KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM DIRECTORATE

GRADE 10 -12

INFORMAL ASSESSMENT:

TOPIC TESTS

JIT TERMS 1- 4

LIFE SCIENCES

GRADE 11

2024

SCHOOL NAME:	
LEARNER NAME:	

INTRODUCTION

This document has been prepared as informal assessment material for the Final Examinations for Grade 10 & 11 Life Sciences.

The Topic tests have been arranged according to the sequence of topics in the ATP and 2024 Examination Guidelines.

Therefore, this document can be used to prepare learners for formal assessment.

The focus was on the core concepts and skills for life sciences.

TABLE OF CONTENTS:

KWAZULU-NATAL PROVINCE

EDUCATION
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GRADE 11

LIFE SCIENCES-TERM 1
INFORMAL ASSESSMENT
TOPIC TEST: MICRO-ORGANISMS

MARKS: 30 MARKS

TIME: 30 MINUTES

N.B. This question paper consists of 5 pages including this page .

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.
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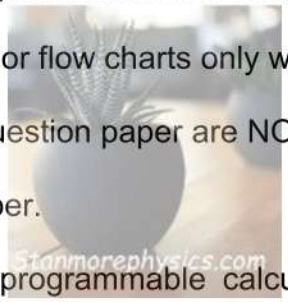

SECTION A

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 1.1.3) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 The use of antibiotics is an effective treatment for.....

A viral infections
B bacterial and protist infections
C bacterial and viral infections
D baterial infections only

1.1.2 Vaccines are effective in protecting the body because they.....

A trigger the immune system to produce antibodies to protect body from a disease- causing agent
B attack disease- causing agent as soon as it enters the body
C help the body excrete the disease- causing agent
D allows the disease-causing agent to multiply itself inside the host body

(2x2) (4)

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 1.2.4) in the ANSWER BOOK.

1.2.1 A variety of organisms found in an area or on earth

1.2.2 Symbiotic relationship where one organism benefit while causing harm to their hosts

1.2.3 An agent who carries and transmits an infectious disease into another living organism

1.2.4 Microorganism that feeds on decaying tissues of other organisms

(4x1) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I apply 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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Genetic material found in viruses	A: DNA B: RNA
1.3.2	Pathogens that causes rabies	A: Bacterium B: Fungi

(2 x 2) **(4)**

TOTAL SECTION A = 12

SECTION B

QUESTION 2

2.1 Read the passage below

Malaria is 100% treatable and preventable

Malaria is a deadly disease that is transmitted to humans through a bite of an infected female Anopheles mosquito. Each year 655 000 people around the world die from malaria, 200 000 of these deaths are newborns and 10 000 mothers.

2.1.1 Identify the kingdom to which the organisms that cause malaria belong. (1)

2.1.2 Explain the possible reason why there is a high death rate due to malaria. (2)

2.1.3 Explain ONE strategy that should employed by the department of health to reduce malaria death. (2)

2.1.4 Calculate the percentage of mothers who die each year according to the extract. (2)

2.1.5 Explain the economic impact to the country if there is high percentage of people suffering from malaria. (2)

[9]

QUESTION 3

3.1 A group of Grade 11 learners investigated the effect of temperature on bacterial growth. They used the following procedure:

- 5 Petri dishes containing agar were labeled with the corresponding incubation temperature.
- Incubators were set at different i.e. 10 °C ,20 °C,30°C,40°C,50°C
- After sterilizing the inoculation loop using a Bunsen burner, it was dipped into the bacterial culture and gently moved across the surface of each agar plate, ensuring even distribution.
- The learners inverted the plates and placed them in their respective incubators at the designated temperatures
- After incubation, the numbers of visible bacterial colonies on each plate were counted.

The results are shown in the following table. The table below shows the average time the group of athletes was able to run after drinking Cup **A** and

drinking Cup **B**

Temperature (°C)	Number of colonies
10	10
20	75
30	250
40	100
50	0

3.1.1 Identify the independent variable in this investigation. (1)

3.1.2 Give ONE reason why this experiment may be considered unreliable. (1)

3.1.3 Identify any ONE way in which the learners could have increased validity in this investigation. (1)

3.1.4 Draw a bar graph to show the relationship between temperature and the growth of bacteria. (6)

[9]

TOTAL SECTION B: 18

GRAND TOTAL: 30

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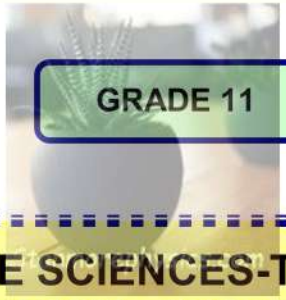

GRADE 11

LIFE SCIENCES-TERM 1
INFORMAL ASSESSMENT
TOPIC TEST: BIODIVERSITY IN PLANTS

MARKS: 30

TIME: 30 minutes

N.B. This question paper consists of 6 pages including this page.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

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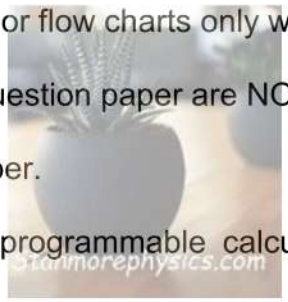


