KZN DEPARTMENT OF EDUCATION
GREENBURY SECONDARY SCHOOL
DEPARTMENT OF MATHEMATICS AND SCIENCES
NOVEMBER EXAMINATION 2016
LIFE SCIENCES PAPER 2
GRADE 10

EXAMINER: S.SINGH
MODERATORS: K.GOVENDER, C. JUGDHAW, K. JAIRAM
DATE: 08/11/2016

DURATION: 2.5.HRS
MAX.MARKS: 150

INSTRUCTIONS TO LEARNER:

1. Answer all questions.
2. Begin each question on a new page.
3. Rule off after each sub - question.
4. Number your answers exactly as the questions are numbered.
5. Draw all diagrams in pencil and label in ink.
6. Write neatly and legibly.
7. This paper consists of 13 printed pages.

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. The biotic component in an ecosystem is its:

A. soil
B. oxygen
C. rainfall
D. plants and animals

1.1.2. When a lion kills and eats a zebra, the lion is the:

A. producer
B. predator
C. prey
D. Decomposer

1.1.3. Organisms that are adapted to live in water are called:

A. xerophytes
B. buoyant
C. terrestrial
D. aquatic

1.1.4. All parts of the earth where life exists is the:

A biomass.
B. biosphere
C. biotic factors
D. abiotic factors

1.1.5. The pyramid of numbers for an ecosystem may not be a normal pyramid shape. It depends on the organisms involved.

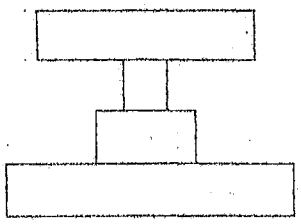
Match the following correct food chain with the pyramid of numbers below.

A. Blades of grass ----------> zebras ----------> lion ----------> fleas

B. Tree ----------> beetles ----------> lizards ----------> owl

C. Algae ----------> fish ----------> birds ----------> crocodile

D. Sunflower ----------> ants ----------> spiders ----------> crocodile



1.1.6. Refer to the features below:

(i) large surface area

(ii) in close contact with tissue cells

(iii) thin walled

Which combination of features applies to the blood capillary network?

A. (i) and (ii) only

B. (ii) and (iii) only

C. (i) and (iii) only

D. (i), (ii) and (iii)

Questions 1.1.7. and 1.1.8 are based on the following information

Every species is given a two part name

The scientific name of the house cat is: FELIS DOMESTICUS

1.1.7. The correct way to type the above scientific name is:

A. felis domesticus

B. *Felis Domesticus*

C. *Felis domesticus*

D. Felis Domesticus

1.1.8. The above system of classification is called:

A. Taxonomic system

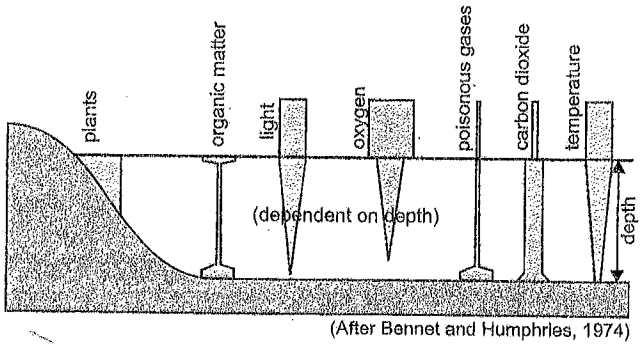
B. Hierarchical system

C. Two-kingdom classification

D. Binomial system

PTO/ pg 3

1.1.9. The diagram below shows a vertical section through a large dam. The columns represent different components of the ecosystem and the width of each column indicates the relative amount of the component and how it varies with the depth in the dam.



Oxygen decreases as the water depth increases because....

A. There is too little light to sustain photosynthesis.
B. There are fewer animals at deeper levels of the dam.
C. There are more photosynthetic organisms at deeper levels of the dam.
D. It is colder at deeper levels of the dam.

1.1.10. A person who studies fossils is a/an:

A. archaeologist
B. anthropologist
C. palaeontologist
D. radiologist

10X2 = 20

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

1.2.1. The type of blood system in mammals where blood is confined to blood vessels.
1.2.2. A drainage system that allows tissue fluid to return to the blood via special vessels.
1.2.3. The study of relationships between living organisms and the environment in which they live.
1.2.4. All the populations of different species living in an ecosystem that interact with one another.
1.2.5. Process of water released from clouds in the form of rain, snow, hail, etc.
1.2.6. Organisms that are able to regulate their body temperature so that they are not restricted to a particular habitat.
1.2.7. The gas required by all living organisms for cellular respiration.

