chain below and answer the questions that follow.



2.4.1 What do the arrows in the food chain indicate? (1)

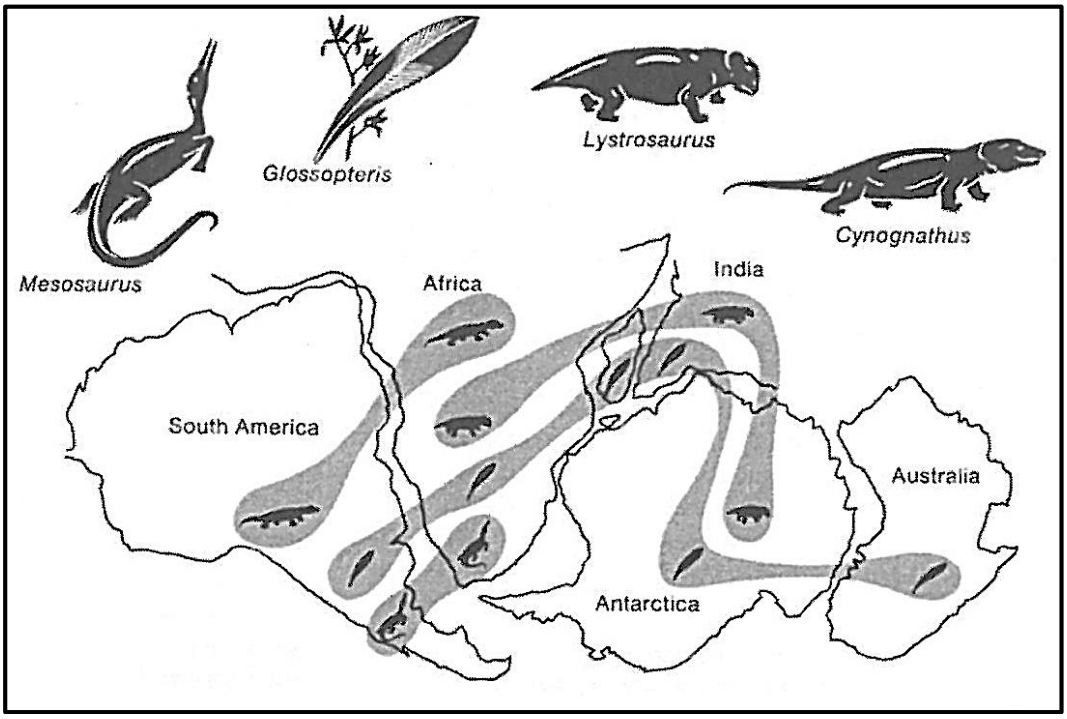
2.4.2 Name the primary consumer in the above food chain. (1)

2.4.3 Why does the total energy in each trophic level become less as we move up the food chain? (3)

[40]

