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KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA



NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES

JUNE COMMON TEST

2022

MARKS: 120

TIME: 2 hours

This question paper consists of 12 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 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. 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.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided 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 1.1.9) in the ANSWER BOOK, for example 1.1.10 D.

1.1.1 A positive test for starch is shown by ...

A Blue black
B Brown
C Black
D Brick red

1.1.2 Which ONE of the following animals has an exoskeleton?

A Locust
B Tapeworm
C Sponge
D Earthworm

1.1.3 The stomata in leaves control the supply of the following for photosynthesis.

A Carbon dioxide
B Water
C Oxygen
D ATP

1.1.4 Which ONE of the following combinations of plant groups do male gametes depend on water/moisture to swim towards the ovum?

A Pteridophytes and gymnosperm
B Pteridophytes and angiosperms
C Bryophytes and pteridophytes
D Bryophytes and gymnosperms

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1.1.5 The list below represents the steps in a starch test in leaves.

(i) Drops of iodine solution are added to a leaf
(ii) Boil leaf in water
(iii) Rinse the leaf in water
(iv) Boil the leaf in alcohol

Which ONE of the following combinations is the correct sequence of steps for the starch test in plant leaves?

A (i) → (iii) → (ii) → (iv)
B (ii)→ iv) → (iii) → (i)
C (iii) → (i) → (iv) → (ii)
D (iv) → (ii) → (i) → (iii)

1.1.6 Which ONE of the following Phyla is called round worm?

A Chordata
B Cnidaria
C Annelida
D Arthropoda

1.1.7 Which ONE of the following plant groups consists of needle leaves that reduce surface area for transpiration?

A Gymnosperms
B Angiosperms
C Pteridophyes
D Bryophytes

1.1.8 Saprophytic Fungi obtains nutrients from ...

A Living organisms
B The atmosphere
C Dead organic matter
D From the soil

1.1.9 Insects are ...

A Acoelomate
B Triploblastic
C Diploblastic
D Asymmetrical

(9 x 2) **(18)**

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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 1.2.9) in the ANSWER BOOK.

1.2.1 Type of symmetry in which an animal can be cut in any vertical plane through its central axis to give two mirror images

1.2.2 The outer tissue layer of an organism

1.2.3 Symbiotic relationship between humans and pathogenic bacteria

1.2.4 Group of seed-producing plants

1.2.5 The dominant generation in moss plant

1.2.6 The gut that runs through organism with two openings, the mouth and anus

1.2.7 Organism without a true nucleus

1.2.8 The ring-like structure of DNA carrying genetic material in bacterium

1.2.9 Disease causing organisms

(9 x 1) **(9)**

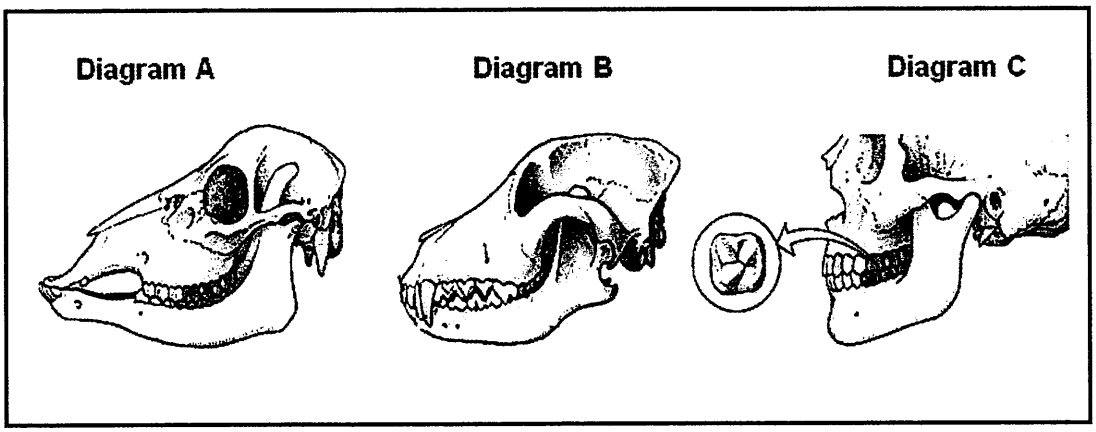
1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY, B ONLY, BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.5) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	All organisms in this phylum are sessile	A: Porifera B: Chordata
1.3.2	Body cavity in multicellular organisms	A: Acoelomate B: Coelom
1.3.3	Plants with long tube shaped flower with no odour	A: Wind pollinated B: Insect pollinated