PTO/ pg 4

1.2.8. Sources of energy such as coal and oil that developed within the Earth over millions of years.

1.2.9. The representation of a timescale that shows the history of life on Earth.

1.2.10. The height above sea level.

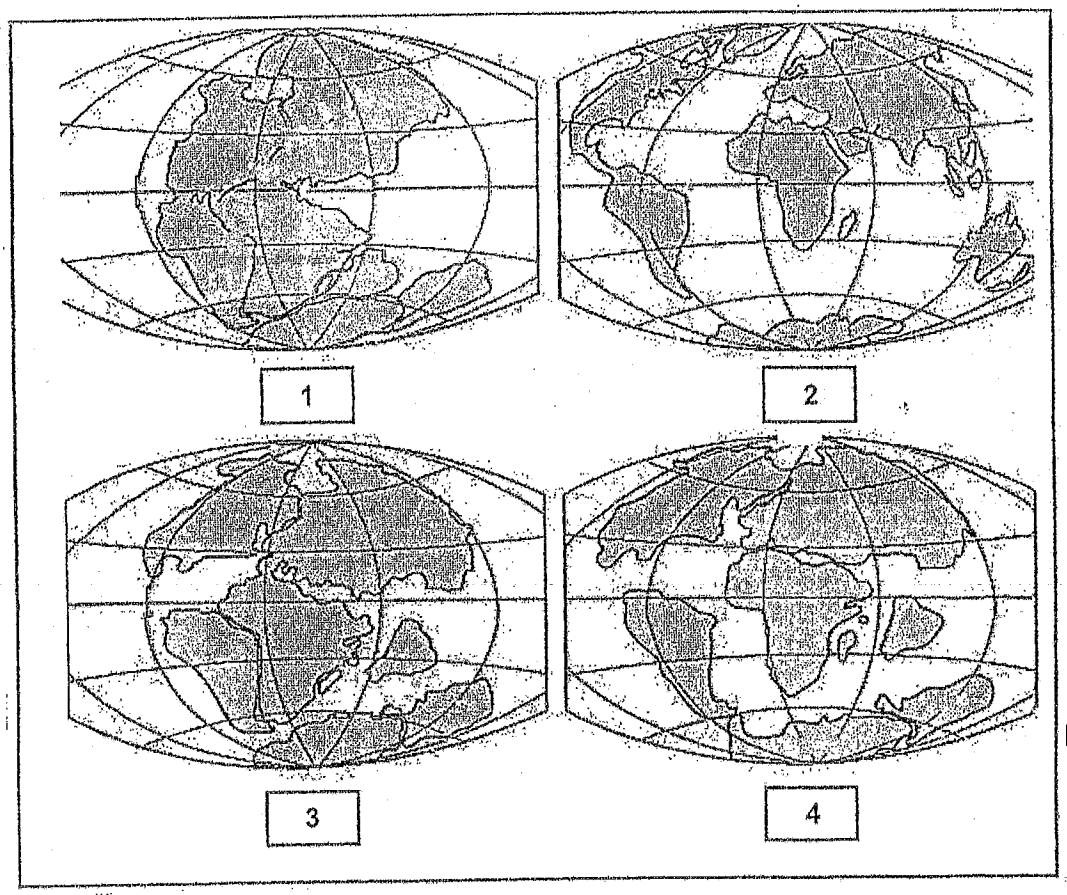
(10)

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.

COLUMN I	COLUMN 11
1.3.1. The position of an area in relation to the sun.	A. Aspect B. Slope
1.3.2. Species found only in one area and nowhere else in the world.	A. Indigenous B. Endemic
1.3.3. A well known fossil of the Cambrian Period similar to crustaceans and Arachnids.	A. Trilobite B. Horseshoe crab
1.3.4. A "living fossil"	A. Coelacanth B. Archaeopteryx
1.3.5. Plants adapted to live on land	A. Hydrophyte B. Terrestrial

5X2 = 10

1.4. Study the diagrams below and answer the questions that follow on the next page



PTO / pg 5

1.4.1. Name the theory proposed by geologists that is represented by the diagrams on the previous page. (1)

1.4.2. About 250 mya all the land masses were fused as a super continent. Name this super continent. (1)

1.4.3. The super continent named in 1.4.2. above split into two land masses, Laurasia and Gondwanaland. Which one of the two was Africa a part of? (1)

1.4.4. Which sequence correctly illustrates the order in which the process mentioned in question 1.4.1. had occurred. Write down only the letter of the correct answer.

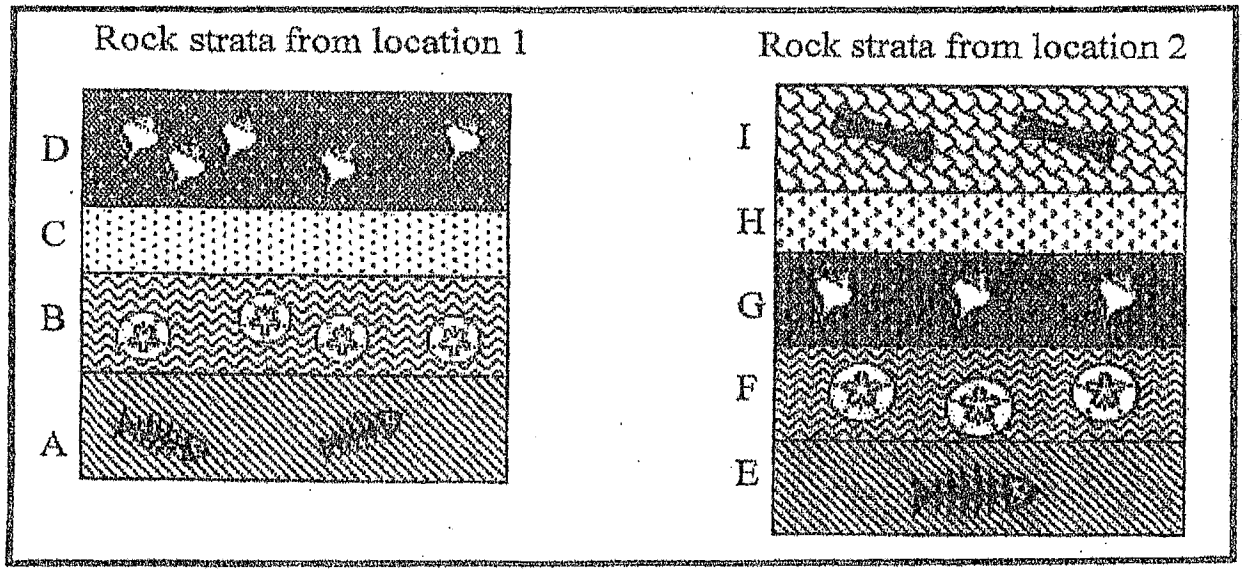
A. 1, - 4, - 2, - 3 B. 1, - 3, - 4,- 2

C. 1, - 2, - 3, - 4 D. 1, - 2, - 4, - 3 (1)

1.4.5. The process illustrated above resulted in mass extinction of marine life. Name TWO other processes or events that may have caused or contributed to mass extinctions. (2)

(6)

1.5. The diagrams below represent sedimentary rock strata from two different palaeontological sites. Study it and answer the questions that follow.



