PHOENIX NORTH CLUSTER

NOVEMBER EXAMINATION 2017

LIFE SCIENCES GRADE 10 - PAPER 2

EXAMINER: PALMVIEW SECONDARY

MODERATOR: WOODVIEW SECONDARY

MARKS: 150

TIME: 2½ HOURS

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Begin 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. ALL drawings should be done in pencil and labelled in blue or black ink.
7. Only draw diagrams or flow charts when asked to do so.
8. The diagrams in this question paper are NOT all drawn to scale.
9. Do NOT use graph paper.
10. Non-programmable calculators, protractors and compasses may be used.
11. Write neatly and legibly.
12. ***This paper consists of 10 pages.***

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 to D) next to the question number (1.1.1 to 1.1.10)**

1.1.1 An organism that makes its own food is said to be;
- A herbivorous
- B carnivorous
- C autotrophic
- D heterotrophic

1.1.2 The element Nitrogen is mainly absorbed by plants in the form of;
- A nitrogen gas
- B ammonia
- C nitrates
- D proteins

1.1.3 The correct way to write the scientific name of the domestic dog is;
- A canis familiaris
- B Canis Familiaris
- C Canis familiaris
- D Canis familiaris

1.1.4 Land dwelling organisms are called
- A terrestrial
- B aquatic
- C arboreal
- D endemic

1.1.5 Which of the following processes occur during the Nitrogen cycle?
- i) Consumption of proteins by herbivores
- ii) The decomposition of dead organic material
- iii) Conversion of nitrates to nitrites by bacteria
- iv) Absorption of nitrates by plants

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

1.1.6 The blood vessels that carries oxygenated blood from the lungs to the heart is the;
- A Pulmonary artery
- B Aorta
- C Inferior vena cava
- D Pulmonary vein

1.1.7 The natural pace maker of the heart.
- A Atrio-ventricular (AV) node
- B Sinoatrial (SA) node
- C Sympathetic nerve
- D Parasympathetic nerve

1.1.8 Fossils are found mainly in;
- A igneous rock
- B sedimentary rock
- C metamorphic rock
- D None of the above

1.1.9 Scientists who study fossils are called;
- A anthropologists
- B geologists
- C palaeontologists
- D zoologists

1.1.10 Mass extinctions could possibly results from;
- A ice ages
- B volcanic eruptions
- C asteroid impacts
- D All of the above

(10x2 = 20)

1.2 **Give the correct biological term for the following descriptions. Write only the term as your answer.**

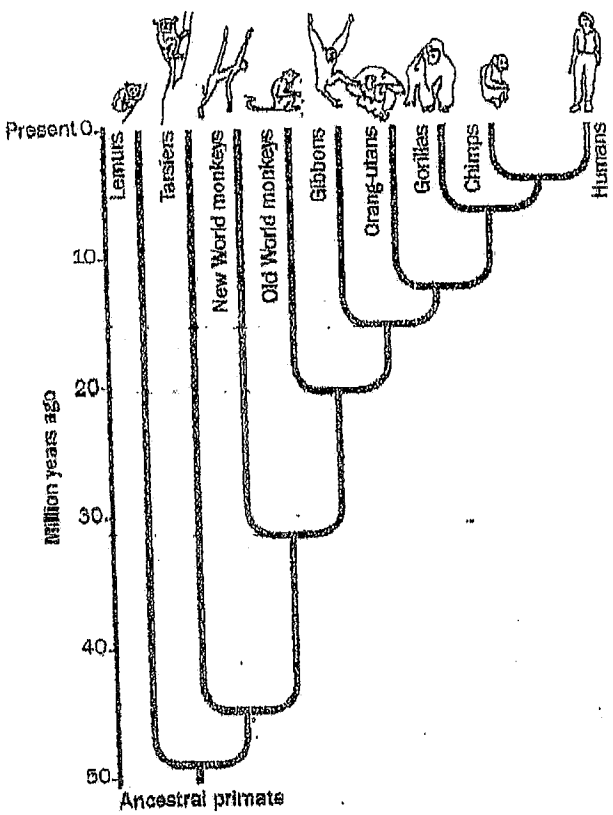
1.2.1 An organism that lives in water.
1.2.2 A method of determining the real age of a fossil.
1.2.3 Ancient fern-like gymnosperm that formed the coal deposits in Mooi River.
1.2.4 Type of fossil left by the Latoeli man in Tanzania.
1.2.5 Non-indigenous organisms that invade and replace natural organism in an area.
1.2.6 Organisms composed of many cells.
1.2.7 Kingdom to which bacteria belong.
1.2.8 Organisms that do not have true nuclei.
1.2.9 The science of classifying living organisms
1.2.10 The two-name system of giving organisms scientific names. (10)

