



Hillcrest High School

Life Science Exam

Grade 10

November 2014

Time: 2½ hours

Paper 2

Examiner: Mrs Harmse

150 Marks

Instructions

1. Write your Life Science teachers name on all booklets.
 2. Number the answers exactly as the questions are numbered.
 3. Write neatly and legibly
 4. Do all drawings in pencil and label them in ink.
 5. Only draw diagrams and flow charts when requested to do so.
 6. The diagrams in the question paper may not necessarily be drawn to scale.
 7. Non-programmable calculators, protractors and compasses may be used.
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SECTION A

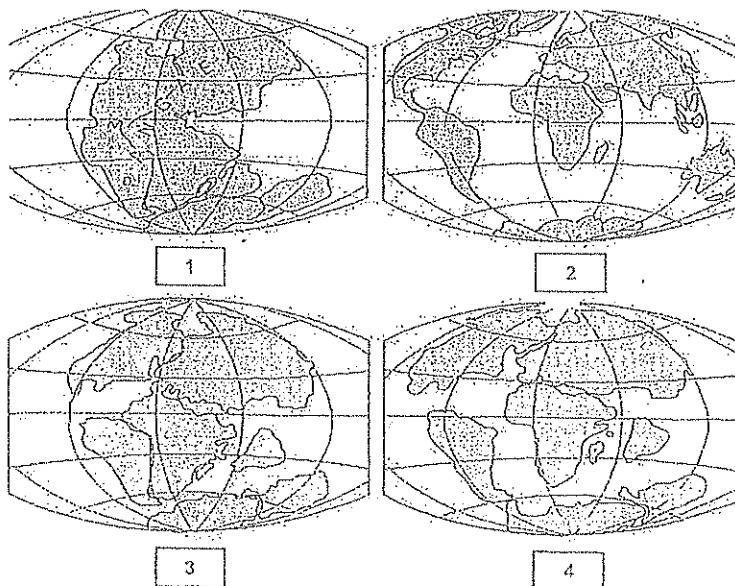
Question 1

1.1 Various possible options are provided as 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 your answer book, for e.g. 1.1.6 C

- 1.1.1 An organism that makes its own food is..
- A- Herbivorous
 - B- Carnivorous
 - C- Autotrophic
 - D- Heterotrophic

- 1.1.2 Organisms that live in water are called...
- A- Terrestrial.
 - B- Xerophytes.
 - C- Aquatic.
 - D- Mesophytes.
- 1.1.3 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 specie in an area.
- 1.1.4 The element nitrogen is mainly added to plants in the form of.
- A. Nitrogen gas
 - B. Ammonium salts
 - C. Nitrates
 - D. Proteins
- 1.1.5 A palaeontologist studies
- A- Living organisms
 - B- Minerals buried in the Earths crust
 - C- Fossils
 - D- Rock layers in the Earths crust
- 1.1.6 The correct way to write the scientific name for a domestic dog is...
- A- canis familiars
 - B- Canis Familiars
 - C- CANIS familiaris
 - D- Canis familiars

Refer to the diagram and answer questions 1.1.7 to 1.1.10



11.7 Diagram 1. Represents earths land formation during which of the following periods?

- A- Permian
- B- Triassic
- C- Jurassic
- D- Tertiary

11.8 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

11.9 The diagram above illustrates...

- A- Techtonic plates
- B- Continental drift
- C- Asteroid impact
- D- Volcanic activity

11.10 The southern divide of continents was named:

- A- Gondwana land
- B- Southern land
- C- Laurasia
- D- Antarctica

1.2 Give the correct biological term for each of the following descriptions.

1.2.1 Factors which include aspect, slopes and altitude.

1.2.2 A set of interconnected food chains.

1.2.3 A biome that is characterized by having large trees and shade loving shrubs.

1.2.4 An organisms that is not indigenous to an area and has become a problem

1.2.5 Plants that are adapted to living in dry habitats

1.2.6 The death of all individual species living in the world at one time

1.2.7 The wall of tissue separating the left and right side of the heart

1.2.8 Organisms responsible for decomposition of organic matter

1.2.9 Species that no longer exist

1.2.10 Unicellular organisms that lack a membrane-bound nucleus

(Total 10)

1.3 For each of the following statements in column one, state whether it applies to A only, B only, both A and B, or neither A nor B