SECTION A

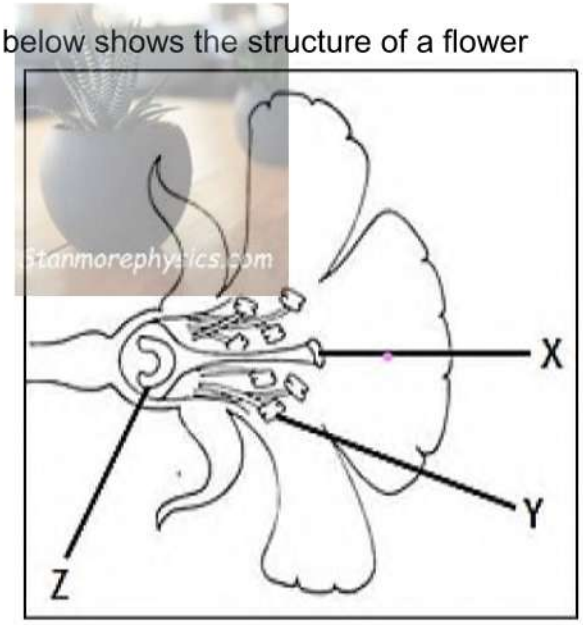
QUESTION 1

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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 The dominant generation in pteridophytes is...

A gametophyte
B spermatophyte
C sporophyte
D seeds

1.1.2 The diagram below shows the structure of a flower



Which ONE of the following matches the parts where POLLINATION and FERTILISATION takes place respectively

	POLLINATION	FERTILISATION
A	X	Y
B	Y	Z
C	Z	Y
D	X	Z

(2x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 A diagram showing the evolutionary relationship between organisms

1.2.2 The protective cap that covers the sporangia in mosses

1.2.3 The transfer of pollen grains from the anther to the stigma of another plant's flower

1.2.4 Type of reproduction involving the fusion of gametes

(4x 1) **(4)**

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 1.3.2) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Naked seeds	A: Angiosperms B: Gymnosperms
1.3.2	Root like structures in moss plants	A: Thallus B: Rhizoid

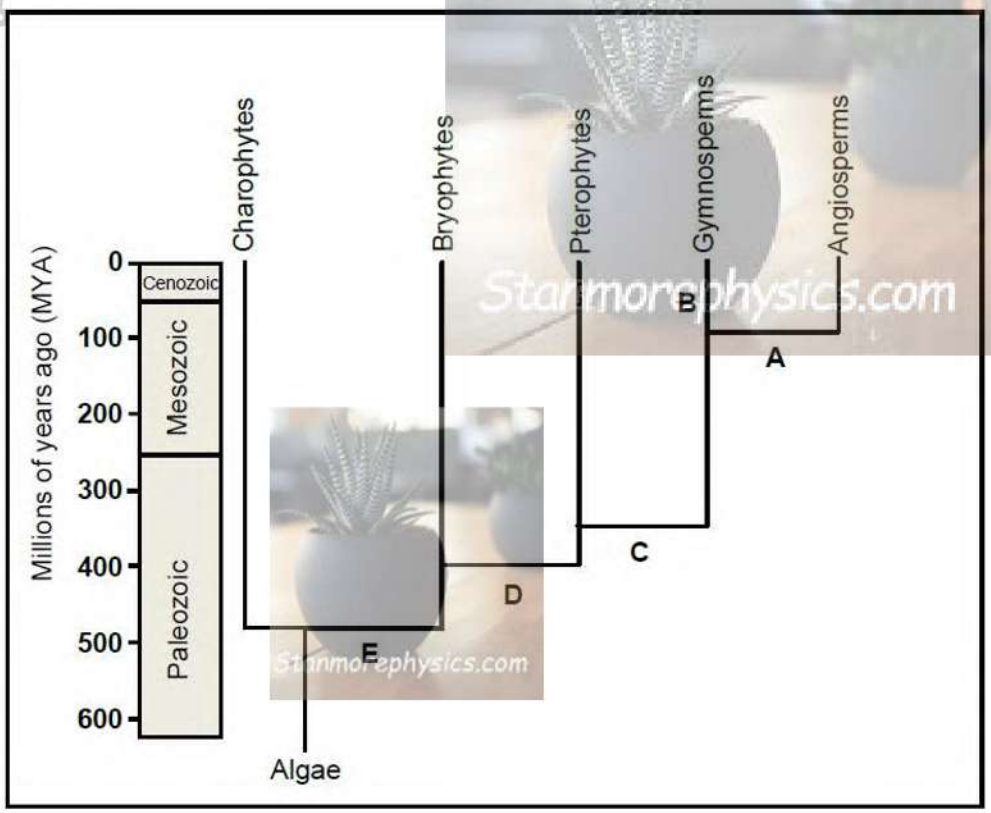
(2 x 2) **(4)**

TOTAL SECTION A: 12

SECTION B

QUESTION 2

2.1 The diagram below shows a phylogenetic tree of some plants.



2.1.1 State…

(a) the kingdom to which the above organisms belong. (1)

(b) ONE plant division that was found on earth during the Palaeozoic era. (1)

(c) the phylum to which liverworts, hornworts and mosses belong. (1)

2.1.2 How many million years ago did seed plants arise on earth? (1)

2.1.3 Explain TWO adaptations of gymnosperms and angiosperms for terrestrial life. (4)

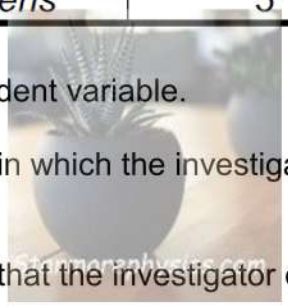
[8]

QUESTION 3

3.1 A Grade 11 learner wanted to investigate the preferences of two pollinating agents, hummingbirds and hawk moths, to visit two different types of plant species, *A. Formosa* and *A. pubescens*. The total number of visits to the flowers of these plant species was recorded over a period of 24 hours.