1.3 State whether the following phrases in COLUMN I applies to A only, B only, Both A and B, or None in COLUMN II. Write only A only, B only, Both A and B or None as your answer.

COLUMN I	COLUMN II
1.3.1 Organisms with cells that have true nuclei	A Prokaryotic B Eukaryotic
1.3.2 Occurs when some organisms go into a period of dormancy in response to low temperatures.	A Hibernate B Aestivate
1.3.3 Cambrian organisms that had hard, flattened, segmented bodies.	A Pikaia B Trilobite
1.3.4 Became extinct 75mya	A Dinosaur B Coelecanth
1.3.5 Species that no longer exist on earth	A Extinct B Endemic

(5x2=10)

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



1.4.1 Name the diagram above that shows evolutionary relationships between organisms. (1)

1.4.2 How long ago did the ancestral primate live on earth? (2)

1.4.3 Name the organism that is most closely related to Humans. (2)

1.4.4 How many years ago did the New World Monkeys split from the common ancestor that gave rise to the Old World Monkeys? (2)

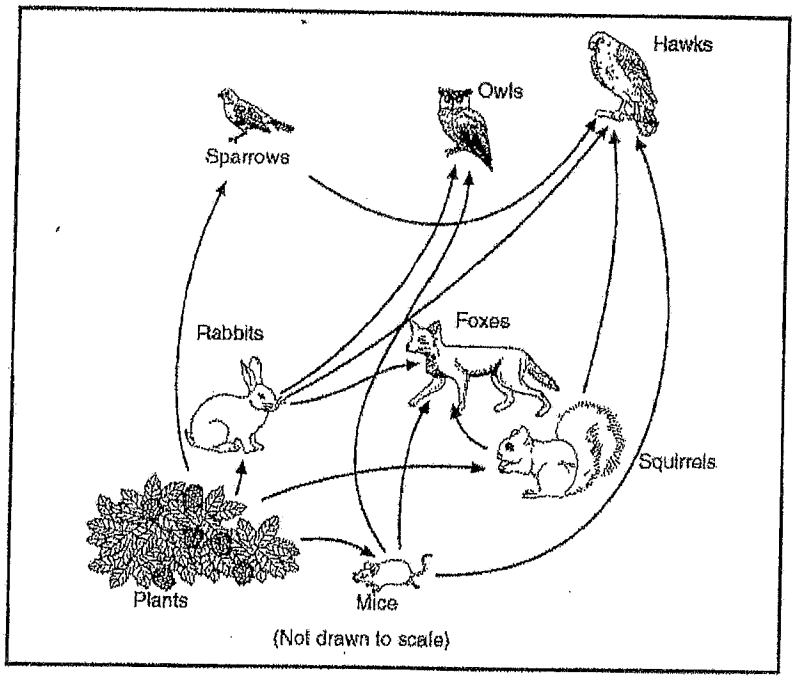
1.4.5 For how long did the common ancestor that evolved into the Gibbons exist? Show your working. (3)