1.5.1. Name the method of fossil dating represented by the above diagrams. (1)

1.5.2. Refer to Rock strata from location 1. Which fossils (A or D) is older? (1)

1.5.3. Name the strata from location 2 that is similar to strata B from location 1. (1)

1.5.4. Name the other method used by scientists to date fossils. (1)

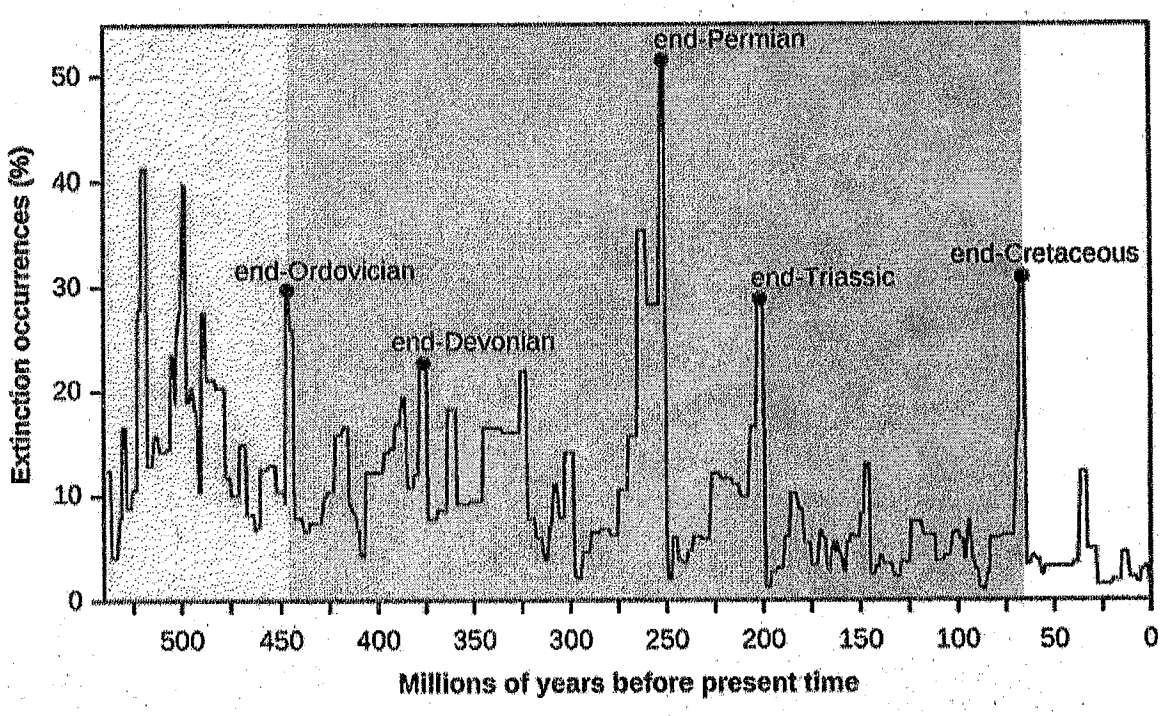
(4)

SECTION A: 50

PTO / pg 6

QUESTION 2:

2.1. The graph below shows the various mass extinctions that have occurred since life on Earth began and the number of species that went extinct during each period mentioned in the graph. Study it and answer the questions that follow.