The results are shown in the table below.

Plant species	**Number of visits to the flowers by pollinators**	
	Hummingbirds	Hawkmoths
A. formosa	81	2
A. pubescens	5	115



3.1.1 State the dependent variable. (1)

3.1.2 State ONE way in which the investigator ensured that the investigation was valid. (1)

3.1.3 State ONE way that the investigator could increase the validity of the Investigation. (1)

3.1.4 What can the researcher conclude from the results? (2)

3.1.5 Tabulate ONE difference between wind and bird pollinated flowers (3)

3.2 Explain why seedless vascular plants are able to grow taller than non-vascular plants (2)

[10]

TOTAL SECTION B: 18

GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
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GRADE 11

LIFE SCIENCES- TERM 1
INFORMAL ASSESSMENT
TOPIC TEST: BIODIVERSITY OF ANIMALS

MARKS: 30

TIME: 30 minutes

N.B. This question paper consists of 6 pages including this page

INSTRUCTIONS AND INFORMATION

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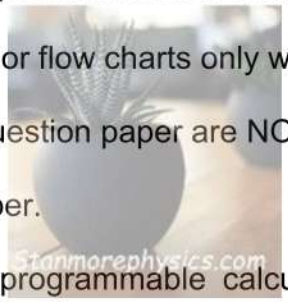


SECTION A

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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 Sponges can best be described as …

A triploblastic
B slow moving
C filter feeders
D coelomate

1.1.2 Study the following statements relating to a gut:

(i) There is no mixing of digested, undigested and partially digested food
(ii) Digestion can take place continuously i.e. even when ingestion or egestion is taking place
(iii) Gut is greatly efficient as food moves in two directions
(iv) Different regions of the gut become specialized

Which ONE of the following combinations describes the advantages of a through gut?

A (i) and (ii) only
B (i), (ii) and (iv) only
C (i) and (iv) only
D (ii) and (iii) only

(2X2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 Embryonic layer that gives rise to the digestive tract and associated organs

1.2.2 Type of blood system that has blood vessels and haemocoels

1.2.3 Removal of solid waste from the gut

1.2.4 Organisms that remain attached to the substrate for most of their lives

(4X1) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **AONLY**,**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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Cephalisation is found in	A: Platyhelminthes B: Cnidaria
1.3.2	Body cavity in multicellular organisms	A: Acoelomate B: Coelomate

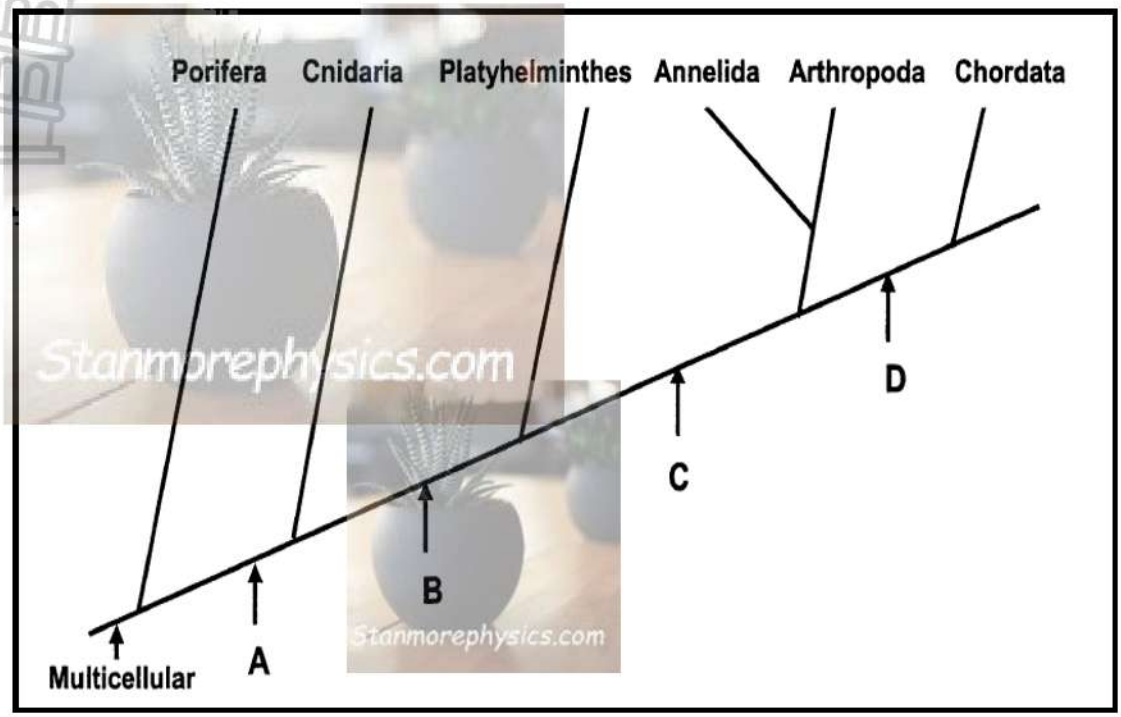
(2 x 2) **(4)**

TOTAL SECTION A: 12

SECTION B

QUESTION 2

2.1 The diagram below shows the relationships between animal phyla.



2.1.1 Identify the diagram above (1)

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

2.1.3 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)

2.1.4 Explain TWO importance of coelom in certain organism (4)
[9]

QUESTION 3

3.1 A female locust uses her abdomen to make a hole in sandy soil in which to lay her eggs. She then secretes a sticky substance onto the eggs which hardens in a short while. The sticky substance and the eggs together form an egg pod.