QUESTION 3

3.1 Study the map below and answer the questions that follow.



3.1.1 What do we call the study of the distribution of individual species? (1)

3.1.2 Name the supercontinent evident in the diagram. (1)

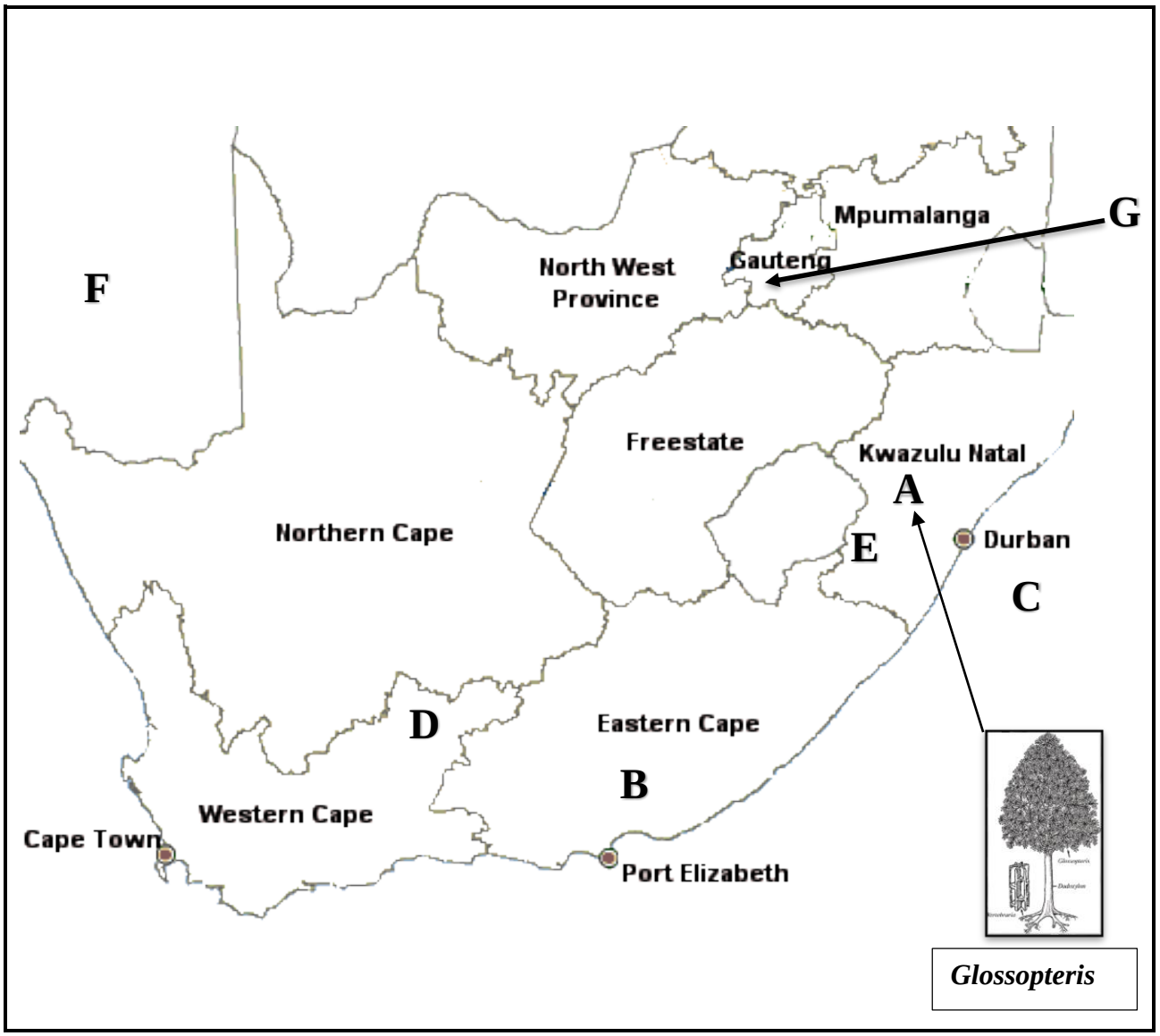
3.1.3 Using the diagram above, explain how fossil evidence supports the fact that Africa and South America may have once been joined as part of the same continent. (2)

3.1.4 Which organism's fossil remains are found on all six land masses shown above? (1)

3.1.5 Today there are coal deposits found in Antarctica. Which organism shown above would have been source of these coal deposits? (1)

3.1.6 The movement of the continents have led to the 'Theory of Plate Tectonics'. Describe the reason behind the movement of the continents according to this theory. (3)

3.2 The map below shows some of the fossil sites in South Africa. Study the map and answer the questions that follow.



3.2.1 Name ONE of the towns in Area **A** on the map where fossils of primitive plants like *Glossopteris* have been found. (1)

3.2.2 Which town in the Eastern Cape (marked **B**) has fossil evidence of early plants? (1)

3.2.3 Early human and pre-human fossils have been found in a number of locations in South Africa. Which letter on the map shows the 'Cradle of Humankind' where many of these fossils have been found? (1)