(3 x 2) **(6)**



1.4 The diagrams below show the differences between dentition of herbivores, carnivores and omnivores.



1.4.1 Which diagram (**A**, **B** or **C**) represents:

(a) Herbivore (1)

(b) Carnivore (1)

(c) Omnivore (1)

1.4.2 Name the large sharp pointed teeth in diagram **B**. (1)

1.4.3 Name the type of teeth in diagram **C** that is responsible for the slicing of food. (1)

1.4.4 Diagram **3** represents the skull of a human.

State the:

(a) Gland that produce digestive juice in the mouth of this skull (1)

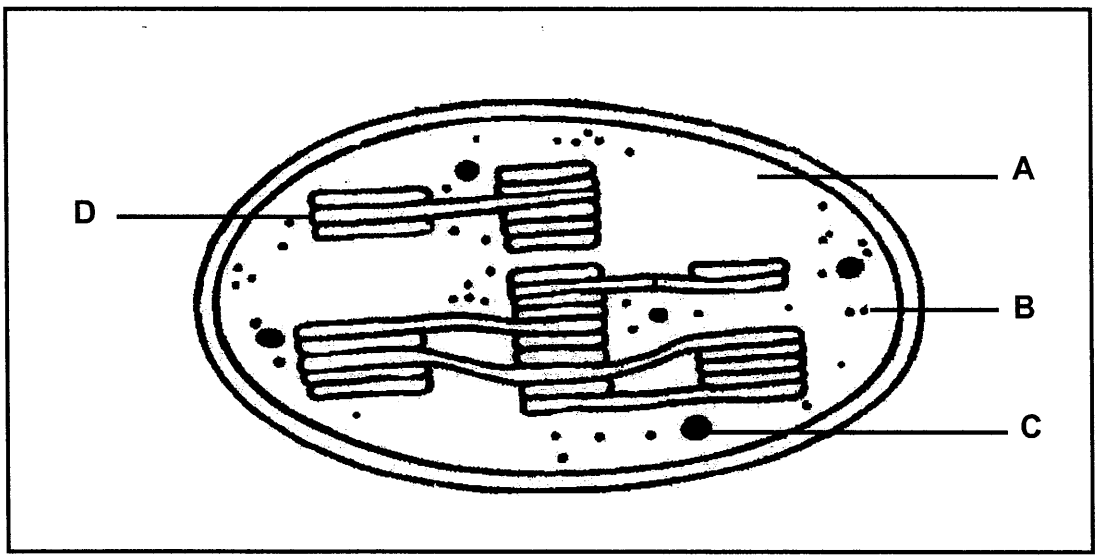
(b) Digestive juice produced by the gland mentioned in QUESTION 1.4.4 (a). (1)
(7)

SECTION A TOTAL 40

SECTION B

QUESTION 2

2.1 The diagram below shows a chloroplast.



2.1.1 Give the LETTER and NAME of the part that:

(a) Stores the products of photosynthesis (2)

(b) Is the site for dark phase (2)

(c) Photosynthetic membrane (2)

2.1. 2 Describe *light phase* of photosynthesis (5)
(11)

2.2 In industrial brewing process, yeast is added to a sugary solution and kept at 25^0c. Sugar solution and yeast cells undergo fermentation process.

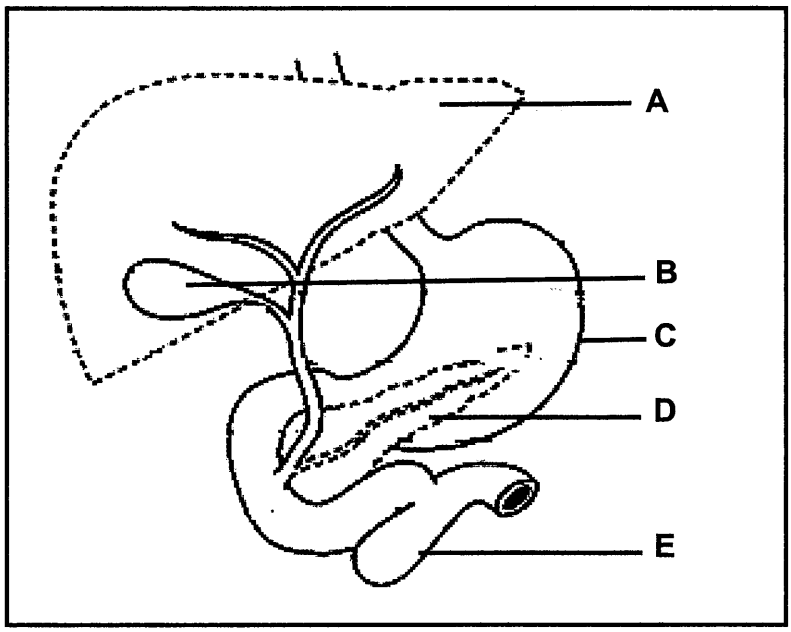
2.2.1 Name TWO products of fermentation in plants? (2)