A grade 11 learner wanted to investigate the influence of the amount of water in the soil on the number of egg pods formed by the female locusts.

The following procedure was followed:

- The learner put 25 male and 25 female locusts in a large cage
- She then put 9 troughs of sandy soil in the cage, each containing different amounts of water
- The number of eggs pods that formed was counted

The results of the investigation are shown in the table below.

Amount of water (ml) added to 100g of sandy soil	Number of egg pods formed
0	0
2	1
4	2
6	12
8	19
10	20
12	24
14	18
16	12

3.1.1 State the *dependent variable* for the above investigation. (1)

3.1.2 State THREE factors that should be kept constant in this investigation. (3)

3.1.3 What can the investigator conclude from the results? (2)

(6)

3.2 Explain the role of earthworms and insects in agriculture and ecosystems. **(3)**

[9]

TOTAL SECTION B: 18

GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES- TERM 2

INFORMAL ASSESSMENT

PHOTOSYNTHESIS

MARKS: 30

TIME: 30 minutes

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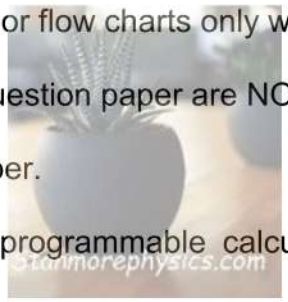


SECTION A

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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 The stomata in the leaves allows … to enter for photosynthesis.

A carbon dioxide
B water
C oxygen
D ATP

1.1.2 The list below represents the steps in a starch tests in leaves

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

(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 The green, light –trapping pigment in photosynthesis found in plant leaves

1.2.2 Stacks of thylakoids where light phase occurs

1.2.3 The form of carbohydrates in which energy is stored in most plants

1.2.4 The organic molecules that acts as catalysts during photosynthesis

(4 X 1) **(4)**

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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	The site where dark phase occurs	A: Stroma B: Cytoplasm
1.3.2	Factors affecting the rate of photosynthesis	A: Light intensity B: Amount of CO_2

(2 x 2) **(4)**

TOTAL SECTION A: 12

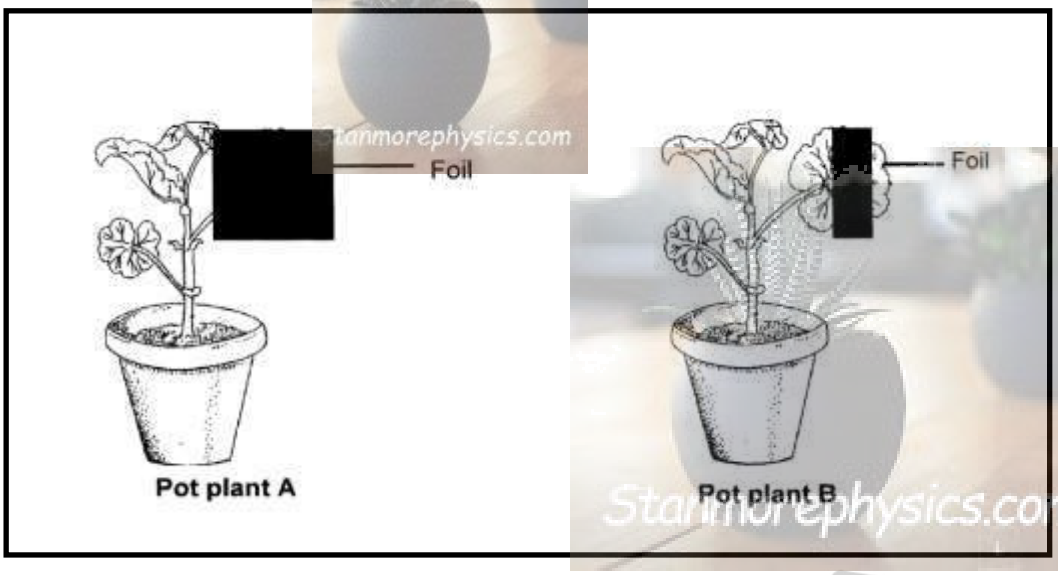
SECTION B

QUESTION 2

2.1 A group of Grade 11 learners performed an investigation to determine whether light is essential for photosynthesis

The procedure was as follows:

- Two pot plants were used.
- Both pot plants were left in the dark for 24 hours before they were used.
- Pot plant A, the whole leaf was covered with a foil.
- Pot plant B, section of a leaf was covered with a foil.
- Both pot plants were left in a sunny area.
- After some time, a leaf from each pot plant was tested for the presence of starch
- The diagrams below shows how the investigation was set up



