



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

GRADE 10

LIFE SCIENCES PAPER 2

FINAL EXAMINATION

13 NOVEMBER 2024

14H00

MARKS: 150

TIME: 2½ hours

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 your 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 given as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.8) in the ANSWER BOOK, for example 1.1.9 D.

1.1.1 An animal that has skin with hairs and nourishes its young with milk.

- A Amphibian
- B Bird
- C Mammal
- D Reptile

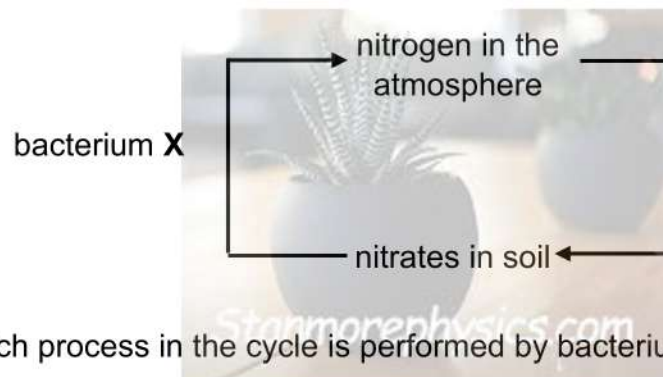
1.1.2 The chamber, found in the heart, that has the thickest wall?

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

1.1.3 Which ONE of the following is a biotic factor?

- A Decomposers
- B Light
- C Water
- D Soil

1.1.4 The diagram below shows part of the nitrogen cycle.

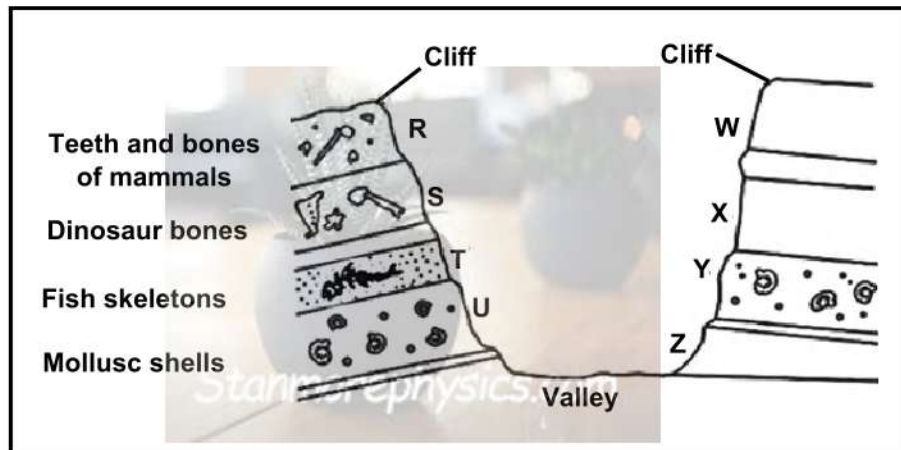


Which process in the cycle is performed by bacterium X?

- A Decomposition
- B Nitrification
- C Nitrogen fixation
- D Denitrification

1.1.5

The diagram shows a section through rock layers containing fossils.



Which ONE of the following statements is CORRECT?

- A Mollusc shells are the most recent fossils
- B Dinosaur bones are younger fossils than the mollusc shells
- C Teeth and bones of mammals are of the same age as the dinosaur bones
- D Fish skeletons are the oldest fossils

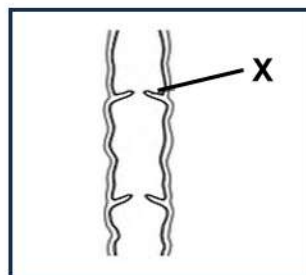
1.1.6

The longest phase of the cardiac cycle is ...

- A atrial systole.
- B ventricular systole.
- C ventricular diastole.
- D general diastole.

1.1.7

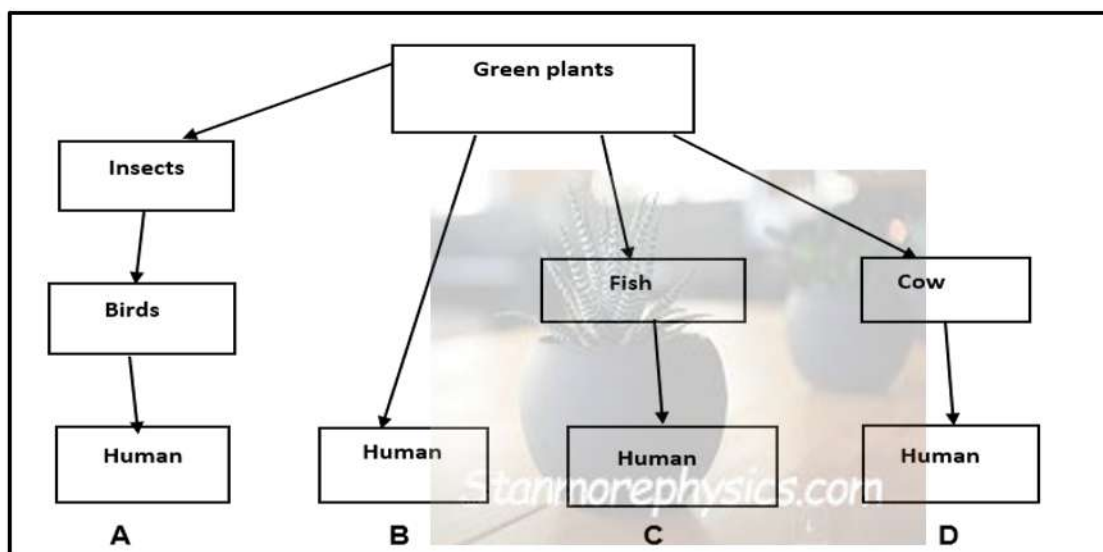
The diagram below shows a section of a human vein.



The function of part labelled X is...