2.2.2 State TWO ways that the above-mentioned process is economically important. (2)

2.2.3 Fermentation also takes place in animals.

Describe the process of fermentation in animal tissue. (6)
(10)

2.3 The diagram below shows part of human digestive system.



2.3.1 Write down the LETTER and NAME of the part that produces:

(a) Gastric juice (2)

(b) Digestive juice that emulsify fats (2)

(c) Insulin and glucagon (2)

2.3.2 Explain TWO structural features of villus found at part E that enables it to perform its function effectively. (4)
(10)

2.4 The table below shows the number of deaths due to tuberculosis (TB) in four provinces reported per 100 000 in 2005

PROVINCE	TB death rate per 100 000
Eastern Cape	300
Free State	150
Kwazulu Natal	200
Limpopo	165

2.4.1 Which province has a least number of reported deaths? (1)

2.4.2 Explain why TB may be deadly to those people having HIV. (2)

2.4.3 Draw a bar graph to illustrate the information in the table above. (6)
(9)
[40]

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QUESTION 3

3.1 The following table shows an analysis of the nutrients found in a 100 g portion of breakfast. The breakfast was made up of eggs, bread and butter.

NUTRIENTS IN A 100 g PORTION	FOOD TYPES		
	Eggs	Bread	A specific brand of butter
Proteins (g)	0	10	0,10
Fats (g)	3	0,2	34
Carbohydrates(g)	4	1	0
Calcium (mg)	27	1	6
Iron (mg)	2	0,5	0,8



3.1.1 Explain why athletes should include carbohydrate in their daily breakfast. (2)

3.1.2 Calculate the percentage of fats in the breakfast served in the table above. Show all working. (2)

3.1.3 Describe *chemical digestion* of proteins in the stomach. (5)
(9)

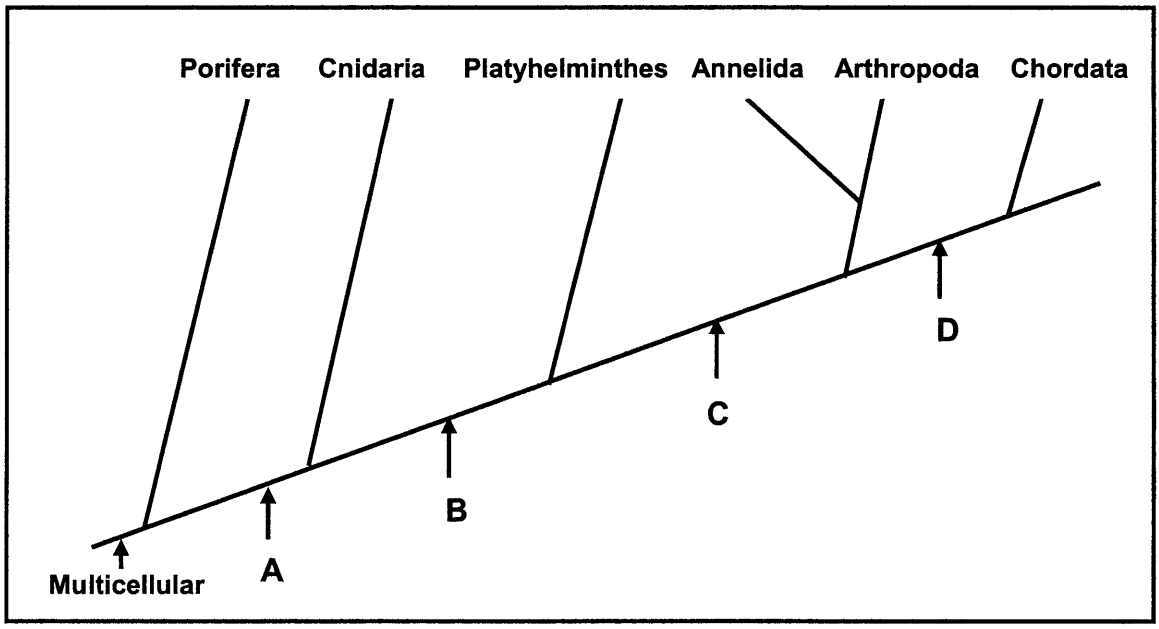
3.2 Over years plants evolved and developed characteristics that makes them more adapted to live on land.