2.1.1 Identify the dependent variable of this investigation (1)

2.1.2 State THREE other factors that must be kept constant during the investigation except those mentioned above. (3)

2.1.3 State TWO ways that the scientists can increase reliability of results of the investigation above (2)

2.1.4 State the expected colour change on the part of a leaf exposed to light. (1)

2.1.5 State a conclusion regarding the results in pot plant B. (2)

[9]

QUESTION 3

3.1 The table below shows the effect of temperature on the rate of photosynthesis in a species of a plant.

Temperature (°C)	Rate of photosynthesis (arbitrary units)
15	14
20	17
25	20
30	15
35	10

3.1.1 Draw a line graph to represent the data in the table above. (6)

3.1.2 Explain why the rate of photosynthesis is low at a temperature of 15°C. (1)

3.1.3 Explain ONE reason why an increase in carbon dioxide concentration may not necessarily lead to an increase in the process of photosynthesis. (2)

[9]

TOTAL SECTION B: 18

GRAND TOTAL: 30

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GRADE 11

LIFE SCIENCES- TERM 2
INFORMAL ASSESSMENT
TOPIC TEST: CELLULAR RESPIRATION

MARKS: 30

TIME: 30 minutes

N.B. This question paper consists of 5 pages including this page.

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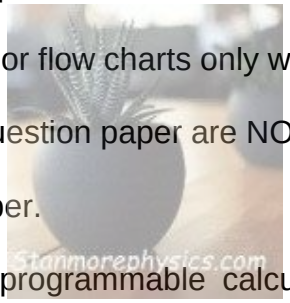


SECTION A

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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 The main organelle that is involved in cellular respiration is the…

A mitochondrion
B nucleus
C golgi-apparatus
D endoplasmic reticulum

1.1.2 The gas released during the Krebs cycle is…

A oxygen
B carbon dioxide
C carbon monoxide
D hydrogen

(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 Folded structures found on the inner membrane of the mitochondrion

1.2.2 The anaerobic respiration that occurs in yeast cells

1.2.3 The stage of cellular respiration in which glucose is converted to pyruvic acid

1.2.4 The stage during aerobic respiration where water is released as a waste product

(4 x 1) **(4)**

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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Role of anaerobic respiration in industry	A: Bread- making B: Wine - making
1.3.2	A product of cellular respiration which supplies energy in cells	A: ATP B: Oxygen

(2 x 2) **(4)**

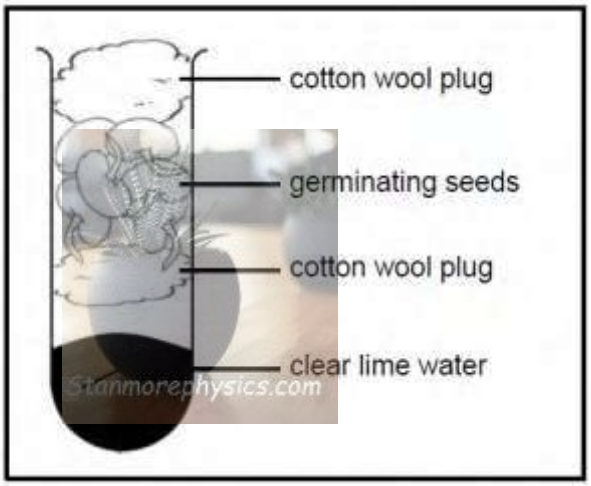
TOTAL SECTION A: 12

SECTION B

QUESTION 2

2.1 The apparatus below was used to carry out an experiment on aerobic respiration. The experiment was set up as follows:

- 20 seeds of the same kind were used
- The seeds and the apparatus were sterilized before the investigation
- Once set up, the apparatus was placed in a dark cupboard at 35°C
- A control was also set up



2.1.1 State the aim of the experiment. (2)

2.1.2 What is the significance of sterilizing the seeds before they are used? (1)

2.1.3 Give ONE controlled variable in this investigation. (1)

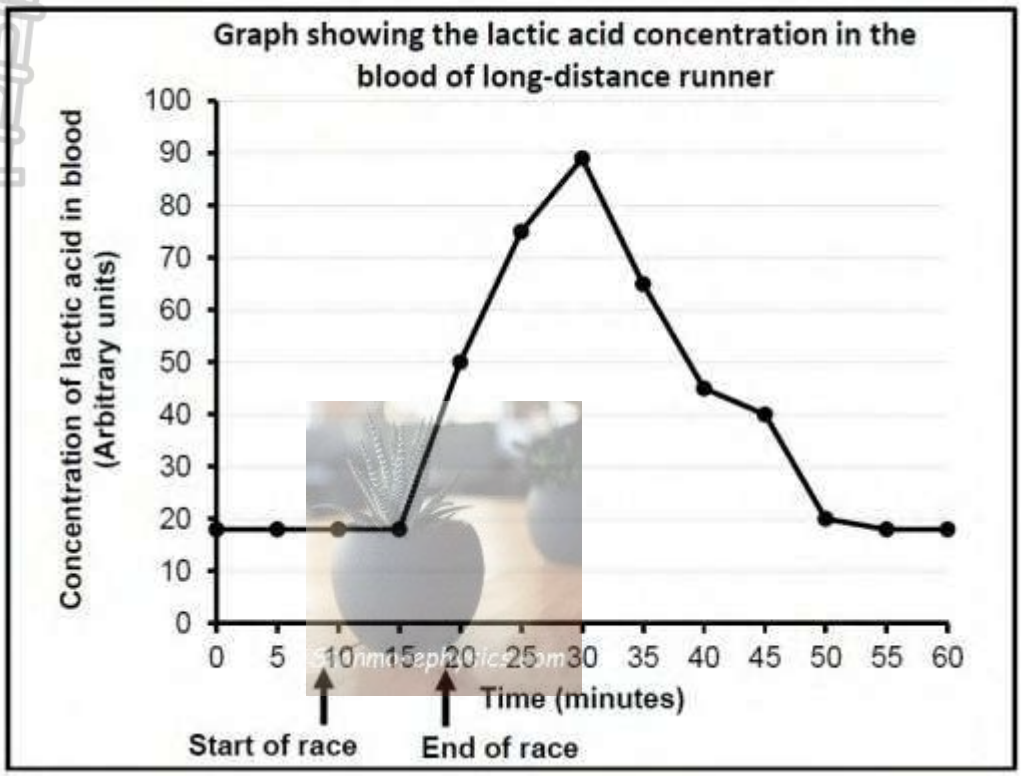
2.1.4 Explain how you would set up a control for this investigation. (3)