2.1.1. During which period did the first mass extinction occur? (1)

2.1.2. Name the period during which the least extinction occurred. (1)

2.1.3. How long ago did the mass extinction mentioned in 2.1.2. end? (2)

2.1.4. Many scientists believe that we are in the middle of the sixth mass extinction.

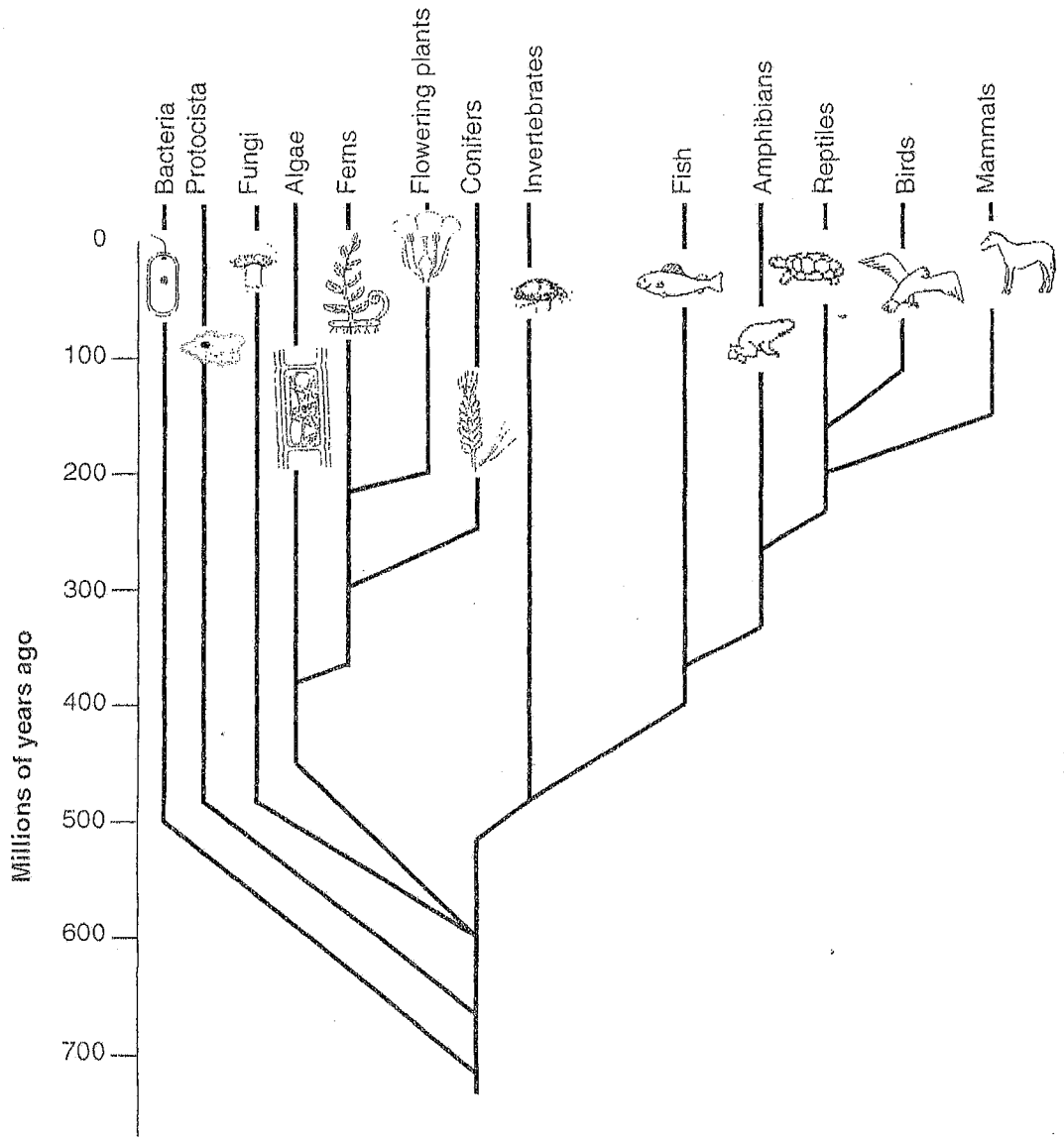
(a) Name the cause of the sixth mass extinction. (1)

(b) Explain your answer in 2.1.4. (a) above using an example. (3)

(8)

PTO / pg 7

2.2. Study the diagram showing possible evolutionary relationships amongst some groups of organisms and answer the questions that follow.



Possible evolutionary relationships amongst some groups of organisms

2.2.1. According to the diagram:

a) Which was the first organism to live on earth? (1)

b) Name the kingdom to which the group of organisms named 2.2.1. (a) belong. (1)

c) Which is the most recent group of organisms to evolve? (1)

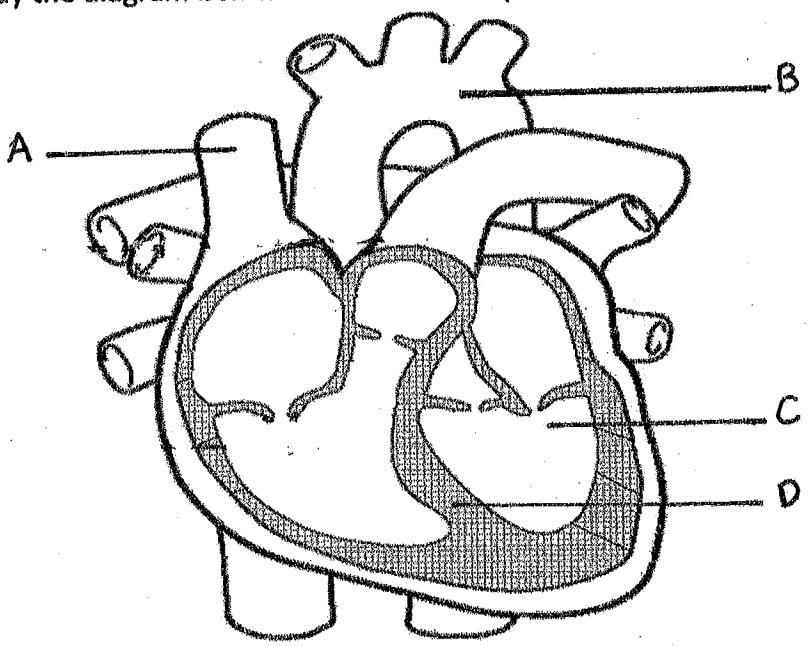
d) Name the group of organisms that reptiles share the most recent ancestor with . (1)

e) How many million years ago did conifers evolve? (1)

(5)