3.2.1 Name FOUR plant groups that you studied, according to how they evolved. (4)

3.2.2 Which plant group lacks vascular tissues? (1)

3.2.3 Explain why gymnosperms produce more pollen than most angiosperms. (4)
(9)

3.3 The diagram below shows the relationships between animal phyla.



3.3.1 Identify the diagram above. (1)

3.3. 2 Name the characteristic that is shared by all organisms in the animal kingdom shown in the diagram above (1)

3.3.3 Give the LETTER only that represents each of the following characteristics with respect to the body plan:

(a) Diploblastic (1)

(b) Coelom (1)

(c) Vertebral column (1)

3.3.4 Explain TWO importance of coelom in certain organisms. (4)
(9)

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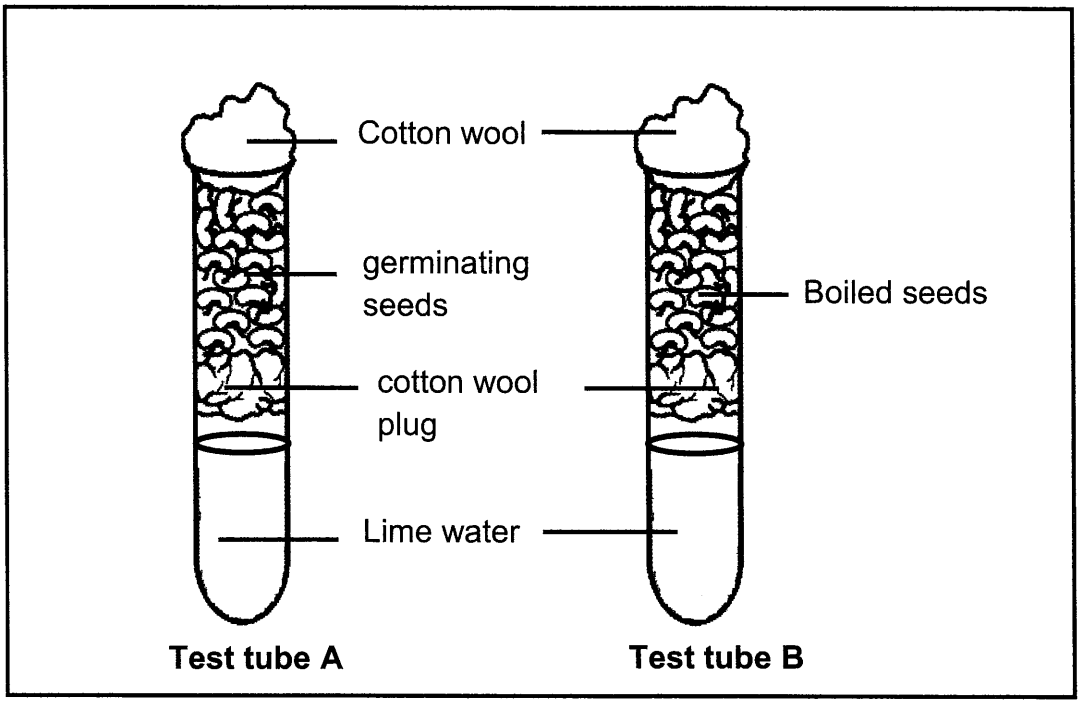


3.4 An investigation was conducted by scientists.

The investigation was set up as follows:

- 10 seeds of the same the kind were used
- The seeds and apparatus were all sterilized before they were used.
- Same type of cotton wool was used
- Same size test tubes
- In test tube A water was added
- In test tube B lime water was added
- Once set up the apparatus were placed in a dark box at 35^0C
- The investigation was done once

The diagrams below show how the investigation was set up.