- A to make sure the blood flows to the lungs.
- B to make sure the blood flows to the brain.
- C to make sure the blood flows to the kidneys.
- D to make sure the blood flows to the heart.

1.1.8 Which of the following pathways transfers the most energy to humans?



- A Pathway A
B Pathway B
C Pathway C
D Pathway D

(8 x 2) (16)

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 to 1.2.8) in the ANSWER BOOK.

- 1.2.1 Organisms that do not have a true nucleus
1.2.2 Species found in one area and nowhere else in the world
1.2.3 The study of fossils
1.2.4 The process of the formation of large sheets of ice called glaciers.
1.2.5 The large variety of living organisms found on earth
1.2.6 The group name given to the first life forms, such as bacteria, which developed on Earth about 3,8 billion years ago.
1.2.7 A region with distinct climate together with all the organisms that in live in it.
1.2.8 The path taken by the energy as it passes from one organism to the other in an ecosystem

(8 x 1) (8)

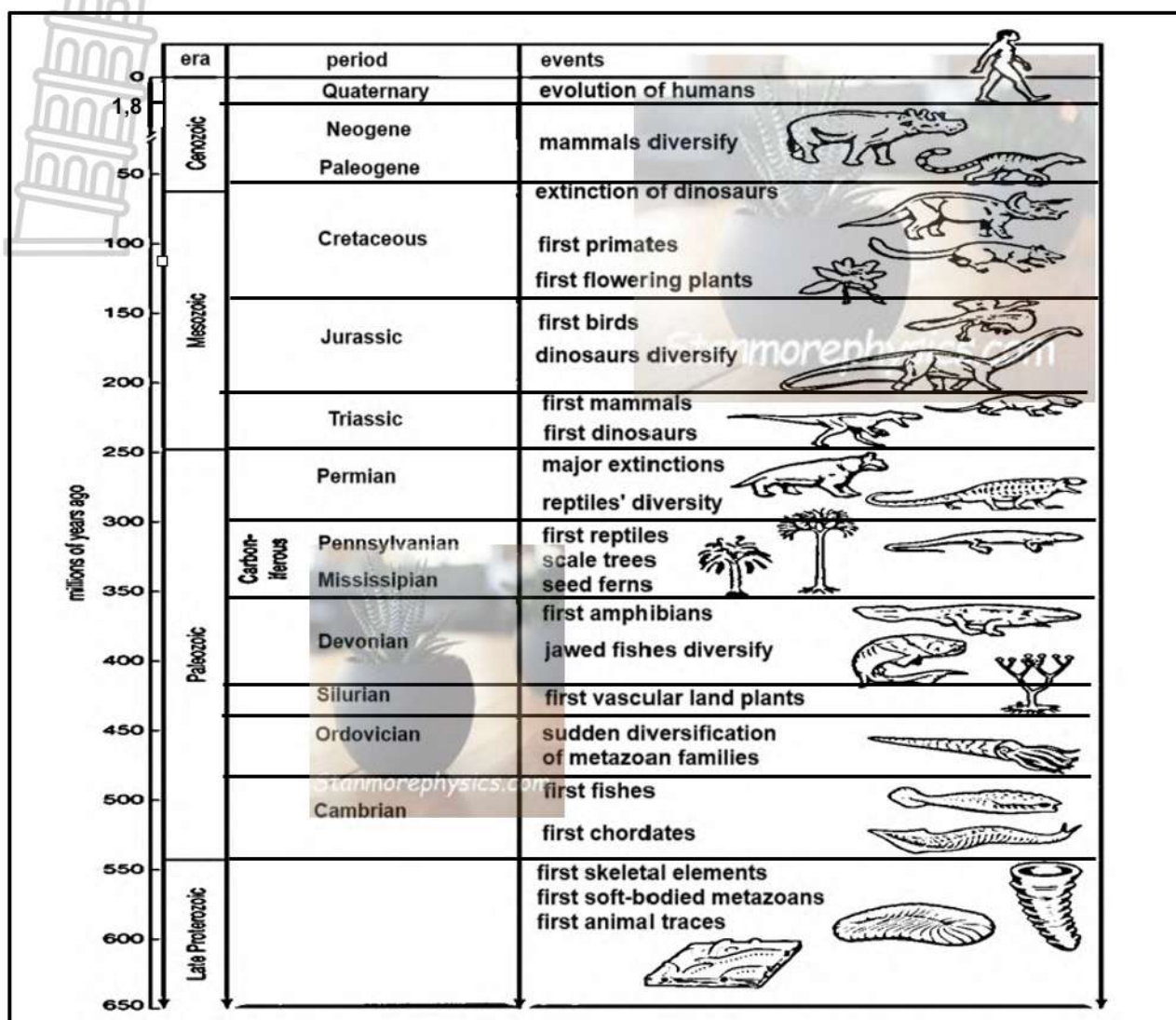
- 1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.4) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	Driven by human impact	A:	Continental Drift
		B:	6 th mass extinction
1.3.2	Plants adapted to live in very dry conditions	A:	Hydrophytes
		B:	Mesophytes
1.3.3	The scientific way of naming organisms in which the name has two terms	A:	Classification
		B:	Binomial nomenclature
1.3.4	Physiographic factor/s	A:	Aspect
		B:	Altitude

(4 x 2) (8)



1.4 The table below is a timescale showing how life has changed over time



1.4.1 Name the type of timescale shown above. (1)

1.4.2 In which ...

(a) period did dinosaurs first appear? (1)

(b) era did humans first appear? (1)

1.4.3 In which period did an explosion (a large increase) in the number and diversity of life on Earth take place? (1)

1.4.4 Identify the period during which by its end the worst mass extinction took place, wiping out approximately 90% of the species. (1)