/10/

Section A Total = 50

SECTION B
QUESTION TWO

2.1 Study the diagram below that represents a food web in an ecosystem and answer the questions that follow.



2.1.1 Name the organism that represents a ...
a) herbivore
b) producer
c) Nocturnal animal (3)

2.1.2 How does a food chain differ from a food web? (2)

2.1.3 Explain what would happen if all the rabbits were killed in this food web? (3)

2.1.4 Write down (construct) a food chain with 3 links showing the direction of energy flow. (4)

(12)

2.2

3 soil samples, (A, B, C) from different areas in the school garden, were analysed for ***water content, permeability to water*** (ml of water passing through 10g soil) and ***humus content.*** The results are indicated in the table below.

FACTOR ANALYSED	Soil Samples		
	A	B	C
Water content (%)	30	10	60
Permeability	25	50	05
Humus content (%)	15	05	10

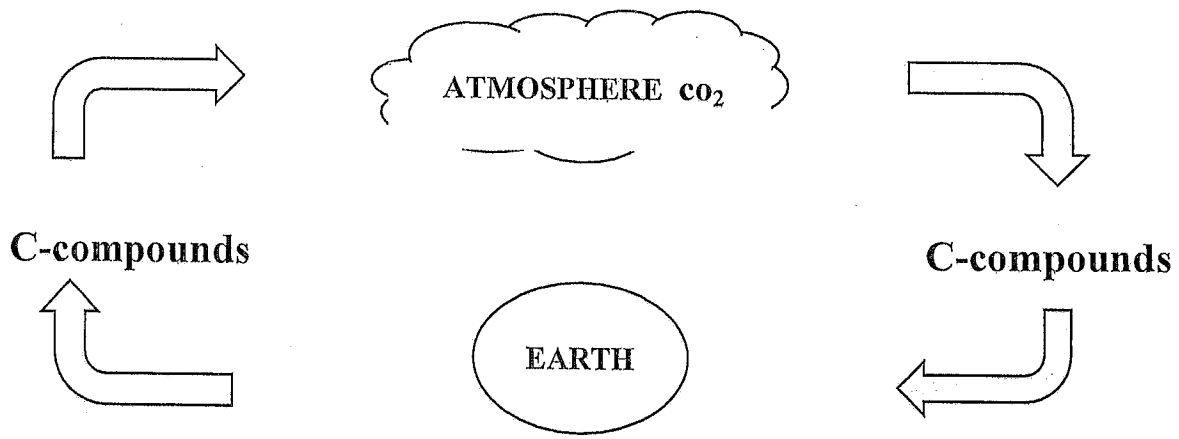
2.2.1 Identify soil type A (Sand, Clay, Loam). Give a reason for your answer. (2)

2.2.2 Which soil is most likely to become waterlogged easily? Explain your answer. (3)

2.2.3 Explain why plants will wilt the quickest in soil B? (2)

2.2.4 State the importance of humus to soil quality. (2)
(9)

2.3 The diagram below represents a simplified version of the Carbon Cycle – *the cyclical movement of carbon from the atmosphere to earth and back into the atmosphere.*



2.3.1 How does deforestation lead to increased levels of CO_2 in the atmosphere? (2)

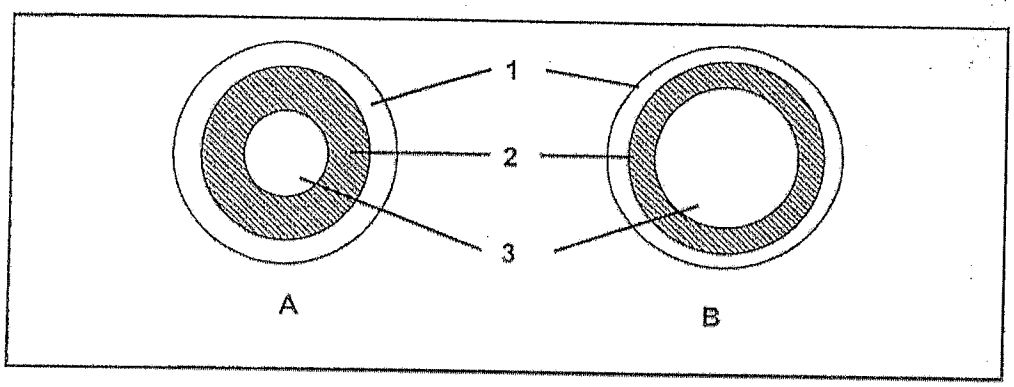
2.3.2 List the various ways CO_2 is released into the atmosphere. (3)