2.1.5 Explain why germinating seeds were used in this investigation (2)

[9]

QUESTION 3

3.1 The graph below represents the lactic acid levels in the blood of a long distance runner.



3.1.1 Name the:

(a) Type of respiration that takes place in the cells of a long-distance runner 15 minutes after the race has started (1)

(b) Site where lactic acid accumulates during this process (1)

3.1.2 According to the graph, what is the acceptable level of lactic acid in the blood? (1)

3.1.3 For how long did the lactic acid concentration continue to increase after the end of the race? (2)

3.1.4 Explain why there is an increase in the lactic acid concentration in the blood (4)

[9]

TOTAL SECTION B: 18

GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES- TERM 2

INFORMAL ASSESSMENT

TOPIC TEST: ANIMAL NUTRITION

MARKS: 50

TIME: 50 minutes

N.B. This question paper consists of 5 pages including this page.

INSTRUCTIONS AND INFORMATION

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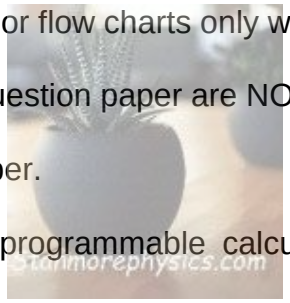
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.



SECTION A

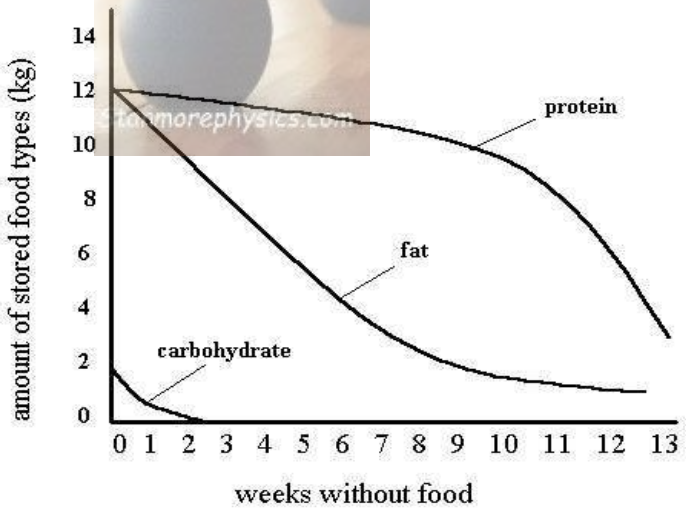
QUESTION 1

1.1 Various options are 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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 Which ONE of the following is not part of the alimentary canal?

A Stomach
B Colon
C Pancreas
D Appendix

1.1.2 The graph below shows the effect of starvation on stored food types.



The sequence in which each of the three types of stored food is used as a source of energy is…

A carbohydrates; proteins; fats.
B fats; proteins; carbohydrates.
C proteins; fats; carbohydrates.
D carbohydrates; fats; proteins.

(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 The finger-like structures that absorb digested food nutrients