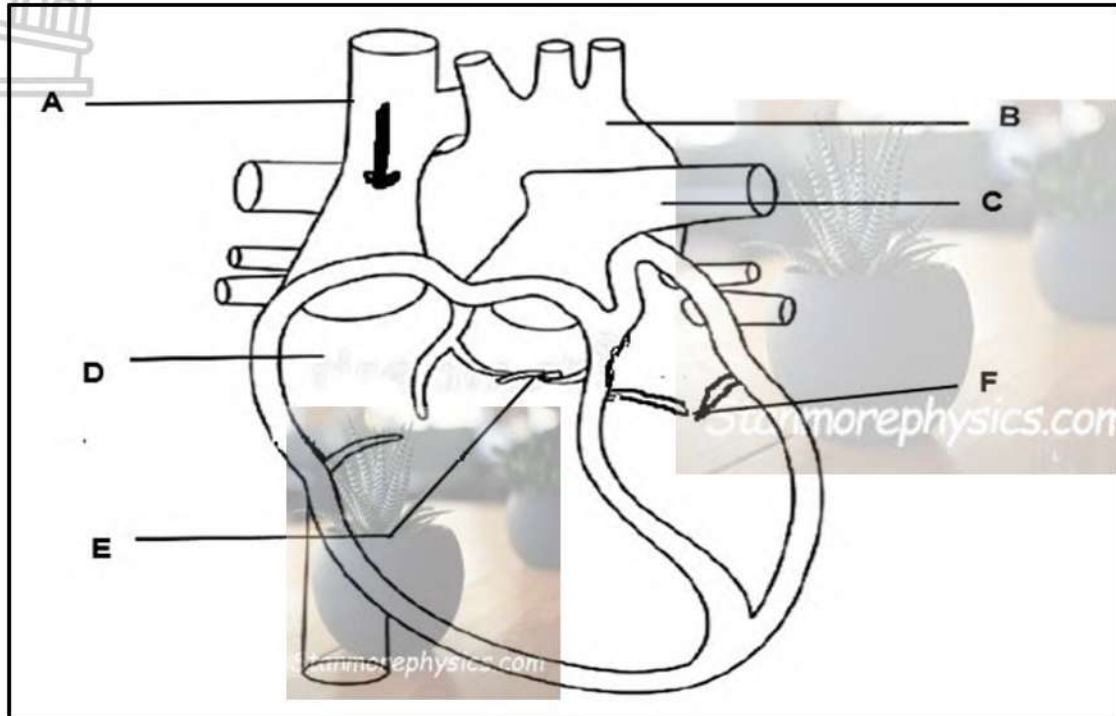
1.4.5 The discovered fossils were used to recreate the sequence in which living organisms appeared, but the fossil record has gaps.

Give TWO reasons why there are gaps in the fossil record. (2)

- 1.4.6 Name TWO other places that fossils are formed, other than in sedimentary rocks.

(2)
(9)

- 1.5 Study the diagram of the heart and answer the questions that follow.



- 1.5.1 Write down the LETTER and NAME of the blood vessel that transport blood to the lungs. (2)
- 1.5.2 Describe the type of blood that is found in blood vessel **A**? (1)
- 1.5.3 Which chamber of the heart contains the pacemaker in its wall? (1)
- 1.5.4 Give the NAME of the part that prevents oxygenated and deoxygenated blood from mixing. (1)
- 1.5.5 Give ONE significance of one ventricle wall that is thicker than the other in a human heart. (1)
- 1.5.6 Describe the function of valve **E**. (2)
- 1.5.7 Describe how the blood flow will be affected if part number **F** is damaged and cannot open properly. (1)

(1)
(9)

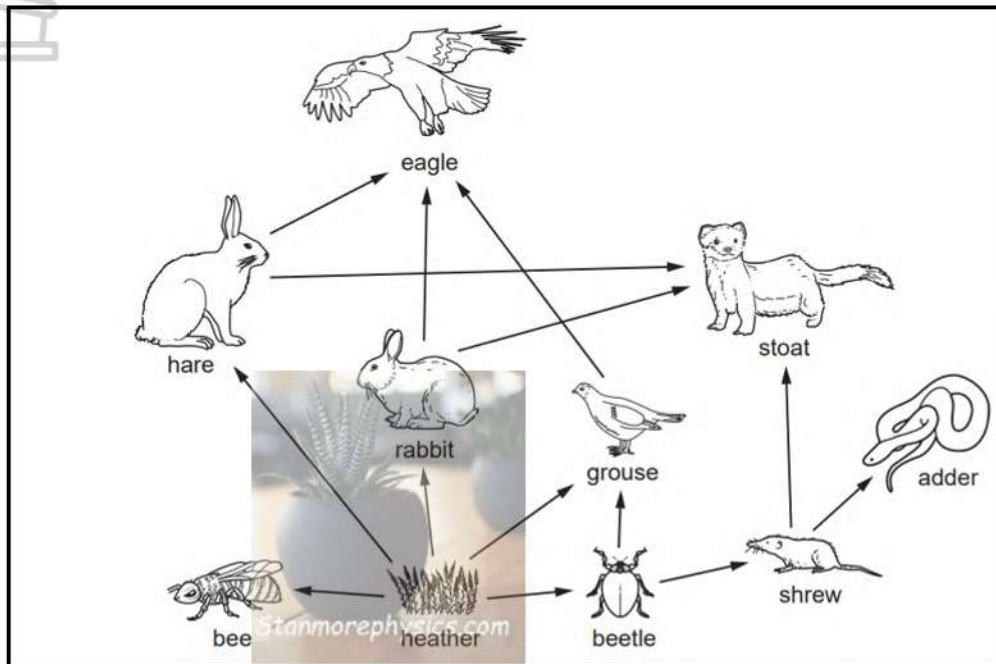
TOTAL SECTION A:

50

SECTION B

QUESTION 2

2.1 Study the diagram of organisms in an ecosystem and answer the questions that follow.



- 2.1.1 Define an *ecosystem*. (2)
- 2.1.2 Identify the diagram above. (1)
- 2.1.3 From the diagram above, name ONE organism that represents a:
- (a) Primary consumer (1)
 - (b) Producer (1)
 - (c) Tertiary consumer (1)
- 2.1.4 If all the shrews were removed from this ecosystem, explain what would happen to the population of the following:
- (a) Adder (2)
 - (b) Beetle (2)
- 2.1.5 Draw a food pyramid to show energy flow to the adder if the producer contains $5500\text{kJ/m}^2/\text{year}$ of energy and only 14% of this energy is passed on from one trophic level to the next. (5)
- 2.1.6 Use the food chains in the diagram to explain why the chances of survival of the stoat are higher than that of the adder. (2)

(17)

2.2

Lilitha and Mila learnt that the spekboom plant is very good in absorbing carbon dioxide from the atmosphere. This helps prevent the extreme increase in the Earth's temperature called global warming. This carbon dioxide is used by plants to manufacture their own food by photosynthesis.