3.4.1 State the aim for the investigation above. (2)

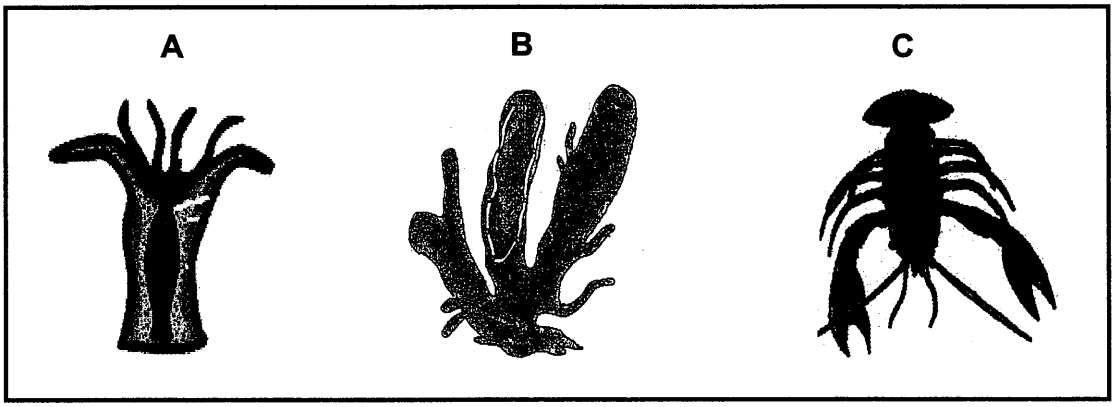
3.4.2 Name TWO factors that were kept constant during the investigation (2)

3.4.3 Give ONE reasons why this investigation may be regarded as unreliable. (1)

3.4.4 State ONE reason why seeds were sterilized before the investigation. (1)

3.4.5 Why lime water was used in this investigation? (1)
(7)

3.5 The diagrams below represents different phyla.



3.5.1 Write down the LETTER and NAME of the Phylum that is:

(a) Cephalisation (2)

(b) Radial symmetrical (2)

(d) No gut (2)
(6)
[40]

TOTAL SECTION B: 80

GRAND TOTAL: 120



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GRADE 11

LIFE SCIENCES

JUNE 2022

MARKING GUIDELINE

REVISED MARKING GUIDELINE BELOW

MARKS: 120

This marking guideline consists of 6 pages.

SECTION A

QUESTION 1

1.1	1.1.1	A✓✓		
	1.1.2	A✓✓		
	1.1.3	C✓✓		
	1.1.4	C✓✓		
	1.1.5	B✓✓		
	1.1.6	C✓✓		
	1.1.7	A✓✓		
	1.1.8	B✓✓		
	1.1.9	C✓✓		
			(9 x 2)	**(18)**
1.2	1.2.1	Radial symmetry✓		
	1.2.2	Ectoderm✓		
	1.2.3	Parasitism✓		
	1.2.4.	Gymnospermae✓		
	1.2.5	Gametophyte✓		
	1.2.6	Through-gut✓		
	1.2.7	Prokarytes✓		
	1.2.8	Plasmid✓		
	1.2.9	Pathogens✓		
			(9 x 1)	**(9)**
1.3	1.3.1	A only✓✓		
	1.3.2	B only✓✓		
	1.3.3	A only✓✓		
			(3 x 2)	**(6)**
1.4	1.4.1	(a) A✓		(1)
		(b) B✓		(1)
		(c) C✓		(1)
	1.4.2	Canine✓		(1)
	1.4.3	Incisor✓		(1)
	1.4.4	(a) Salivary✓ gland		(1)
		(b) Saliva✓		(1)
				(7)
			TOTAL SECTION A:	**(40)**