2.3.3 Why is CO_2 regarded as a greenhouse gas? (2)

2.3.4 List THREE ways in which you can reduce your CO_2 emissions? (3)

(10)

2.4 The diagrams below represent a T/S through a vein and an artery.



2.4.1 Which diagram (A or B) represents an artery? Give a reason for your answer. (3)

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

2.4.3 State the purpose of the valves in the above blood vessel. (2)

2.4.4 Provide labels for parts numbered 1, 2 and 3. (3)

(9)

TOTAL QUESTION 2 = 40

QUESTION THREE

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

This biome is the smallest of the world's floral kingdom. Approximately 70% of the 9000 plant species in this area are endemic.
The vegetation is mostly reeds, geophytes and plants with small leaves that have to survive long dry summers and frequent fires.

This biome is threatened by habitat destruction and invasive alien plants which have already caused some of the endemic plants to become extinct.
Eco-tourism is one project that is undertaken in an attempt to conserve and preserve this biome.

3.1.1 Name the biome mentioned in the above extract. (1)

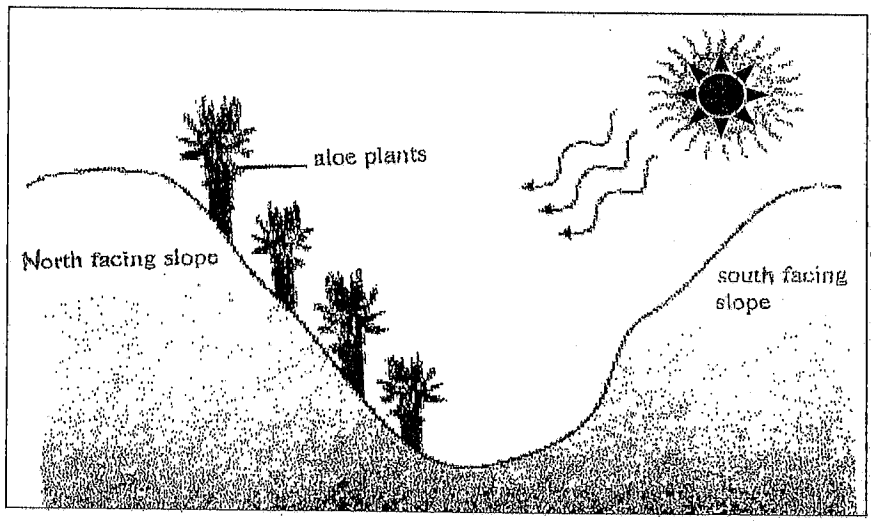
3.1.2 Name any TWO plants that you will find in the above habitat. (2)

3.1.3 How are the above plants adapted to live in this particular biome? (2)

3.1.4 Give TWO reasons why humans need to conserve nature. (2)

3.1.5 Explain the term "Eco-tourism" and how it can help conserve this threatened biome. (3)
(10)

3.2 Aloes generally grow on the North-facing slopes in the Eastern Cape. Study the diagram below and answer the questions that follow.