	COLUMN A	COLUMN B
1.3.1	Possible cause of the sixth mass extinction.	A. Climate change B. Human impact
1.3.2	The loss of water in vapour from the surface of a leaf	A. Transpiration B. Evaporation
1.3.3	When carbon dioxide is removed from the atmosphere	A. Respiration B. Photosynthesis
1.3.4	Fossils are normally found in	A. Sedimentary rock B. Igneous rock
1.3.5	The part of earth where life is found	A. Atmosphere B. Hydrosphere
1.3.6	Contraction of the Atria and ventricles during the cardiac cycle	A. Diastole B. Systole
1.3.7	Structures in blood vessels that ensure one directional flow	A. Ventricles B. SA nodes
1.3.8	Organisms that cannot produce their own food	A. Heterotrophic B. Autotrophic
1.3.9	The study of the distribution of living organisms in specific geographical regions on earth	A. Archaeology B. Biogeography
1.3.10	The position of an area in relation to the sun	A. Aspect B. Slope

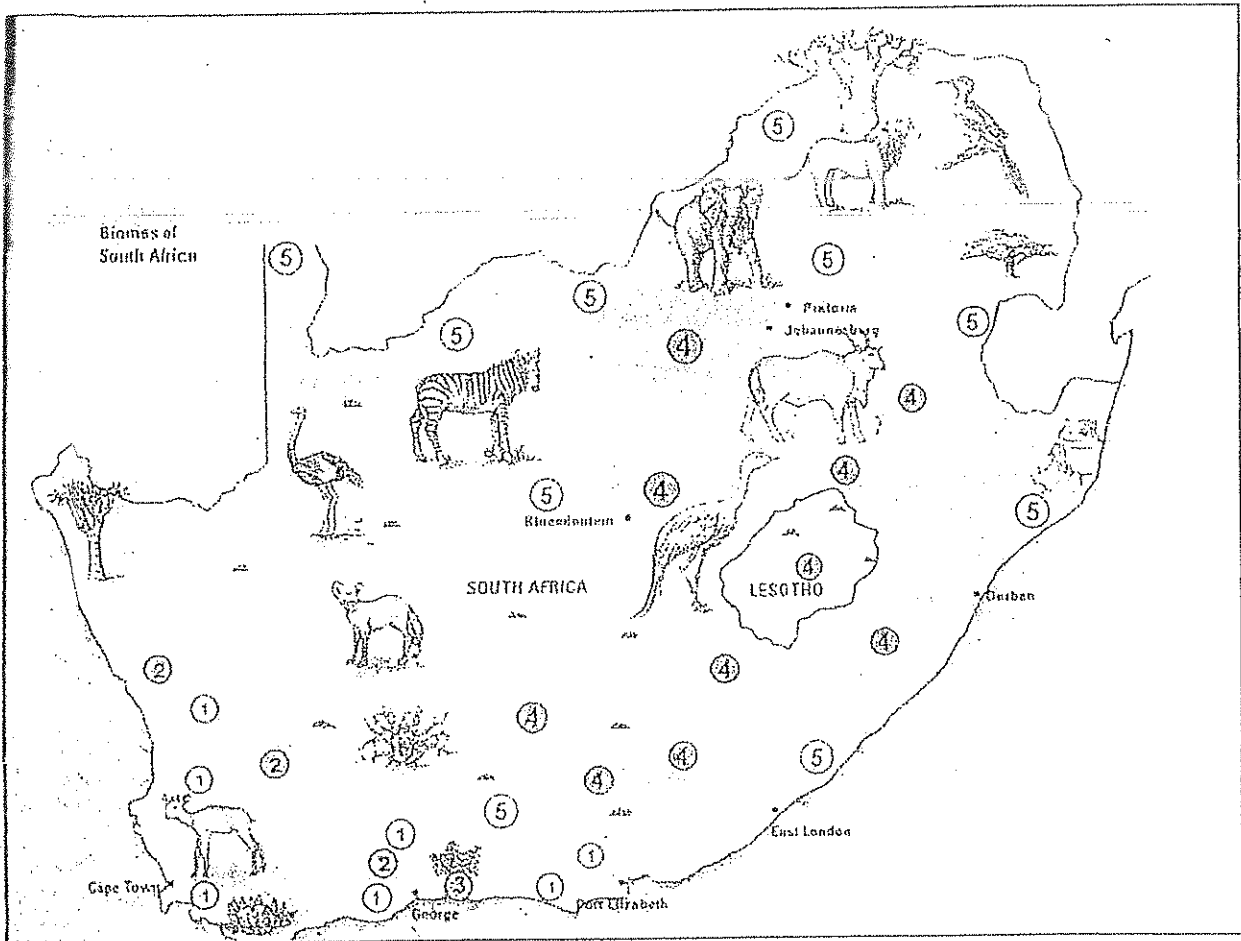
(Total 10)