They decided to investigate the rate at which different plants absorb CO_2

- They obtained THREE different types of plants from their local nursery (A spekboom, Aloe and Prickly Pear)
- They made sure that the plants are of the same height
- They planted the plants in equal sized pots with the same amount of soil
- All three plants were placed in the same location and received equal amounts of water
- They measured the weight/mass of their plants in the pots at the start of the investigation.
- They then left the plants to grow for one month and measured their weight/mass again.

The results are shown in the table below.

Plant	Weight / mass (g)		
	Start	End	Increase
Aloe	800	842	42
Prickly Pear	800	853	53
Spekboom	800	896	96

2.2.1 Identify the:

- (a) Independent variable (1)
- (b) Dependent variable in this investigation (1)

2.2.2 State the purpose of measuring the starting weight/mass of the plants. (1)

2.2.3 Give TWO ways that Lilitha and Mila used to ensure the validity of their investigation. (2)

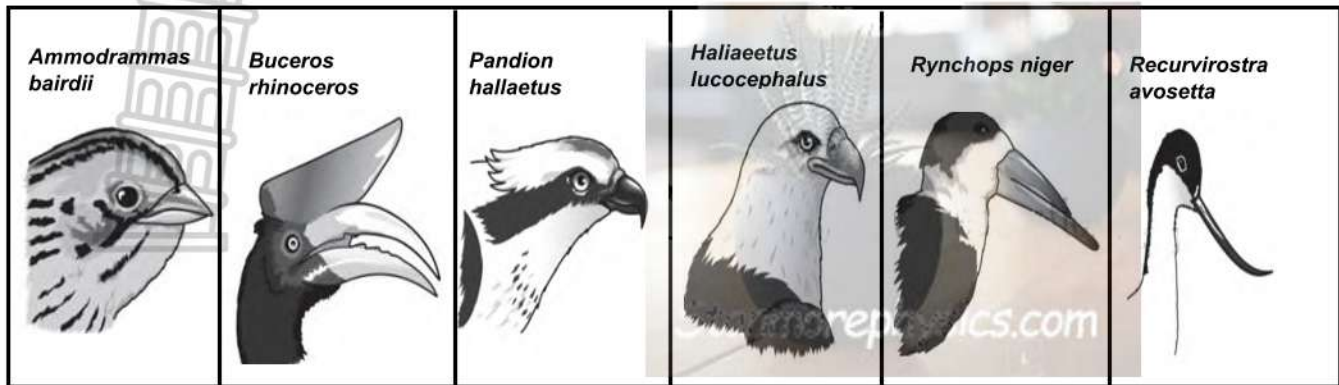
2.2.4 Give ONE way in which the reliability of their investigation could be improved? (1)

2.2.5 Calculate the percentage increase in mass from the start to the end of the investigation of the spekboom plant. Show ALL your working. (3)

2.2.6 Explain how using the weight gain of the plants will give Lilitha and Mila an idea of how much CO_2 the plants are absorbing. (2)

2.2.7 Plot a bar graph of weight/mass increase of the three plants. (6
(17)

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



Use the key below to identify each bird above. Write letters **A-F** and their correct scientific names.

(6)

	KEY	LETTER OF THE BIRD
1(a)	Beak is longer than the head	Go to 2
(b)	Beak is shorter than the head	Go to 3
2(a)	Beak curves upwards	C
(b)	Beak does not curve upwards	Go to 4
3(a)	Top part of the beak is hooked over the bottom part of the beak	Go to 5
(b)	Top part of the beak is not hooked over the bottom part of the beak	E
4(a)	Top part of the beak is shorter than bottom part of the beak	B
(b)	Has a large projection above the beak	D
5(a)	Head has a stripe	F
(b)	Head does not have a stripe	A

2.4 Read the extract below.

Carolus Linnaeus established a hierarchical classification system of grouping similar organisms together. He grouped them from broad groups called Kingdoms down to the smallest group called species.

Using his system a chimpanzee is fully classified as follows:

Animalia, Chordata, Mammalia, Primates, Hominidae, Pan, Troglodytes

2.4.1 According to Linnaeus' system, to which class does the chimpanzee belong? (1)

2.4.2 Write correctly the scientific name of the chimpanzee. (2)

2.4.3 Identify the genus to which the chimpanzee belongs. (1)

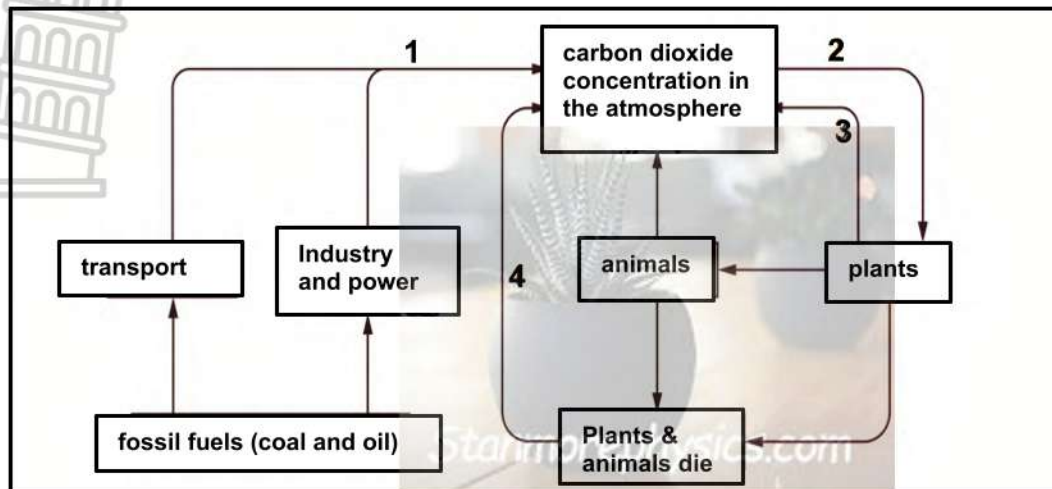
2.4.4 State TWO reasons why organisms are given scientific names. (2)
(6)