3.2.4 The coelacanth was found in area **C** on the map. Why is this fish called a 'living fossil'? (3)

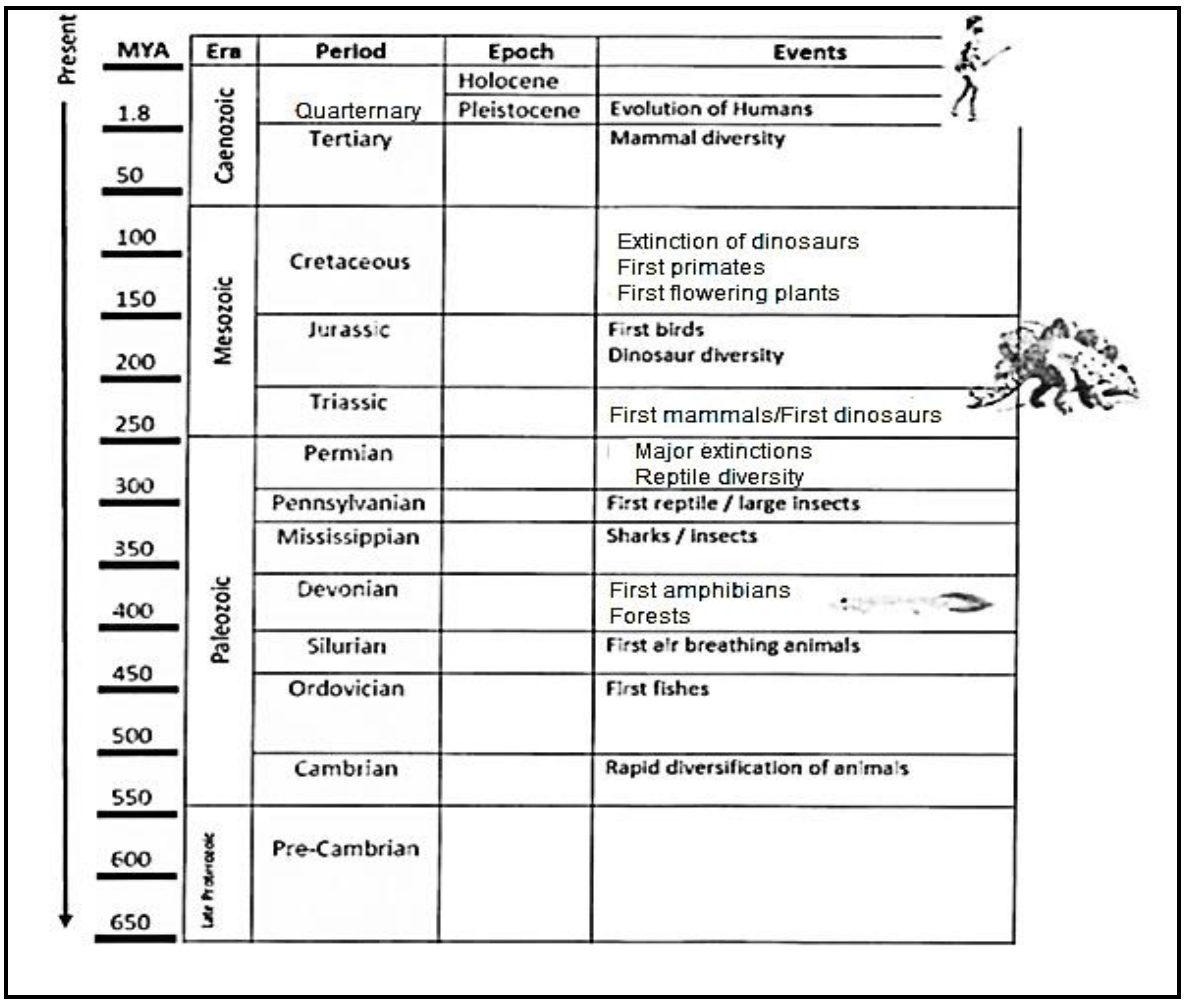
3.2.5 Explain how a fossil of a coelacanth would be formed. (5)

3.2.6 Name TWO ways in which fossils can be dated. (2)

3.2.7 Suggest TWO reasons why not all organisms will be fossilised. (2)

3.2.8 The Karoo National Park is found at **D** on the map. How can fossils found in the Karoo National Park benefit the people that live in the area? (2)

3.3 Study the Geological Timescale below and answer the questions which follow.



3.3.1 What does "MYA" stand for as shown in the diagram? (1)

3.3.2 When did the Triassic period start? (2)

3.3.3 In which **Era and Period** are we living in now? (2)

3.3.4 How long did the Ordovician period last? Show all your working. out. (3)

3.3.5 In which geological period did the first reptile appear? (1)

3.3.6 What major event took place 543mya that saw a rapid increase in the number of species on Earth? (1)

3.3.7 During which period did the Mass Extinction occur that wiped out the dinosaurs? (1)

3.3.8 Discuss any ONE theory that scientists put forward to explain the Mass Extinction mentioned in QUESTION 3.3.7. (3)

[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

Give a detailed description of the journey of a red blood cell as it travels from the right atrium of the heart round the body and back to the left atrium. Also list the differences between arteries and veins.

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