1.2.2 The structure that prevents food from entering the trachea during swallowing

1.2.3 The process by which food is moved along in the alimentary canal of human

1.2.4 The chewing process that breaks food molecules up mechanically

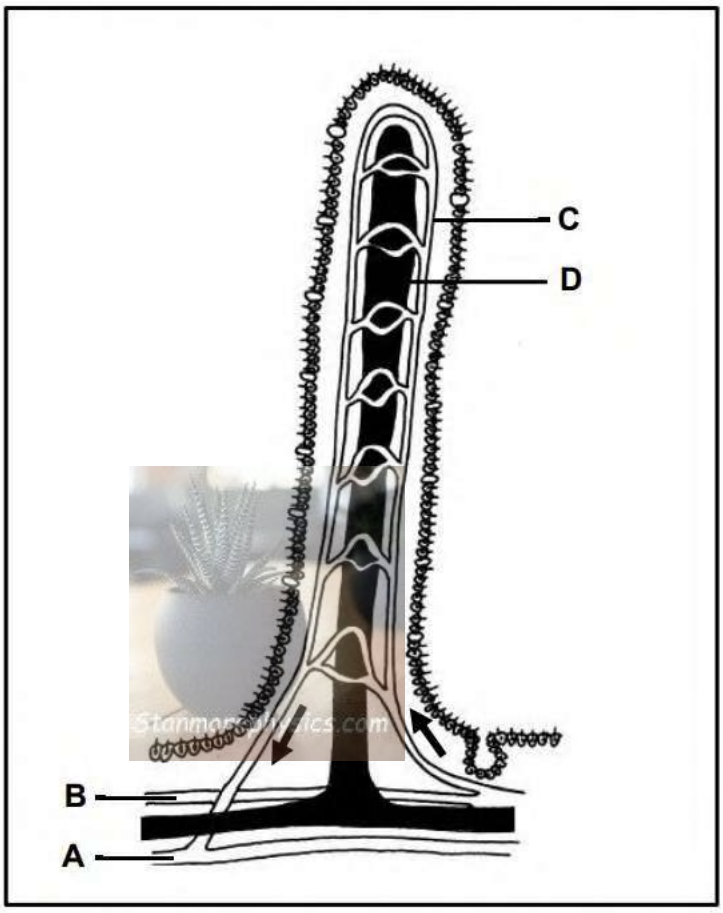
(1 x 4) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **AONLY**,**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 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.3.1	Substances that need to be digested before absorption	A: Amino acids B: Glucose
1.3.2	Emulsification occurs	A: Small intestine B: Large intestine
1.3.3	Transport of digested nutrients from the small intestine to the liver	A: Renal vein B: Hepatic vein

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

1.4 The diagram below represents a structure found in the small intestine of a human.



1.4. 1.4.1 Identify the structure shown in the diagram above (1)

1.4.2 Name the labelled part which is responsible for the absorption of:

(a) Fatty acids and glycerol (1) (1)

(b) Glucose and amino acids (1) (1)

1.4.3 Which ONE of the blood vessels (A or B) transports the highest amount of digested nutrients? (1)

1.4.4 State TWO processes responsible for the absorption of digested nutrients. (2)

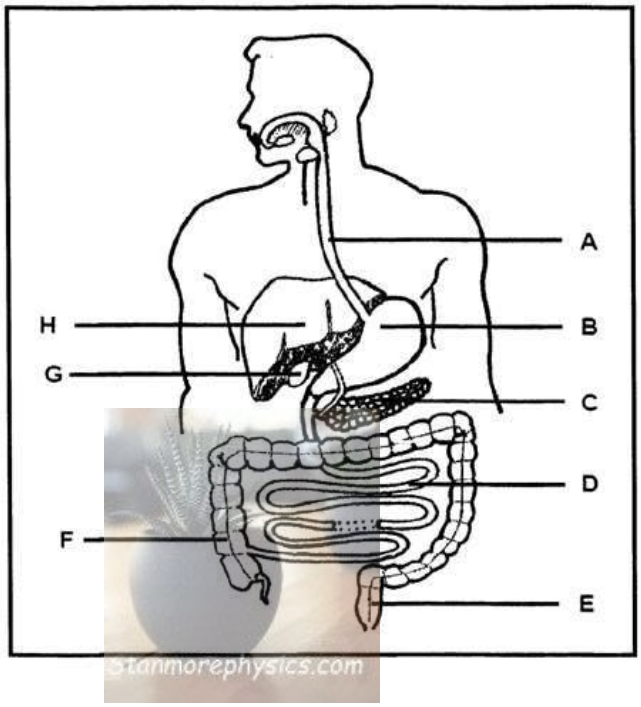
(6)

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2. Study the diagram below showing a human digestive system.



2.1 Give the **LETTER** of a part of the digestive system

(a) Contains enzymes (1)

(b) Stores bile (1)

(c) Absorbs most of the nutrients (1)

2.2 Explain the consequences to the digestive system if part **B** is severely damaged and cannot perform its function (2)

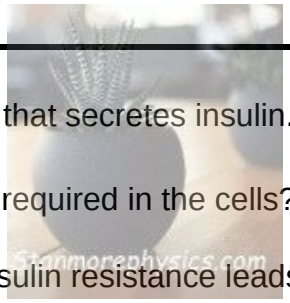
2.3 Explain TWO structural adaptations of the villus for its function (4)

[9]

QUESTION 3

3 Read the following extract.

> Insulin is a hormone that allows cells to absorb and use glucose. It regulates the amount of glucose that circulates in the blood stream. It also instructs the liver to store excess glucose.
>
> In people with insulin resistance, the cells are unable to use insulin effectively. When the cells cannot absorb glucose, levels of glucose build up in the blood. Therefore, the pancreas makes extra insulin to overcome the low rate of glucose absorption and diabetes is less likely to develop. This means that the blood glucose levels will stay within the healthy range. Over time, the pancreas's ability to release insulin begins to decrease which leads to the development of type 2 diabetes.