PTO/pg 8

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



2.3.1. Provide labels for **A, B, C** and **D.** (4)

2.3.2. Tabulate TWO structural differences between the right side and left side of the heart. (3)

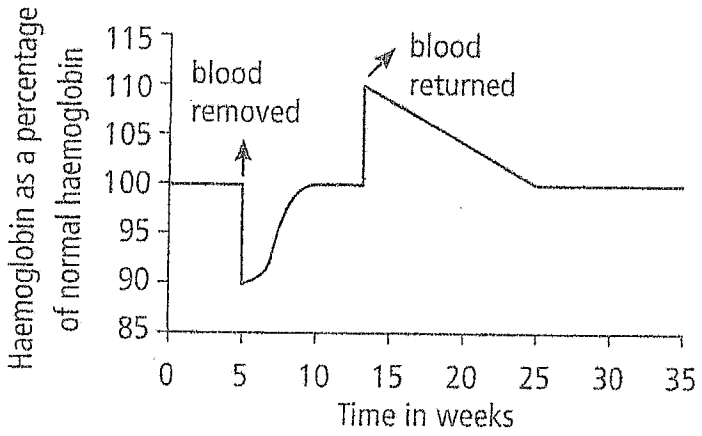
2.3.3. Explain what will happen if the coronary arteries that go to the muscles of the heart become blocked due to a high cholesterol level in the blood stream. (3)

2.3.4. Describe the ventricular systole in the cardiac cycle. (4)
(14)

PTO / pg 9

2.4. Read the paragraph below on blood doping.

In the Comrades Marathon in 2013, a runner had 500ml of his own blood removed, stored and returned to his body a few days before he competed in the marathon. The graph below shows the haemoglobin content of the blood in the athlete's body over a period of 35 weeks. Study the graph and answer the questions that follow.



2.4.1. Explain why this is considered as blood doping. (3)

2.4.2. How many weeks did it take for the athlete's haemoglobin level to get back to normal:

(i) after the blood had been removed

(ii) after the blood had been returned (2)

2.4.3. State the percentage increase in haemoglobin levels in the athlete's blood after his blood was returned to his body. (1)

2.4.4. Discuss the advantage this athlete would have compared to an athlete who did not undergo blood doping? (3)

2.4.5 Explain why the authorities would find it difficult to detect blood doping in this athlete? (2)

2.4.6. Do you consider this act of blood doping to be acceptable or not? Explain your answer. (2)

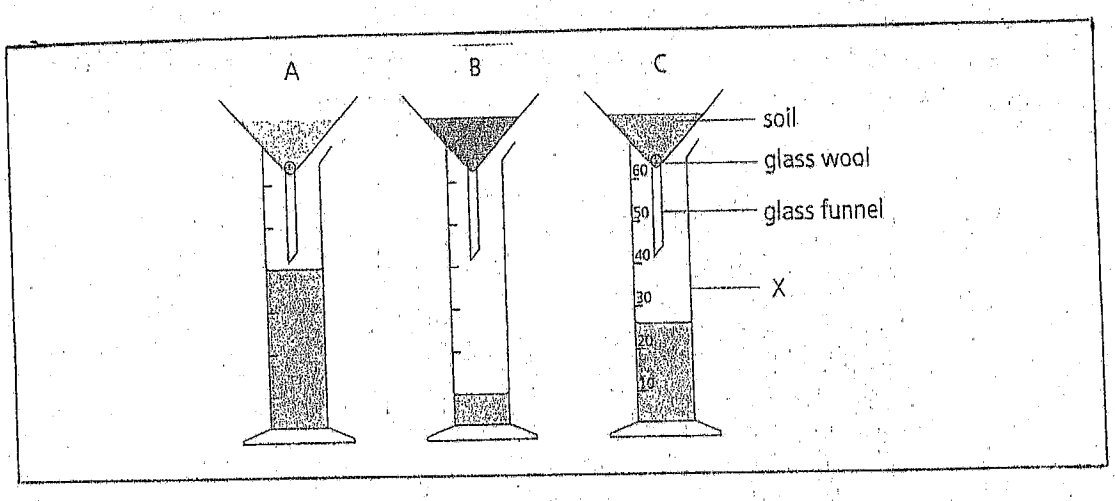
(13)

[40]

PTO/ pg 10

QUESTION 3:

3.1. The diagram below shows an experiment carried out by grade 10 learners. 80 ml of water was poured into each of the soil types.



3.1.1. State the AIM of the above experiment. (2)

3.1.2. Identify soil types A, B and C. (3)

3.1.3. Calculate the volume of water that was retained by soil sample A. Show working. (2)

3.1.4. Name the following variables:

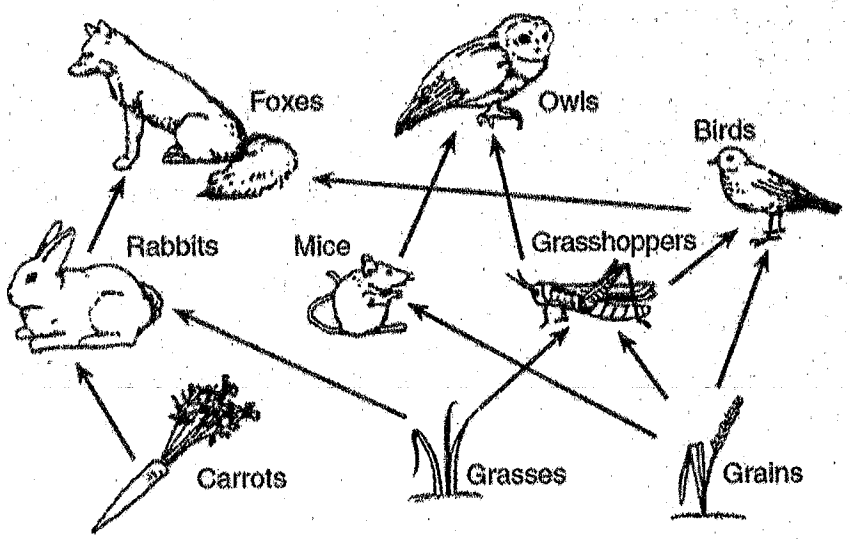
a) Independent

b) Dependent (2)