SECTION B

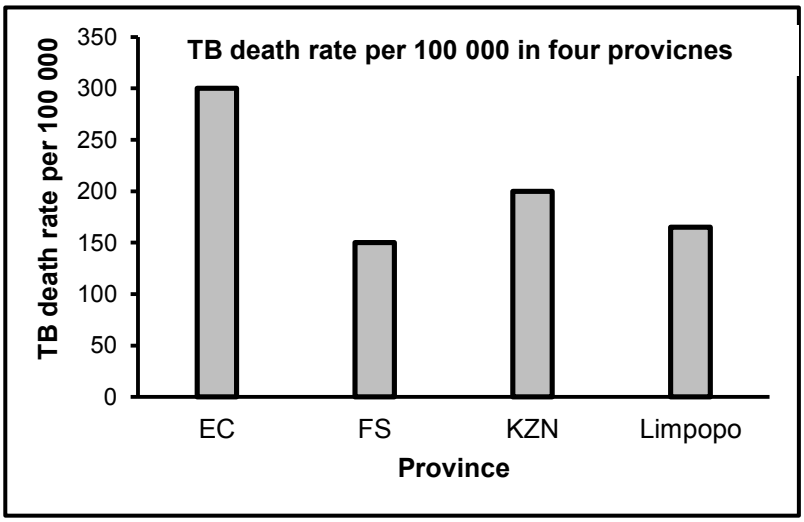
QUESTION 1

2.1	2.1.1	(a) C✓ - store starch✓ grain		(2)
		(b) A✓ - stroma✓		(2)
		(c) D✓ - thylakoids✓		(2)
	2.1.2	- Occurs in the grana✓ - Chlorophyll absorb radiant energy✓/sunlight - Radiant energy changed into chemical potential energy✓ - Some energy is stored in ATP✓ - Some is used to split water✓ from the soil - into hydrogen and oxygen✓ - The oxygen is released into the atmosphere✓ - The energized hydrogen is taken up by a carrier✓/NADP - forming NADPH✓	Any	(5) **(11)**
2.2	2.2.1	- Carbon dioxide✓ - Ethanol✓ **Mark the first TWO only**		(2)
	2.2.2	- Produces beer✓ /wine - For making bread✓ - Production of cheese✓ **Mark the first TWO only**		(2)
	2.2.3	- Glucose is broken down✓ - in the absence of oxygen✓ - to produce less energy✓ - in muscles✓ - Lactic acid is also produced✓ - leading to fatigue and stiffness✓ - during and after exercising✓		(6) **(10)**
2.3	2.3.1	(a) C✓ Stomach✓		(2)
		(b) A✓ Liver✓		(2)
		(c) D✓ Pancreas✓		(2)
	2.3.2	- It has a large surface area✓ - for more nutrient absorption✓ - It is long✓ - to allow sufficient time for absorption✓ - It has villi✓ - for the absorption of molecules✓ **Mark the first TWO only**	Any (2 x 2)	(4) **(10)**

2.4 2.4.1 Free State✓ (1)

2.4.2 - HIV weakens the immune system✓
- then the body may not fight against TB✓
- increasing the death rate✓ caused by TB (2)

2.4.3





Guideline for assessing the graph

CRITERIA	ELABORATION	MARK
Correct type of graph **(T)**	Bar graph drawn	1
Caption of graph **(C)**	Both variables included	1
Axes labels **(L)**	X- and Y-axis correctly labelled	1
Scale for X- and Y-axes **(S)**	- Equal space and width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of Bars **(P)**	1 to 3 bars plotted correctly All 4 bars plotted correctly	1 2

(6)
(9)

QUESTION 3

3.1 3.1.1 - Carbohydrates release more energy✓
- that is needed by athletes✓
- for their races✓ (2)

3.1.2 $\frac{3}{37.2}$ ✓ x 100✓ = 8.0✓ (3)

3.1.3 - Tongue pushes food towards teeth✓
- for chewing/mastication✓
- Also mixes food with saliva✓
- that contains digestive enzymes✓
- for starch digestion✓ Any (4)
(9)

3.2 3.2.1
- Bryophytes✓
- Pteridophytes✓
- Gymnosperms✓
- Angiosperms✓ (4)

Mark the first FOUR only

3.2.2 Bryophytes✓ (1)

3.2.3
- Gymnosperms depend on wind pollination✓
- for fertilisation✓
- So many pollens increase chances of fertilisation✓
- Whereas most angiosperms depend on wind /water and insects✓
- This increases chances of fertilisation✓ Any (4)

(10)

3.3 3.3.1 Phylogenetic tree✓ (1)

3.3.2 Multicellular✓ (1)



3.3.3
(a) A✓ (1)
(b) C✓/D (1)
(c) D✓ (1)

3.3.4
- Provides room for organ development✓
- to allow for more complex organisms✓

- Provides a hydrostatic skeleton✓
- for support✓

- Separates gut wall from the body✓
- for more efficient digestion of food✓

- Increases respiration and nutrition✓
- by allowing nutrients to dissolve✓ Any (2x 2) (4)

Mark the first TWO only **(9)**

3.4 3.4.1 To show that germinating seeds produces carbon dioxide during respiration✓ (2)