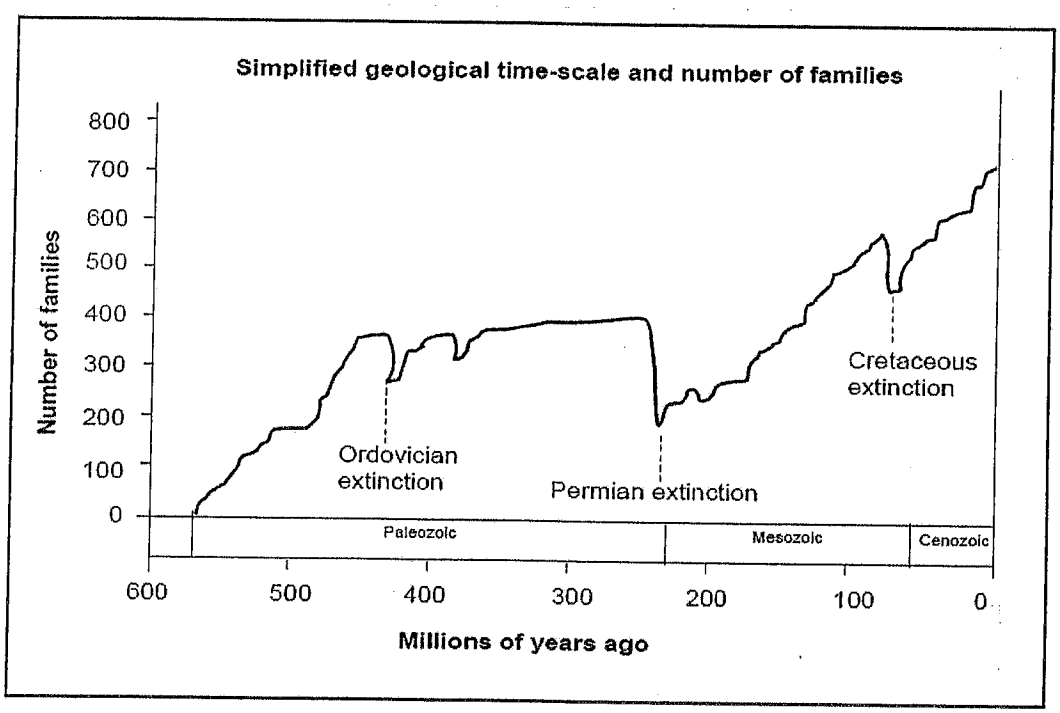


3.2.1 Are Aloes hydrophytes, mesophytes or xerophytes? Give a reason for your answer. (2)

3.2.2 List THREE abiotic factors shown in the diagram. (3)

3.2.3 Aloe leaves contain a bitter sap. Explain how this benefits the aloe plant. (2)
(7)

3.3 Study the graph below which shows the major extinction events and answer the questions that follow.



3.3.1 When did the Cenozoic era begin? (2)

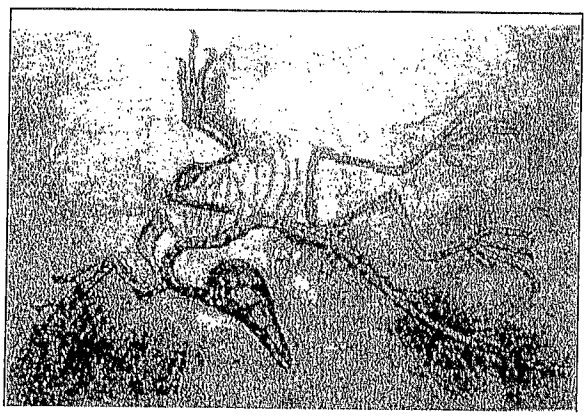
3.3.2 Which mass extinction took place towards the end of the Paleozoic era? (2)

3.3.3 Approximately how many families died out at the end of the Paleozoic era? Show all working. (3)

3.3.4 Explain why the number of families of organisms rapidly increased after each mass extinction. (3)

(10)

3.4 The diagram below represents a fossil of a prehistoric bird.



During the history of life on Earth, many species succumbed to "Mass Extinction". Scientists are able to deduce much information about these species as well as their links to species living on earth presently from fossil records.