2.5 Differentiate between organisms grouped under kingdom animalia and plantae. (4)
[50]



QUESTION 3

3.1 The diagram below shows part of a carbon cycle.

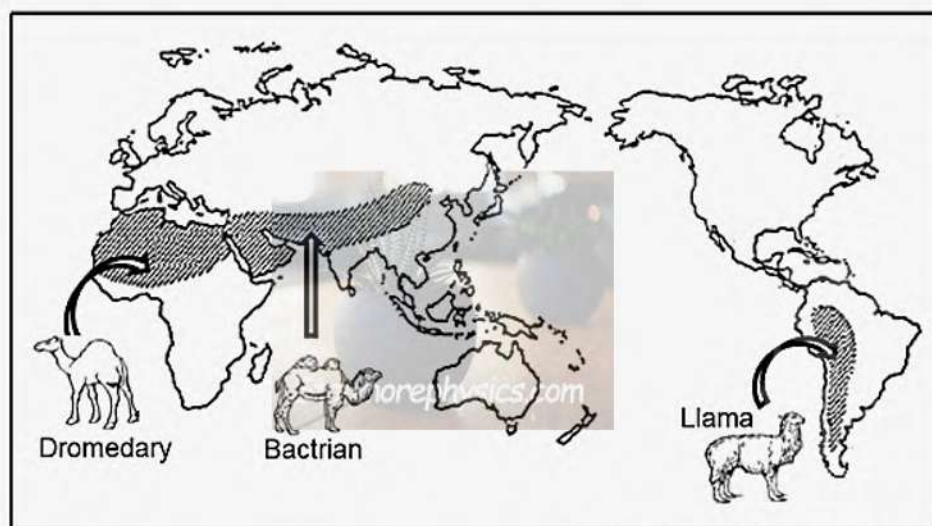


3.1.1 Identify the THREE processes (1, 3 and 4) that lead to an increase in carbon in the atmosphere. (3)

3.1.2 Identify process number 2 and explain its effect in carbon cycle in ecosystems. (3)

(6)

3.2 The diagram below shows the distribution of members of the camel family on different continents. The arrows indicate the current distribution of the different species.



3.2.1 What do we call the study of the distribution of existing and extinct plant and animal species in specific areas on Earth? (1)

3.2.2 Name the supercontinent that all these continents were originally part of. (1)

- 3.2.3 Describe how the continental drift which led to the current distribution of camel species, happened. (4)

(6)

- 3.3 The questions below are based on fossils.

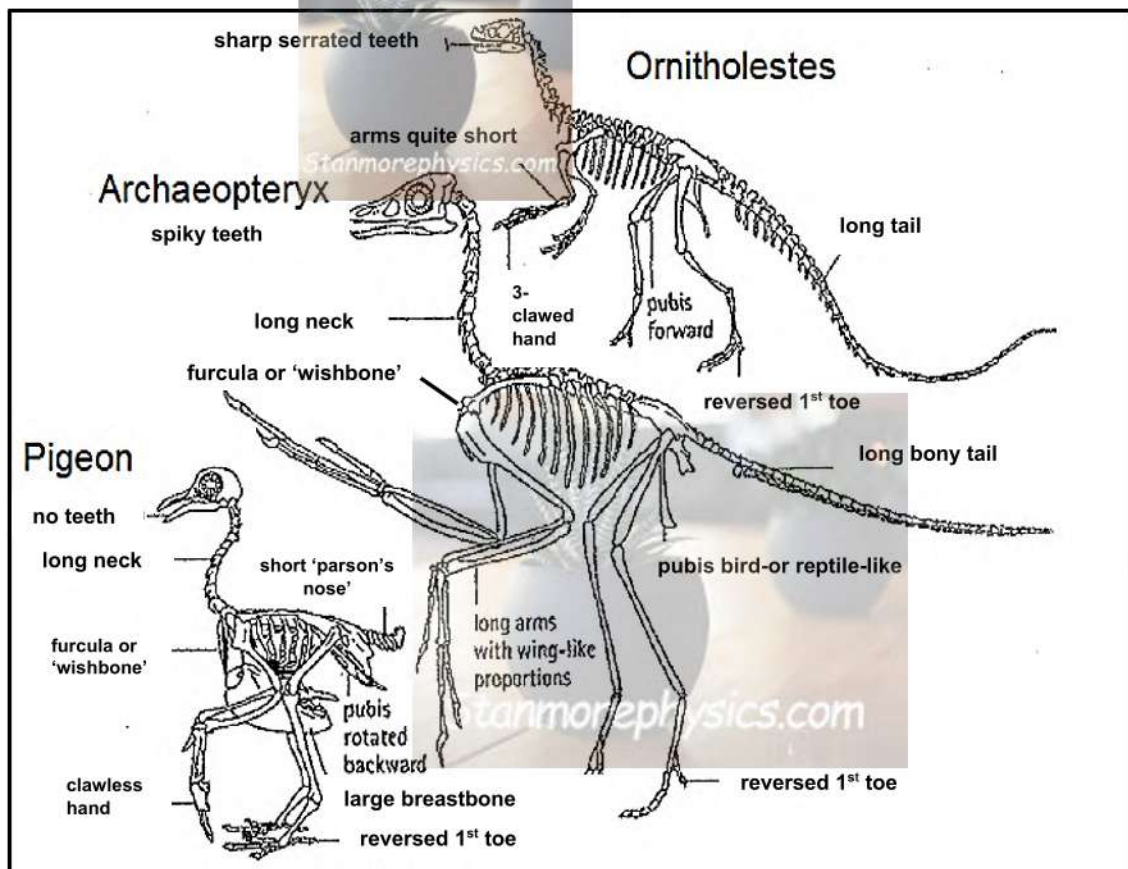
- 3.3.1 Describe how a fossil is formed in sedimentary rocks. (5)