3.1.5. State TWO planning steps that the learners will follow when doing this experiment. (2)

(11)

3.2. Study the food web below and answer the questions on the next page.



3.2.1. Name a primary consumer in the food web on page 10. (1)

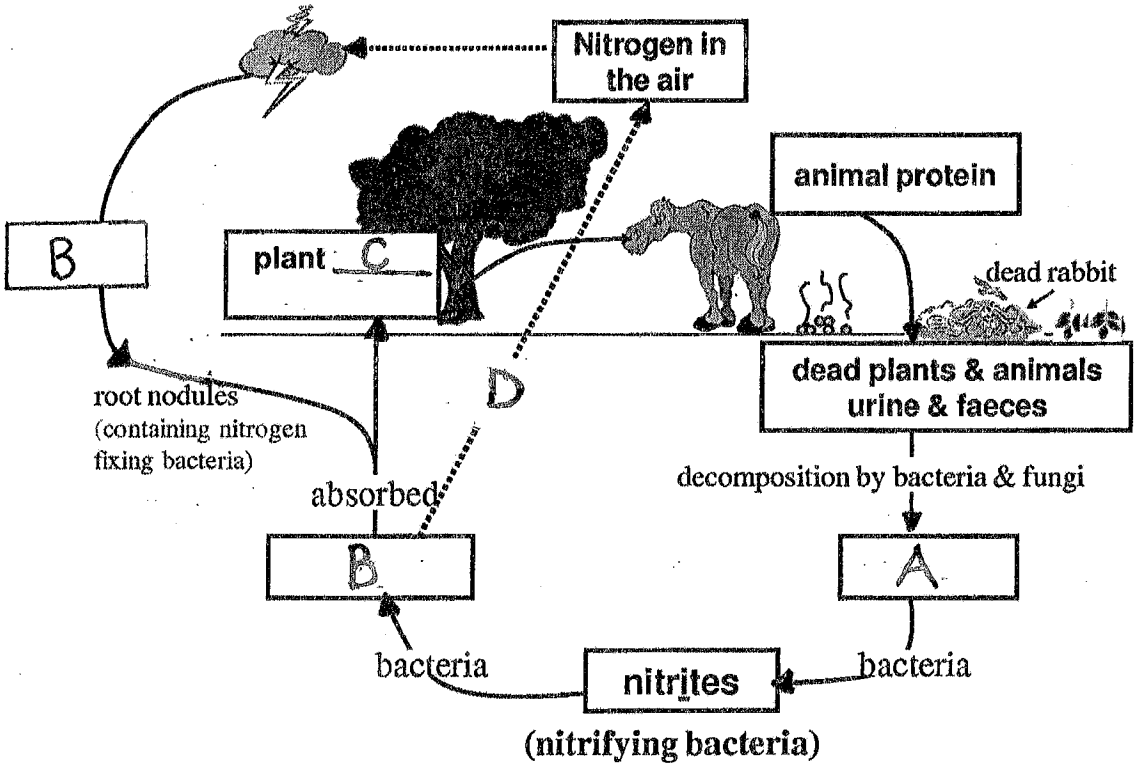
3.2.2. Draw a food chain consisting of FOUR trophic levels that includes the insect - eating bird. (2)

3.2.3. Explain what would happen if the owls migrated to another habitat. (1)

3.2.4. Explain why a food web with more interactions between organisms is more beneficial than one with fewer interactions. (2)

(6)

3.3. Study the Nitrogen cycle below and answer the questions that follow.



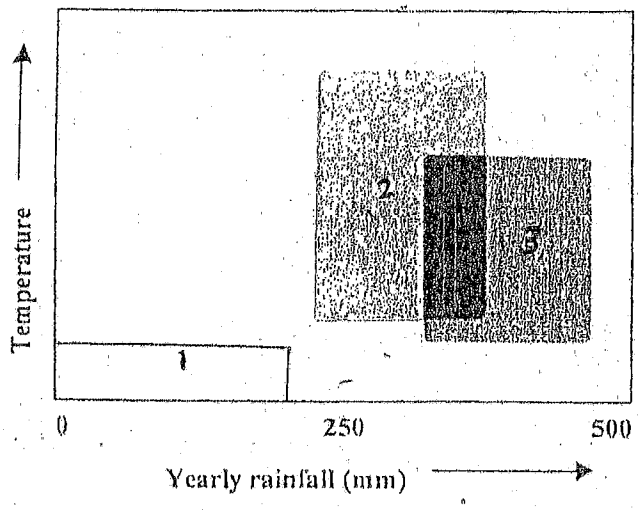
3.3.1. Provide labels for compounds A, B and C (3)

3.3.2. Name the process occurring at D. (1)

3.3.3. Discuss the significance of bacteria and fungi in the ecosystem. (3)

(7)

3.4. In the following diagram the areas enclosed show the range of temperature and rainfall in which species 1, 2 and 3 can co-exist.



3.4.1. State the TWO abiotic factors indicated. (2)

3.4.2. Which species can survive over the greatest temperature range? (1)

3.4.3. Explain why species 2 and 3 are more likely to compete with each other, than with species 1. (2)

3.4.4. Predict what would happen to species 3 as the yearly rainfall drops to 250mm Explain your answer. (2)

(7)

3.5. The table below shows the percentage of various biomes that have been destroyed as well as the percentage conserved. Study the table and answer the questions on the next page.