(Total Section A: 50)

SECTION B

Question 2

2.1 The diagram below represents the distribution of Biomes of South Africa



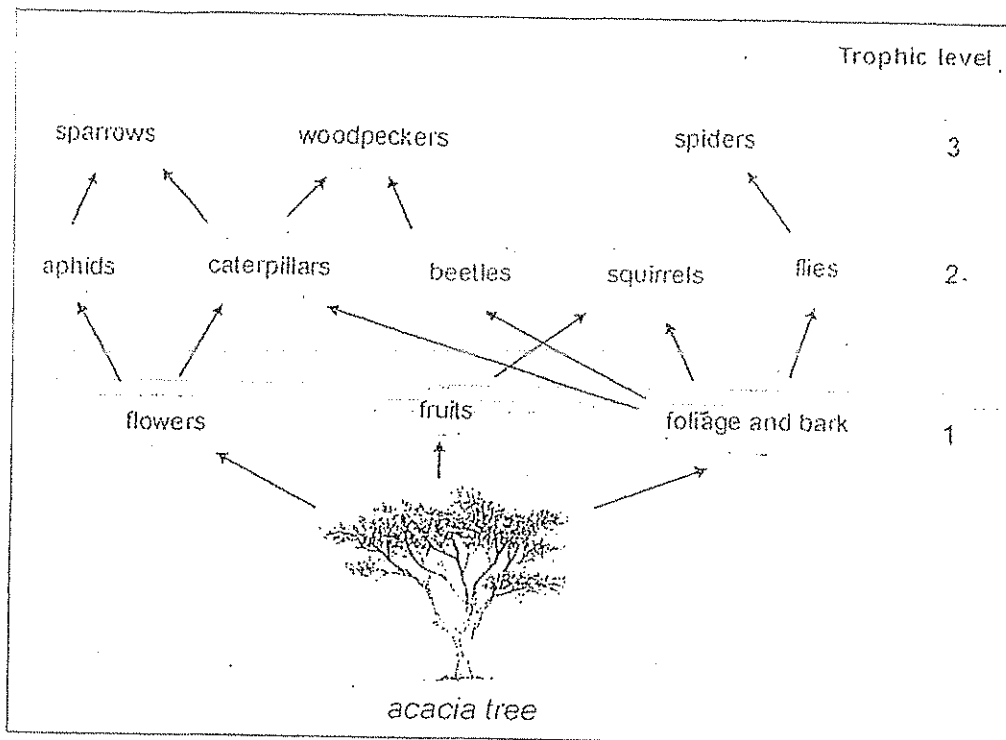
2.1.1 Name the biomes numbered 1 to 5 on the map (5)

2.1.2 Write down the number only of the biome that:

- Has proteas, ericas and restios
- The greatest number of succulent plant species in the world.
- Is often referred to as the bushveld
- Consists mostly of grasses with deep, dark fertile soil
- Is made up of indigenous forest

(5)

2.2 Study the diagram below and answer the questions that follow.



2.2.1 Name the organism that represents the following:

- a) Herbivore
- b) Producer

(2)

2.2.2 The acacia tree contains 1000kj/m² per year of energy. 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 sparrow? Show all calculations.

(4)

2.2.3 If all the caterpillars in this food chain were removed, explain what would happen to the sparrow population.

(2)

2.2.4 Using the information from the diagram, draw a food chain representing four trophic levels.

(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 100g of soil per minute)	20	5	70
Humus content (%)	25	10	5

- 2.31 According to the results which soil sample A, B or C would be the following:
 a) Loam
 b) Clay
 c) Sand (3)
- 2.32 Explain the disadvantage for the plants growing in soil B with regard to permeability to water. (2)
- 2.33 Name TWO factors relating to the composition of soil sample B that results in its low permeability to water. (2)
- 2.34 State TWO advantages of a higher percentage of humus for the soil. (2)
- 2.35 Name the abiotic factors concerned with soil content and texture. (1)