- 3.3.2 Name TWO methods by which the age of fossils can be determined. (2)

(7)

- 3.4 Archaeopteryx is an early prehistoric bird dating from 150 million years ago. A total of EIGHT fossils of archaeopteryx have been found in Germany. It lived during the Jurassic period when many dinosaurs lived. Archaeopteryx seemed to be part bird and part dinosaur.

The diagram below shows the structure of three closely related organisms.



- 3.4.1 List THREE similarities ONLY shared between Ornitholestes (dinosaur) and Archaeopteryx. (3)

- 3.4.2 Tabulate TWO differences between a pigeon and the Archaeopteryx. (5)

3.4.3 Archaeopteryx seemed to be part bird and part dinosaur. Explain the significance of this.

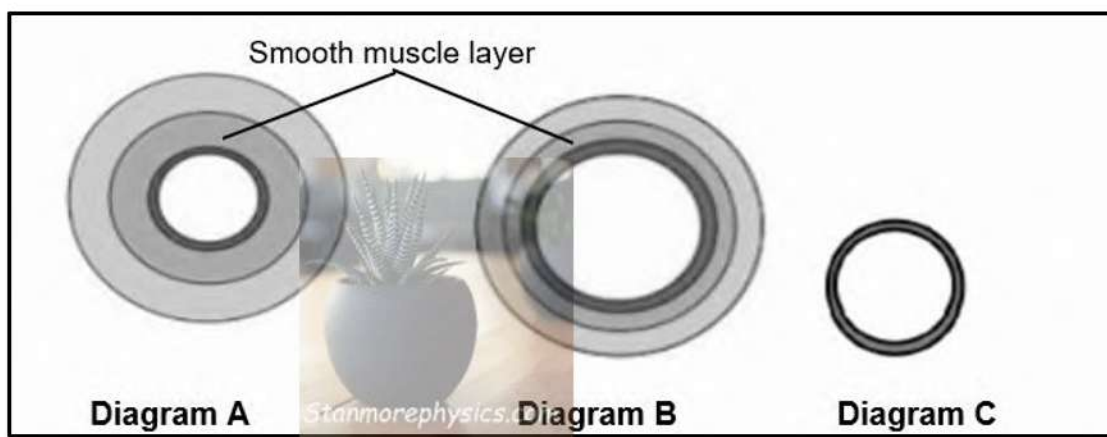
(2)
(10)

3.5 Scientists discovered that five major extinction events occurred over time. The meteors which crashed into the Earth caused enormous permanent losses in biodiversity.

Explain how the impact affected the planet to cause these major losses of life.

(4)

3.5 Diagrams **A**, **B** and **C** below represents THREE types of blood vessels



3.6.1 Identify the type of blood vessel in:

(a) Diagram **B** (1)

(b) Diagram **A** (1)

3.6.2 Explain why blood vessel in Diagram **A** has a thicker smooth muscle layer (2)

3.6.3 Explain ONE structural adaptation of the blood vessel in Diagram **C**. (2)

3.6.4 Tabulate TWO differences between the composition of blood in the pulmonary artery and in the pulmonary vein. (5)

3.7 Read the extract below.

Your liver makes cholesterol for your body. You also can get cholesterol from the foods you eat. Meat, fish, eggs, butter, cheese, and milk all have cholesterol in them. Fruits, vegetables, and grains (like oatmeal) don't have any cholesterol.

Cholesterol is in every cell in your body. You need cholesterol to help your brain, skin, and other organs do their jobs. But eating too much fat and cholesterol is a bad idea.

Cholesterol floats around in your blood and can stick into the walls of the blood vessels. This can cause the blood vessels to get stiffer, narrower, or clogged. If clogging gets worse over many years, it can cause a heart attack or stroke in adults

3.7.1 From the extract above, give ONE food type without cholesterol. (1)

3.7.2 Explain what would happen if someone ate food with too much cholesterol over a long period of time (2)
(3)

3.8 Describe the events that occur during the ventricular systole of the cardiac cycle. (3)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150



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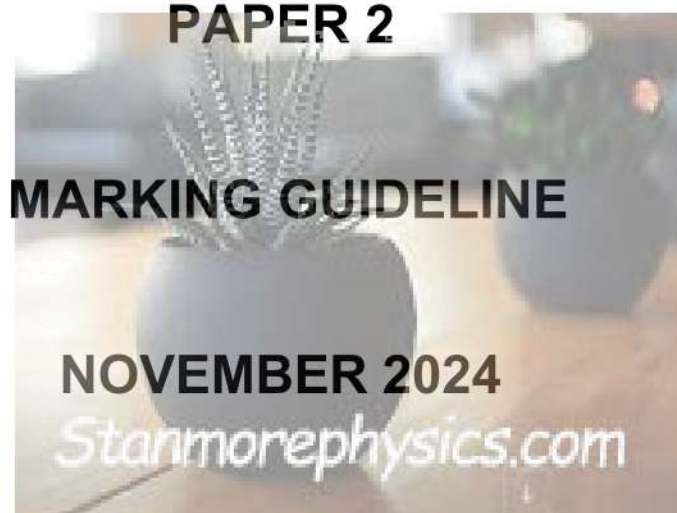
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GRADE 10