3.4.2
- Same type of seeds✓
- Same environmental conditions✓
- Same investigator✓
- Same number of beans✓
- Same size test tubes were used✓
- Same time for the investigation✓ Any (2)

Mark the first TWO only

3.4.3
- It was not repeated✓
- Sample size was not increased✓ Any (1)

Mark the first ONE only

3.4.4 To remove micro-organisms that may influence the results✓ (1)
Mark the first ONE only

3.4.5 To indicate carbon dioxide✓ (1)
(7)

3.5 3.5.1 (a) C✓ Arthropoida✓ (2)
(b) A✓ Cnidaria✓ (2)
(c) B✓ Porifera✓ (2)
(6)
[40]



GRAND TOTAL: 120

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REVISED MARKING GUIDELINE

SECTION A

QUESTION 1

1.1
1.1.1 A✓✓
1.1.2 A✓✓
1.1.3 ~~C~~✓✓ A
1.1.4 C✓✓
1.1.5 B✓✓
1.1.6 C✓✓ leave out
1.1.7 A✓✓
1.1.8 ~~B~~✓✓ C
1.1.9 ~~C~~✓✓ B

(9 x 2) **(18)**

1.2
1.2.1 Radial symmetry✓
1.2.2 Ectoderm✓
1.2.3 Parasitism✓
1.2.4 ~~Gymnospermae~~✓ Spermatophyta
1.2.5 Gametophyte✓
1.2.6 Through-gut✓
1.2.7 Prokarytes✓
1.2.8 Plasmid✓
1.2.9 Pathogens✓

(9 x 1) **(9)**

1.3
1.3.1 A only✓✓
1.3.2 B only✓✓
1.3.3 ~~A only~~✓✓ None

(3 x 2) **(6)**

1.4
1.4.1 (a) A✓ (1)
(b) B✓ (1)
(c) C✓ (1)
1.4.2 Canine✓ (1)
1.4.3 Incisor✓ (1)
1.4.4 (a) Salivary✓ gland (1)
(b) Saliva✓ (1)
(7)

TOTAL SECTION A: (40)

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SECTION B

QUESTION 1

2.1 2.1.1
(a) C✓ - store starch✓ grain/granule (2)
(b) A✓ - stroma✓ (2)
(c) D✓ - thylakoids✓ / lamella (2)

2.1.2
- Occurs in the grana✓
- Chlorophyll absorb radiant energy✓/sunlight
- Radiant energy changed into chemical potential energy✓
- Some energy is stored in ATP✓
- Some is used to split water✓ from the soil
- into hydrogen and oxygen✓
- The oxygen is released into the atmosphere✓
- The energized hydrogen is taken up by a carrier✓/NADP
- forming NADPH✓

Any (5)
(11)

2.2 2.2.1
- Carbon dioxide✓
- Ethanol✓ / alcohol

Mark the first TWO only (2)

2.2.2
- Produces beer✓ /wine
- For making bread✓
- Production of cheese✓

Mark the first TWO only (2)

2.2.3
- Glucose is broken down✓
- in the absence of oxygen✓
- to produce less energy✓
- in muscles✓
- Lactic acid is also produced✓
- leading to fatigue and stiffness✓
- during and after exercising✓

Glucose (6C) - broken down to form (2 x 3C) Pyruvic acid molecules✓ Glycolysis process✓. little energy released Pyruvic Acid molecule converted into Lactic acid because no O_2 present

(6)
(10)

2.3 2.3.1
(a) C✓ Stomach✓ (2)
(b) A✓ Liver✓ (2)
(c) D✓ Pancreas✓ (2)

2.3.2
- elongated/millions
- It has a large surface area✓ for more absorption.
- ~~for more nutrient absorption~~✓
- ~~It is long~~✓ single layer of columnar epithelium
- ~~to allow sufficient time for absorption~~✓ absorption/diffusion made easy
- ~~It has villi~~✓ goblet cells✓
- ~~for the absorption of molecules~~✓ secrete mucus to facilitate absorption