2.4 Study the table below and then answer the questions that follow:

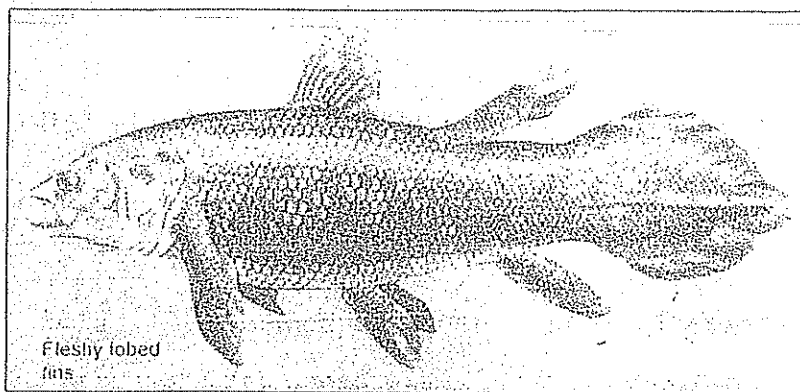
Decay of Carbon								
Years from the present	0	5730	11460	17190	22920	X	34380	40110
Numbers of half-lives elapsed	0	1	2	3	4	5	6	7
Percentage of original Carbon-14 remaining	100	50	25	12.5	6.25	Z	1.56	0.78

- 2.4.1 Name TWO types of methods used to determine the age of fossils. (2)
- 2.4.2 Calculate the value of:
 a) X (2)
 b) Z (2)

- 24.3 Explain why it would not be possible to date a fossil which existed 80 million years ago using the decay of carbon-14. (2)
- 24.4 Give TWO reasons why there are gaps in the records. (2)

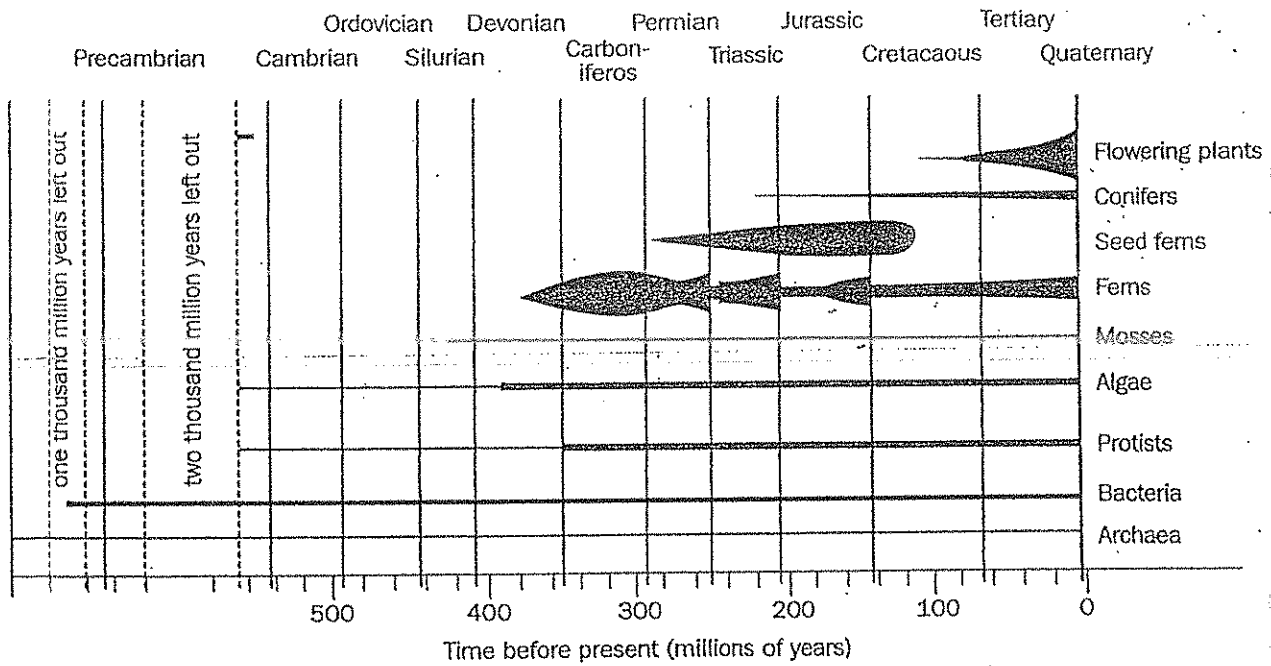
Question 3:

3.1) Study the diagram below and answer the questions that follow.



- 3.1.1 Identify the animal shown in the diagram. (1)
- 3.1.2 When and where was it first discovered in South Africa? (2)
- 3.1.3 Which two groups of animals is this 'living fossil' thought to be the link between. (2)
- 3.1.4 Provide a reason for your answer to 3.1.3. (2)
- 3.1.5 Why is this animal called a living fossil? (2)
- 3.1.6 Name one way in which the body of this fish differs from bony fish today. (1)