LIFE SCIENCES

PAPER 2



MARKING GUIDELINE

NOVEMBER 2024

Stanmorephysics.com

MARKS: 150

This marking guideline consist of 09 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for but descriptions are given**
Accept if the differences/similarities are clear.
5. **If tabulation is required, but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.
10. **Wrong numbering**
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**
Accept, provided it was accepted at the marking guideline discussion meeting.
14. **If only the letter is asked for but only the name is given (and vice versa)**
Do not credit.
15. **If units are not given in measurements**
Candidates will lose marks. Marking guideline allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way.**
17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1

- 1.1.1 C✓✓
- 1.1.2 B✓✓
- 1.1.3 A✓✓
- 1.1.4 D✓✓
- 1.1.5 B✓✓
- 1.1.6 D✓✓
- 1.1.7 D✓✓
- 1.1.8 B✓✓

(16)

1.2 1.2.1 Prokaryotes✓

1.2.2 Endemic✓

1.2.3 Palaeontology✓

1.2.4 Glaciation✓

1.2.5 Biodiversity✓

1.2.6 Monera✓

1.2.7 Biome✓

1.2.8 Food chain✓

(8)

1.3 1.3.1 B only✓✓

1.3.2 None✓✓

1.3.3 B only✓✓

1.3.4 Both A and B✓✓

(8)

1.4 1.4.1 Geological✓ timescale

(1)

1.4.2 (a) Triassic✓

(1)

(b) Caenozoic✓

(1)

1.4.3 Cambrian✓

(1)

1.4.4 Permian✓

(1)

1.4.5 Not all organisms become fossilised✓
Some fossils have not yet been found✓

(2)

1.4.6 Ice ✓

Tar ✓

Amber✓/resin

Any

(Mark the first TWO only)

(2)

(9)

1.5 1.5.1 C✓ – Pulmonary artery✓

(2)

1.5.2 Blood with less oxygen but rich in carbon dioxide✓ / deoxygenated

(1)

1.5.3 Right atrium✓

(1)

1.5.4 Septum✓

(1)

1.5.5 To enable the left ventricle to forcefully pump the blood to the rest of the body✓

(1)

1.5.6 Prevents blood flowing back into the right ventricle✓ when it relaxes

(1)

1.5.7 Less blood enters the left ventricle✓ / heart must work harder to pump blood into the left ventricle

(1)

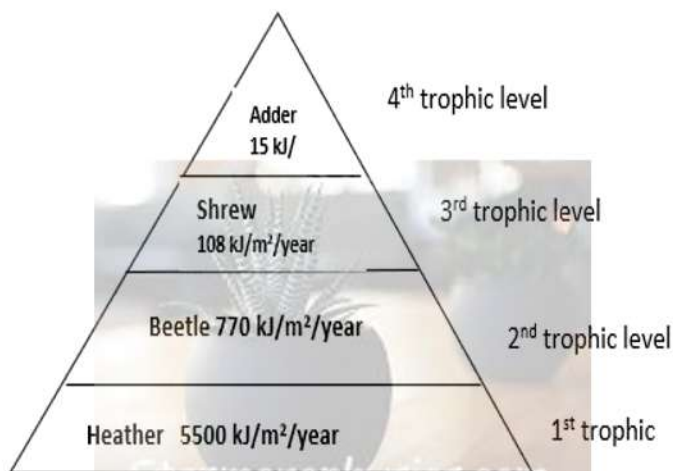
(9)

[50]

SECTION B
QUESTION 2

- 2.1 2.1.1 A well-defined area✓ in which there is a close interaction between plants, animals and the environment✓ (2)
- 2.1.2 Food web✓ (1)
- 2.1.3 (a) Bee✓
Hare✓
Rabbit✓
Grouse✓
Beetle✓
(Mark first ONE only) Any (1)
- (b) Heather✓ (1)
- (c) Adder✓
Eagle✓ Any (1)
- (Mark first ONE only)
- 2.1.4 (a)
- Decrease✓
- no food for them to eat✓
- they will need to find another source of food✓ or emigrate Any (2)
- (b)
- Increase✓
- they are not eaten by the shrews✓ / only grouse eats them (2)
- 2.1.5

Food pyramid of energy



Mark allocation:

Heading ✓

Correct organisms filled in at each level according to the given food chain + correct energy content ✓✓✓✓

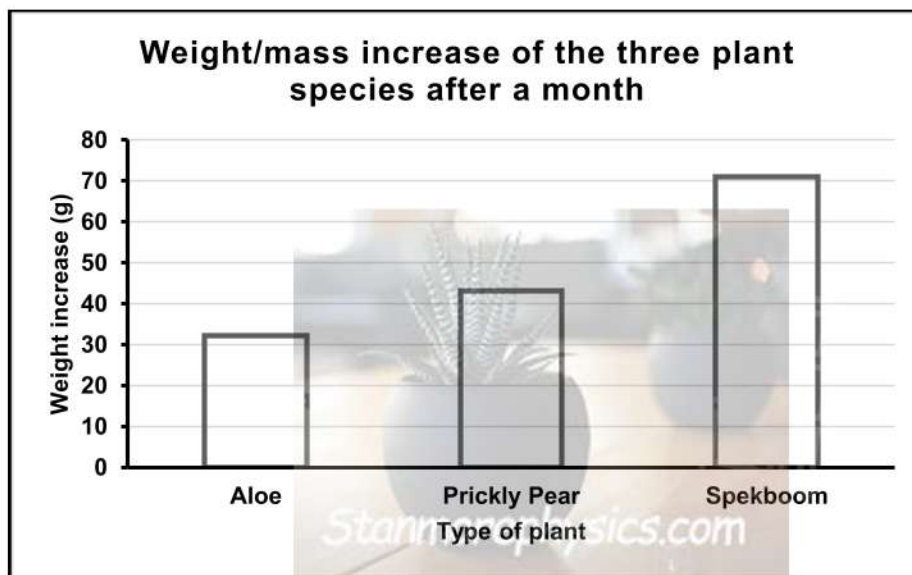
(5)