BIOME TYPE	% DESTROYED	% CONSERVED
GRASSLAND	60	2.5
FOREST	44	24
THICKET	44	6.5
SAVANNA	43	20
FYNBOS	33	6
SUCCULENT KARRO	21	2.1
NAMA KAROO	<20	0.47

3.5.1. Draw a double bar graph for the following biomes only:

Grassland
Forest
Thicket
Savanna
Fynbos

(7)

3.5.2. Explain what can be done by environmental officials to conserve the biomes. (2)

(9)

[40]

SECTION B: 80

SECTION C

QUESTION 4:

Fossils are evidence for the Theory of Evolution. New fossils are constantly being discovered and adds to our knowledge of ancient life. Scientists are also aware that fossil records are incomplete.

Explain the various types of fossils discovered by scientists. Discuss how petrified / mineralised fossils form and why the fossil record is incomplete.

Also discuss the benefits of Fossil Tourism in South Africa.

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

GREENBURY SECONDARY SCHOOL
DEPARTMENT OF MATHS & SCIENCES
H.O.D. MR L PILLAY
03/11/2016

NOVEMBER EXAMINATION 2016

LIFE SCIENCES PAPER 2

GRADE 10

SECTION A

QUESTION 1

1.1.1. D √√	1.2.1. closed blood system √	1.3.1. A only √√
1.1.2 B √√	1.2.2. lymphatic system √	1.3.2. B only √√
1.1.3 D √√	1.2.3. ecology √	1.3.3 A only √√
1.1.4 B √√	1.2.4. community √	1.3.4. A only √√
1.1.5 A √√	1.2.5. precipitation √	1.3.5. B only √√
1.1.6 D √√	1.2.6. endothermic √	10
1.1.7 C √√	1.2.7. oxygen √	
1.1.8 D √√	1.2.8. fossil fuel √	
1.1.9 A √√	1.2.9. geological time scale √	
1.1.10 C √√	1.2.10 altitude √	
(20)	10	

1.4.1. continental drift √ **(1)**

1.4.2. Pangae √ **(1)**

1.4.3 Gondwanaland √√ **(1)**

1.4.4. B √√ **(1)**

1.4.5 Volcanic eruptions √/ meteorites √/ asteroids/global cooling √/ ice age **ANY 2** **(2)**

(6)

1.5.1. relative dating √

1.5.2. A √

1.5.3. F √

1.5.4. Radiometric dating √ / absolute dating

(4)

TOTAL SECTION A: 50

GREENBURY SECONDARY SCHOOL

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SECTION B

QUESTION 2

2.1.1. Ordovician √ **(1)**

2.1.2. Devonian √ **(1)**

2.1.3. 375 √ mya √ **(2)**

2.1.4. a) Human Impact/ humans √ **(1)**

b) over population of Human species. √ Demand for more resources from earth √ leads to habitat destruction √ and loss of biodiversity √ **1 + any 2**

pollution √ toxins kill species √ / suffocation. Leads to habitat destruction √ and loss of biodiversity √

global warming √ change in weather patterns (drought/flooding) √ leads to death of organisms. √

deforestation √ greater demand for land and resources√ declining biodiversity√ habitat destruction √

unsustainable hunting practices √ animals killed / poached for met/ body parts√ numbers decrease√ **(8)**

2.2.1. a) bacteria √ **(1)** d) amphibians √ **(1)**

b) monera √ **(1)** e) 300mya √ **(1)** **(5)**

c) birds √ **(1)**

2.3.1. A = Superior Vena Cava √ **(1)** C = Left ventricle √ **(1)**

B = Aorta √ **(1)** D = septum √ **(1)**

2.3.2.

RIGHT SIDE		LEFT SIDE
Thinner walls	√	Thicker walls
Tricuspid valves	√	Bicuspid valve

√ **table + 2 total 3**

2.3.3. Cardiac muscles will not receive oxygen and nutrients √

Muscle cells may die √ / stop contraction

May lead to heart attack √ **(3)**

2.3.4. - Both ventricles contract simultaneously √

- tricuspid and bicuspid valves close √
- deoxygenated blood from right ventricle √
- is pumped into pulmonary artery √ **any 4**
- oxygenated blood from left ventricle √
- is pumped into aorta √
- semi lunar valves are open √ **any 5 (8)**

2.4.

2.4.1. Blood / haemoglobin is removed from the person √
And added later on √
after the blood in his body has increased to normal √
causing a further increase in blood levels. √ any 3 (3)

2.4.2. (i) 5 weeks √ (ii) 12 weeks √ (2)

2.4.3. 10% √ (1)

2.4.4. He would have more RBC √
Therefore increased √ levels of cellular respiration will take place
Resulting in more energy √ to run the race
Therefore he will not tire easily √ ANY 3 (3)

2.4.5. it is his own blood √ so they will be unable to identify ant foreign substance in his blood √ (2)

2.4.6. Yes √ It is your own blood being used./ it is not a drug √
OR
No √ It is unfair to other runners who are unable to afford blood doping. √
(2)
(13)

QUESTION 3

3.1.

3.1.1. To investigate the water holding capacity √ of three soil types √ (2)

3.1.2. A = sand √ B = clay √ C = Loam √ (3)

3.1.3. 80ml - 40ml √ = 40ml √ (2)

3.1.4. a) Soil Type √
b) Water retention √ (2)

3.1.5. Collect all necessary apparatus √
Decide where to obtain the soil sample from √
Decide on what volume soil/ water to use √
Decide how to record results √ ANY 2 (11)

3.2.

3.2.1. Grass/ shrub / tree √ (1)

3.2.2. ./ grass -----> grasshopper -----> insect eating bird ------> fox √√
(insect -eating bird √ 4 levels √) all correct or none

3.2.3. Mice and locust numbers will increase √ / grass and grains will decrease (1)

3.2.4. It allows more variety of food sources √ for the organism
So that there is a balance √ in the ecosystem
And there is always an alternate source of food available. √ any 2

3.3.