Any (2 x 2) (4)
Mark the first TWO only **(10)**

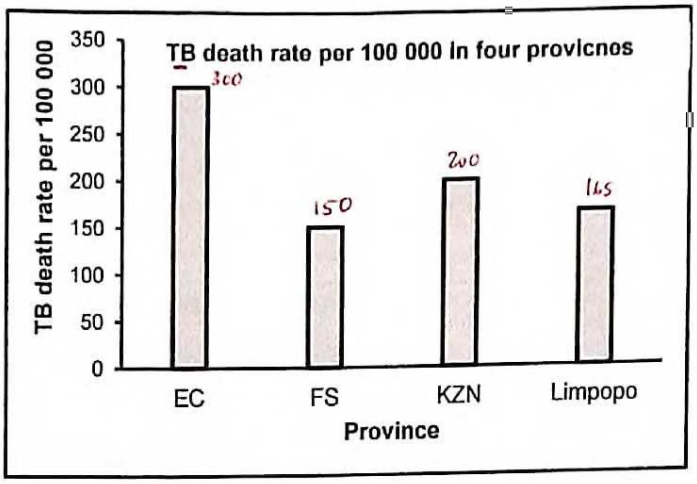
Richly supplied with blood capillaries/lacteal to transport absorbed food immediately

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2.4 2.4.1 Free State✓ (1)

2.4.2 - HIV weakens the immune system✓
- then the body may not fight against TB✓ / decrease fight
- increasing the death rate✓ caused by TB (2)

2.4.3



Guideline for assessing the graph

CRITERIA	ELABORATION	MARK
Correct type of graph **(T)**	Bar graph drawn	1
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Plotting of Bars **(P)**	1 to 3 bars plotted correctly All 4 bars plotted correctly	1 2

(6)
(9)

QUESTION 3

3.1 3.1.1 - Carbohydrates release (more) energy✓
- that is needed by athletes✓ / for races
- ~~for their races~~✓ (2)

3.1.2 $\frac{3}{37.2}$✓ x 100✓ = 8.0✓ $\frac{37,2}{100} \times \frac{100}{1} = 37,2\ \%$ (3)

3.1.3 - Tongue pushes food towards teeth✓
- for chewing/mastication✓
- Also mixes food with saliva✓
- that contains digestive enzymes✓
- for starch digestion✓

Gastric juice✓ contains enzymes proteases✓ pH is acidic✓, because of HCl✓ optimum pH for enzyme/protease action in stomach✓ protein broken down to smaller polypeptide/amino acids (any 4)

Any (4) (9)

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3.2 3.2.1
- Bryophytes✓
- Pteridophytes✓
- Gymnosperms✓
- Angiosperms✓
Mark the first FOUR only (4)

3.2.2 Bryophytes✓ (1)

3.2.3
- Gymnosperms depend on wind pollination✓ ✓ for
- ~~for fertilisation~~✓
- So many pollens increase chances of fertilisation✓ / pollination
- Whereas ~~most~~ angiosperms depend on wind /water and insects✓
- ~~This increases chances of fertilisation~~✓ Any (4) **(10)**

3.3 3.3.1 Phylogenetic tree✓ (1)

3.3.2 Multicellular✓ (1)

3.3.3 (a) A✓ (1)
(b) C✓~~B~~ (1)
(c) D✓ (1)

3.3.4
- Provides room for ~~organ development~~✓ space ✓
- ~~to allow for more complex organisms~~✓ for free movement / growth of internal organs
allow for temp. storage ✓ of food / metabolic waste ✓
- Provides a hydrostatic skeleton✓
- for support✓ / movement / locomotion
- Separates gut wall from the body✓ wall ✓
- for more efficient digestion of food✓ / so gut wall and body wall can work independently ✓
- ~~Increases respiration and nutrition~~✓ allow for metabolic process to occur ✓
- ~~by allowing nutrients to dissolve~~✓ eg osmoregulation ✓ Any (2x 2) (4) **(9)**
Mark the first TWO only

3.4 3.4.1 To show that germinating seeds produces carbon dioxide during respiration✓✓ (2)

3.4.2
- Same type of seeds✓ seeds sterilized ✓
- Same environmental conditions✓ 35°C / dark box same type cotton wool ✓
- Same investigator✓
- Same number of beans✓
- Same size test tubes were used✓
- ~~Same time for the investigation~~✓ Any (2)
Mark the first TWO only

3.4.3
- It was not repeated✓
- Sample size was not increased✓ Any (1)
Mark the first ONE only

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3.4.4 To remove micro-organisms that may influence the results✓✓ (1)
Mark the first ONE only

3.4.5 To indicate carbon dioxide✓ (1)
(7)

3.5 3.5.1 (a) C✓ Arthropoda✓ (2)
(b) A✓ Cnidaria✓ (2)
(c) B✓ Porifera✓ (2)
(6)
[40]

GRAND TOTAL: 120