- 2.1.6 Adder has one source of food, the shrew✓
Stout eats the shrew, if it dies out, there are other food sources - hare and rabbits✓

(2)
(17)

MARKING GUIDELINES

- 2.2 2.2.1 (a) Type of plant ✓ / different plants (1)
 (b) (Rate of) absorption of CO₂ ✓ (1)
- 2.2.2 - To have a baseline ✓ / control
 - to be used to compare the results after carbon dioxide has been absorbed ✓ Any (1)
- 2.2.3 - They chose plants of the same height ✓
 - They put the plants in equal sized pots ✓
 - All plants had the same type of soil ✓
 - All plants had the same amount of soil ✓
 - All plants were in the same location ✓
 - All plants received the same amount of water ✓ Any (2)
(Mark the first TWO only)
- 2.2.4 - Increase the types of plants used ✓
 - Repeat the investigation ✓ Any (1)
(Mark the first ONE only)
- 2.2.5 $\frac{96}{800} \times 100 = 12\%$ ✓ (3)
- 2.2.6 - Plants use CO₂ to create organic compounds ✓ / carbohydrates
 - which they use to grow ✓
 - The more they grow the more they gain weight ✓ Any (2)
- 2.2.7



Rubric for marking the graph

Correct type of graph (T)	1
Correct caption (with both variables) (C)	1
X and Y axes labels including unit (L)	1
X and Y axes scales, bars same width, and equal space between bars (S)	1
Plotting of points (P): 1-2 bars correct	1
All 3 bars correct	1

(6)



(17)

- 2.3 2.3.1 A – *Haliaeetus lucocephalus*✓
 B – *Rynchops niger*✓
 C – *Recurvirostra avosetta*✓
 D – *Buceros rhinoceros*✓
 E – *Ammodrammas bairdii*✓
 F – *Pandion hallaetus*✓

(6)

- 2.3.2 (a) Mammalia✓ (1)
 (b) Pan troglodytes✓✓ (2)
 (c) Pan✓ (1)
 (d) - To avoid confusion/ be accurate✓ (2)
 - common names vary from region to region✓ (12)

- 2.4 Animals depend on other organisms for food whereas plants manufacture their own food✓✓/ Animal cells do not have chloroplasts whereas plant cells have chloroplasts
 Cells making up animals do not have cell walls whereas those of plants have cell walls✓✓
 Plants can produce seeds whereas animals produce eggs or young one✓✓

(4)

[50]

QUESTION 3

- 3.1 3.1.1 1 – combustion✓
 3 – respiration✓
 4 - decomposition✓

(3)

- 3.1.2 Photosynthesis✓ -reduces the concentration of carbon dioxide in the atmosphere✓ by trapping it for the manufacturing of food✓

(3)

(6)

- 3.2 3.2.1 Biogeography✓

(1)

- 3.2.2 Pangea✓

(1)

- 3.2.3 - The continents were originally one landmass called Pangaea✓
 - It broke into Laurasia and Gondwanaland✓ (225 – 200 MYA)
 - Gondwanaland formed – S. America, Africa, Madagascar, Australia, India & Antarctica✓
 - Laurasia formed – N America, Europe, Middle East, Asia and China✓

(4)

(6)

MARKING GUIDELINES



- 3.3 3.3.1 - The organism dies and is covered rapidly by sediment / silt ✓
 - The flesh of the organism decays and only the bone is left behind ✓
 - As time passes layers of sediment build up over the body ✓
 - The layers compress / are squashed by immense pressure building up ✓
 - Minerals begin to replace animal tissues ✓
 - and the body petrifies ✓

Any (5)

- 3.3.2 Relative dating ✓
 Radiometric dating ✓

(2)
 (7)

- 3.4 3.4.1 - Long tail ✓
 - Clawed hands ✓
 - Spiky/ Sharp/Serrated teeth ✓
 (Mark the first THREE answers)

3.4.2	Pigeon	Archaeopteryx
	1. Short 'parson's nose' ✓	Long tail ✓
	2. No teeth ✓	Spiky teeth ✓
	3. Pubis rotated backwards ✓	Pubis: bird- or reptile-like ✓
	4. A large breastbone ✓	No breastbone ✓
		T ✓ + 2x2 (Mark the TWO answers)

(5)

- 3.4.3 - This is a transitional fossil ✓
 - It shows intermediate characteristics of fossils ✓
 - Evidence for evolution ✓

Any (2)
 (10)

- 3.5 - Large amount of dust particles moved up ✓
 - and blocked out the sun ✓
 - leading to less photosynthesis ✓
 - and therefore, less oxygen and food ✓
 - Temperature on Earth decreased ✓
 - This caused many organisms to go extinct ✓
 - as they could not adapt ✓

Any (5)

- 3.6 3.6.1 (a) Vein ✓
 (b) Artery ✓

(2)

- 3.6.2 - To withstand the high pressure ✓
 - created by the pumping of the heart ✓

(2)

- 3.6.3 - Single layer of cells ✓
 - to allow oxygen and nutrients to diffuse into the tissues ✓ / CO₂ and excretory waste to diffuse from the tissues

(2)

MARKING GUIDELINES



3.6.4

Pulmonary artery	Pulmonary vein
1. High level of CO ₂ ✓	Low level of CO ₂ ✓
2. Low level of oxygen✓	High level of oxygen✓

1 table ✓ + (2 x 2) (5)

(Mark the first TWO only)

3.7

3.7.1

Fruit✓
Vegetables✓
Grains✓

(Mark the first ONE only)

Any (1)

3.7.2

- Cholesterol floats in blood and stick into the walls of the blood vessels✓
- Blood vessels to get stiffer, narrower, or clogged✓
- Resulting in heart attack ✓/ stroke

Any (2)
(3)

3.8

- Left and right ventricles contract✓
- Atria relax✓
- Right ventricle pushes blood into pulmonary artery✓
- Left ventricle pushes blood into aorta✓
- Bicuspid and tricuspid valves close to prevent backflow✓

Any (3)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150