3.3.1. A = Ammonia √
B = Nitrates √
C = plant protein √ **(3)**

3.3.2. denitrification √

3.3.3. Bacteria and fungi are decomposers. √ in the ecosystem
They break down dead organic matter √ in the ecosystem
Decomposers release inorganic substances/ nutrients √
From dead organic matter √
Which will be returned to the environment √ **ANY 3 (3)**

3.4.

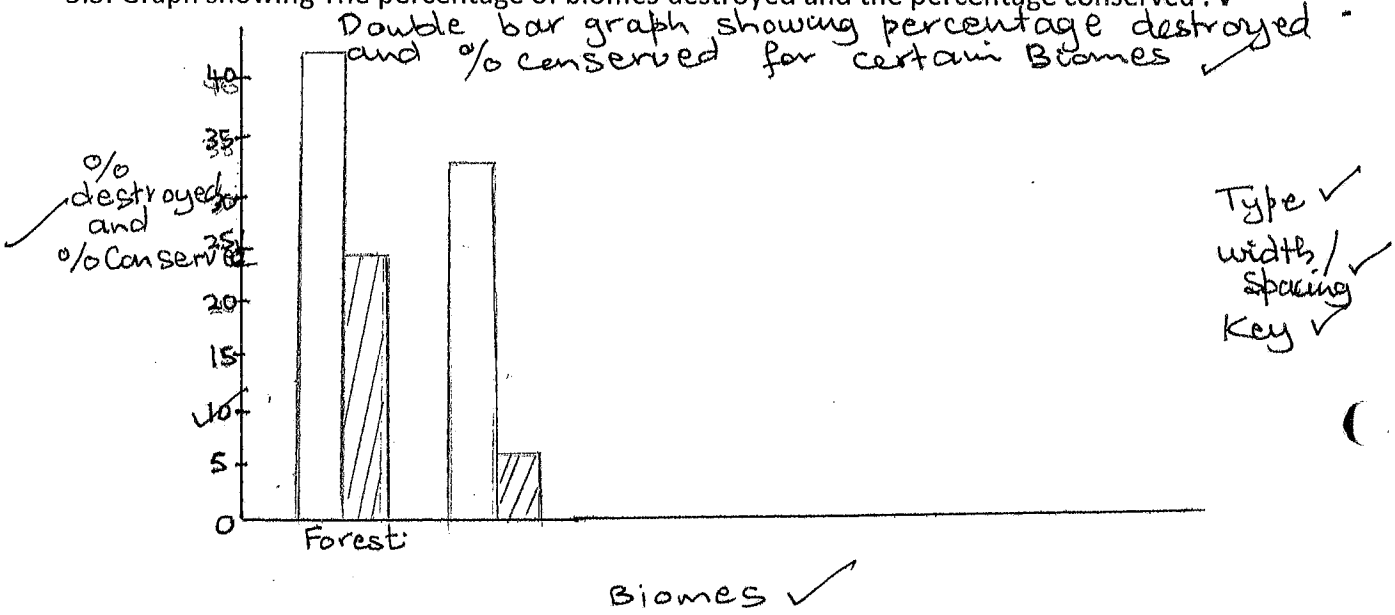
3.4.1. Temperature √ and rainfall √ **(2)**

3.4.2. 2 √

3.4.3. They are able to survive in a similar temperature √ and rainfall √range. **(2)**

3.4.4. It would die √ since there will be a shortage of water √ for its survival **(2)**

3.5. Graph showing The percentage of biomes destroyed and the percentage conserved . √



Caption	1 mark	Type of graph	1 mark
Label an x axis	1 mark	Width and spacing of bars	1 mark
Label on Y axis	1 mark	Key/ label of bars	1 mark
Scale on Y axis	1 mark	**(7)**	

3.5.2. Encourage safe and responsible travel to natural areas in order to conserve environment./ encourage ecotourism./ educate people on conservation
Create an awareness of the importance of conservation./ **any 1**

QUESTION FOUR - ESSAY

a) Process of petrification

- Dead organism falls to the bottom of a water body✓
- Sediment✓ covers the undecayed / hard parts of organism✓
- Over time more and more sediment✓ accumulates on the organisms body
- Layers of sediment become compressed✓
- Hard parts✓ become replaced by minerals✓, e.g. calcium✓, carbonate, from the sediment surrounding it
- Process called permineralisation✓
- Process takes a very long time✓ (any 6)

b) Forms of fossils

- **Moulds / impressions:** ✓ part of dead organism pressed between layers of fine sand/clay leaving an imprint✓ of its shape.
- **Cast:** ✓ body trapped under layers of sand / clay which hardens in that shape✓
- **Trace fossils:** ✓ records of the behaviors and movement of animals✓./ Footprints, nests,faeces, etc, tells about the animal's life style. (6)

c) Benefits of Fossil tourism to South Africa

- Provides employment✓/ income
- Provides business opportunities✓
- Serves as important research sites for scientists✓
- Gives a better understanding of the cradle of human-kind✓history of preserved life forms
- Encourages people to conserve / preserve the heritage sites✓
- Brings revenue to the country✓
- Opportunities for careers✓ such as paleontology, because of the rich fossils sites (any5)

Content	(17)
Synthesis	(3)
	(20)

Description	Marks
All information given is relevant to fossil study .	1
The information for the THREE aspects are presented in the correct sequence	1
Provided sufficient information in the three parts of the essay	1