3.4.1 What is the scientific name of the prehistoric bird? (2)

3.4.2 Explain why this fossil is regarded as a transitional fossil? (3)

3.4.3 Describe how the above fossil could have been formed. (5)

3.4.4 Why is South Africa regarded as the "Cradle of mankind"? (3)

(13)

TOTAL QUESTION 3 = 40

SECTION C
QUESTION FOUR

Describe the pulmonary circulation of blood (Blood flow between Heart and the Lungs) and explain how the heart is suited to perform its function.

Content: 17
Synthesis: 3

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

TOTAL SECTION C = 20

TOTAL = 50 + 40 +40 + 20 = 150

22/10/2017.

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SECTION A
QUESTION 1

1.1

1.1.1 C ✓✓ 1.1.2 C ✓✓ 1.1.3 D ✓✓ 1.1.4 A ✓✓ 1.1.5 B ✓✓

1.1.6 D ✓✓ 1.1.7 B ✓✓ 1.1.8 B ✓✓ 1.1.9 C ✓✓ 1.1.10 D ✓✓ 10 x 2 = (20)

1.2

1.2.1 Aquatic ✓ 1.2.2 Radiometric dating ✓ 1.2.3 *Glossopteris* ✓

1.2.4 Trace ✓ 1.2.5 Alien species ✓ 1.2.6 Mullticellular ✓

1.2.7 Monera ✓ 1.2.8 Prokaryote ✓ 1.2.9 Taxonomy ✓

1.2.10 Binomial nomenclature ✓ (10)

1.3

1.3.1 B only ✓✓
1.3.2 A and B ✓✓
1.3.3 B only ✓✓
1.3.4 A only ✓✓
1.3.5 A only ✓✓ 5 x 2 = (10)

1.4

1.4.1 Phylogenetic tree ✓ (1)
1.4.2 50 MYA ✓ (2)
1.4.3 Chimps ✓ (2)
1.4.4 31 MY – 20 MY = 11MYA ✓✓ ✓✓ (2)
1.4.5 20MY – 15MY = 5MY ✓✓ ✓ (3) (10)

TOTAL SECTION A = 50

22/10/17.

SECTION B
QUESTION TWO

2.1

2.1.1 a) Rabbit/Sparrow/Mice/Squirrel any
b) Plants
c) Owl (3)

2.1.2 a) Food webs are many food chains linked together showing all feeding relationships in the habitat. (2)

2.1.3 It will cause a ripple effect in the food web. Foxes/Owls/Hawks will have less food to eat and will kill more squirrels/mice/sparrows for food. Plants may flourish. (3)

2.1.4 PLANTS ⟶ RABBITS ⟶ HAWKS (4)
(accept other correct food chains also) **(12)**

2.2

2.2.1 Loam – has moderate water content/permeability (2)

2.2.2 C – Has the least permeability. Retains the most water. (3)

2.2.3 Has the least water content. Water seeps through the soil easily and is not available to the plants. (2)

2.2.4 It decomposes releasing nutrients into the soil/ Assists to retain soil water. (2)

(9)

2.3

2.3.1 Deforestation reduces amount of plants and hence photosynthesis.
Less CO_2 removed from atmosphere causing levels to increase. (2)

2.3.2 Cellular respiration, combustion of fossil fuels, Natural fires (3)

2.3.3 It acts as a blanket around earth trapping heat in the atmosphere
– causing the atmosphere to heat up. (2)

2.3.4 – Recycle waste product like paper and glass – less energy used to produce new ones
- Re-use products like cans and bottles - less energy used to produce new ones
- Use energy saving light bulbs – less electricity used – less coal burnt (3)
Or suitable alternatives given by learner **(10)**