3.2 The diagram below shows the approximate change in the number of species of some groups during the history of life.



- 3.2.1 Name the group of the plants that has existed for the least amount of time. (1)
- 3.2.2 For about how many years have they existed? (1)
- 3.2.3 The seed ferns did not last for very long. Name the geologic period in which they became extinct. (1)
- 3.2.4 From the diagram above give evidence that the fern have been a successful group of plants (2)
- 3.2.5 At the end of the Jurassic period which group of plants had the most species? (1)
- 3.2.6 Suggest TWO reasons why you think the bacteria group has survived for the longest period of time (2)
- 3.2.7 Explain the difference between the extinction of a species and a mass extinction. (2)

3.3 During an investigation on fitness, the following results were obtained.

Table 1

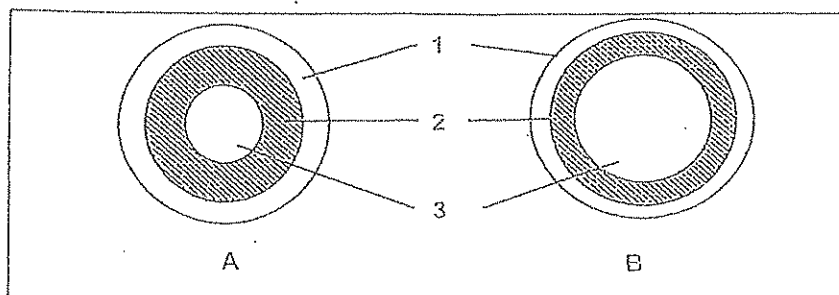
	Learners who do not play sport or exercise	Learners who play sport or exercise twice a week	Learners who play sport or exercise three or more times a week
Average resting heart rate	93	72	65
Average heart rate after 5 minute fitness exercise	125	96	85

Table 2: Fitness level indicator

Resting heart rate (beats/min)	Heart rate after 3 minutes of exercise (beats/min)	Fitness level
50	<80	Very fit
60	81-100	Above average fitness
75	90	Average fitness
90	100-115	Below average fitness
100	>135	Very unfit

- 33.1 Suggest a hypothesis for the investigation. (1)
- 33.2 Identify the:
- a) Dependent variable (1)
 - b) Independent variable (1)
- 33.3 Draw a bar graph to represent the results obtained as indicated in table 1. (5)
- 33.4 Write a conclusion for the investigation. (2)

3.4 Study the diagrammatic representation below and answer the questions that follow

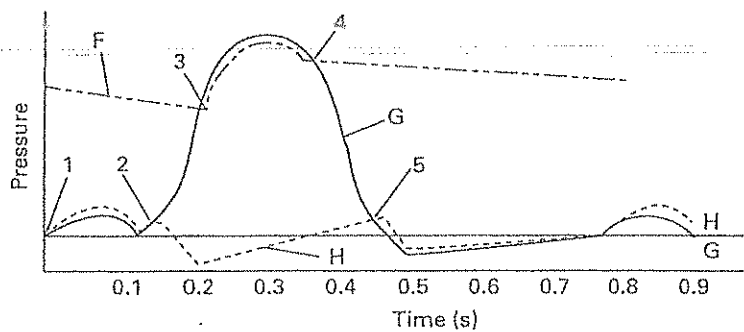
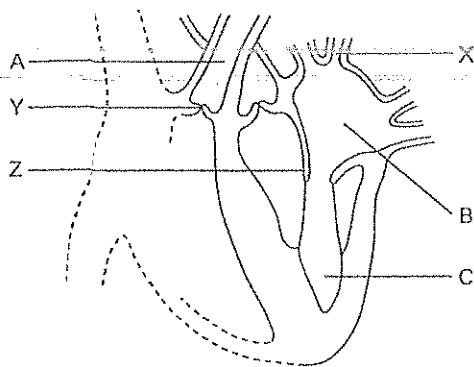


3.4.1 Which blood vessel A or B represent an artery? (1)

3.4.2 Suggest one reason for your answer in 3.4.1. (1)

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

3.5 The graph below shows some of the changes in pressure that happen in three different regions of the left side of the heart, shown in the diagram below as A, B and C during the cardiac cycle. Use it to answer the questions that follow.



3.5.1 Which line (F, G or H) shows the pressure changes in B? (2)

3.5.2 How long does the systole take in chamber B? (2)

3.5.3 How many hearts beats would there be per minute? (1)

3.5.4 Which number on the graph is where you hear the first heart beat sound, 'lub'? (1)

Section C

Question 4

Chemical substances such as carbon, oxygen, nitrogen and water needed by living organisms are used over and over again in nutrient cycles.

Write an essay in which you discuss the carbon, nitrogen and water cycles and the role they play in nutrient recycling. You must discuss the processes involved in each cycle.

Content: 17

Synthesis: 3

Grand total=150