2.4

2.4.1 A – Small lumen, thick layer of smooth muscle (3)

2.4.2 B (1)

2.4.3 Prevents back flow of blood in the vein (2)

2.4.4 1- Connective tissue 2- smooth muscle 3 – Lumen (3)

(9)

QUESTION THREE

3.1

3.1.1 Fynbos (1)

3.1.2 reeds, geophytes, *Ericas*, *Restios*, Shrubs any 2 (2)

3.1.3 – can withstand fire
- can survive the dry summers
- leaves are small and fine to limit water loss any 2 (2)

3.1.4 – many species may have medicinal properties
- preserve the biodiversity of our surroundings
- Man is dependent on nature for food, clothing, building materials etc any 2 (2)

3.1.5 Eco-tourism – a form of tourism where people visit natural areas to enjoy the beauty of nature (Plants/animals) without negatively affecting the habitat/area/ funds can be used for awareness campaigns or conservation. (3)

(10)

3.2

3.2.1 xerophytes – live in dry habitats, leaves fleshy and store water (2)

3.2.2 sunlight, slope, atmosphere, **soil** **any 3** (3)

3.2.3 herbivores avoid eating the Aloe plant as the sap in unpalatable (2)

(7)

3.3

3.3.1 50mya (2)

3.3.2 Permian extinction (2)

3.3.3 number of families that died = 400 – 200 = 200 (3)

3.3.4 - more resources available for the surviving families
- surviving families better suited to the changed habitat (3)

(10)

3.4

3.4.1 *Archaeopteryx* (2)

3.4.2 The fossil cannot be classified into a single animal group as it has features of birds- feathers/hollow bones and reptiles – toothed jaw/three claws at end of wings. (3)

3.4.3 -Through process of mineralisation and impression
- animal died and was covered by sediments/mud
- soft body parts decomposed and feathers left impression between sediment layers
- bones disintegrated and replaced by silica and calcium carbonate forming the fossil (5)

max

3.4.4 – South Africa is rich in hominid fossils – Sterfontein Caves
- oldest Hominid fossils – Mrs Ples was found in South Africa. (3)

(13)

TOTAL QUESTION 3 = 40

TOTAL SECTION B = 80

SECTION
QUESTION 4

Pulmonary circulation

Deoxygenated blood flows from the right atrium✓through the tricuspid valves ✓ into the right ventricle. ✓ When the ventricles contract during systole✓ deoxygenated blood from the right ventricle✓ is pumped past the semi-lunar valve✓ into the pulmonary artery✓, which branches into two arteries entering each lung.✓ In the lung capillaries carbon dioxide diffuses ✓out of the blood into the lungs✓ and oxygen diffuses into the blood. ✓ The capillaries unite to form venules✓ which eventually form four pulmonary veins ✓leaving the lungs carrying oxygenated blood ✓back to the heart✓through the left atrium. ✓

Any (10)

HOW IS THE HEART SUITED FOR IT'S FUNCTION

Heart has the semi-lunar valves✓ between pulmonary artery and right ventricle to prevent the backflow of blood into the ventricles. ✓
Heart has the tricuspid valves✓ between right atrium and right ventricle to prevent the backflow of blood into the right atrium. ✓
Has a septum✓ that prevents mixing of blood in the ventricles/atria. ✓
Walls are made up of cardiac muscles✓, which allows the constant contraction and relaxation. ✓
Made up of Cardiac muscles – can contract/relax continuously without tiring✓
Richly supplied with blood✓ by Coronary arteries/veins – bring oxygen and removes carbon dioxide✓
Heart enclosed by Pericardium ✓– reduces friction during beating✓

Any 7
Content (17)

Moderated.
A. Ahmed
22/10/17.

Criterion	Relevance	Logical Sequence	Comprehensive
Elaboration	All information provided is relevant to the topic	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been addressed
	1	1	1

Synthesis (3)

SUBTOTAL SECTION C: 20 MARKS

TOTAL = 50 + 40 + 40 + 20 = 150