3.1 Name the gland that secretes insulin. (1)

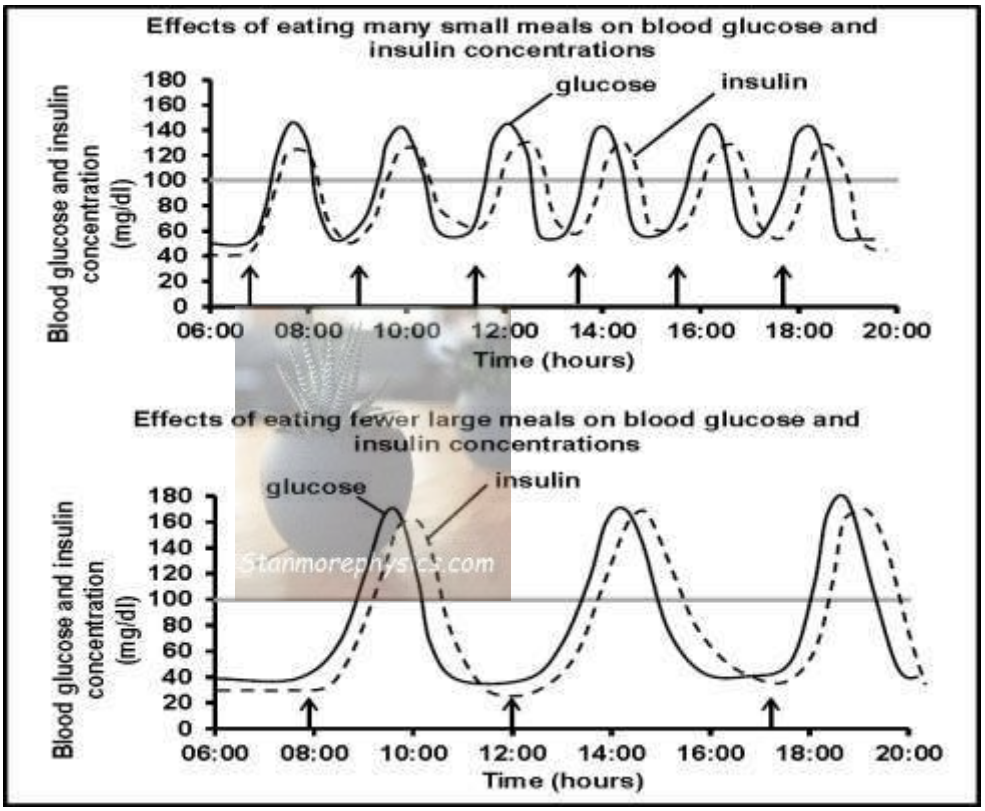
3.2 Why is glucose required in the cells? (1)

3.3 Describe how insulin resistance leads to type 2 diabetes. (3)

3.4 Explain how normal glucose levels are maintained when a healthy non-diabetic person consumes food containing a high percentage of glucose. (4)

(9)

3.5 The graphs below show the effects of eating many small meals and eating fewer large meals on blood glucose and insulin concentrations in a normal person. The arrows on the graphs below indicate when meals were eaten. The normal blood glucose concentration is 100 mg/dl.



3.5.1 State what happens to the blood glucose concentration immediately after a meal is eaten. (1)

3.5.2 State the normal blood glucose level as shown by the graph above. (2)

3.5.3 Use the information in the graphs. Tabulate TWO ways in which eating fewer large meals and eating many small meals affect the blood insulin levels differently. (5)

3.5.4 Explain why eating many small meals per day is better for a diabetic person than eating fewer large meals a day. (4)

(12)

TOTAL SECTION B: 30

GRAND TOTAL: 50

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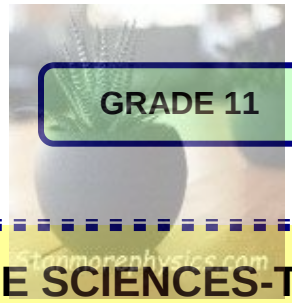

GRADE 11

LIFE SCIENCES-TERM 3

INFORMAL ASSESSMENT

TOPIC TEST: GASEOUS EXCHANGE

MARKS: 30

TIME: 30 minutes

N.B. This question paper consists of 5 pages including this page.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

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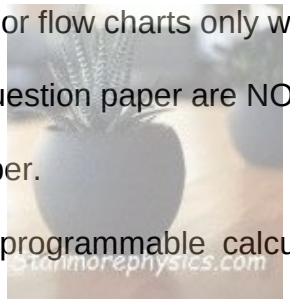


SECTION A

QUESTION 1

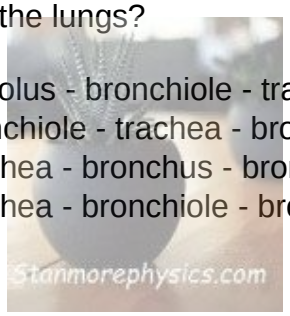
1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.2) in your ANSWER BOOK, for example 1.1.4 D.

1.1.1 The blood tissue that transports oxygen is/are the …

A white blood cells
B red blood cells
C platelets
D haemoglobin

1.1.2 Which ONE of the following pathways correctly represents air movement in the lungs?

A Alveolus - bronchiole - trachea - bronchus
B Bronchiole - trachea - bronchus - alveolus
C Trachea - bronchus - bronchiole - alveolus
D Trachea - bronchiole - bronchus - alveolus



(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 A protective membrane surrounding the lungs

1.2.2 A cartilaginous, leaf-shaped structure which covers the opening of the trachea

1.2.3 A part of the brain that controls the breathing rate

1.2.4 The tissue making up the rings that surround the trachea

(4 x 1) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **AONLY**,**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 1.3.2) in the ANSWER BOOK.

COLUMN I			**COLUMN II**
1.3.1	Breathing muscles	A B	Intercostal muscles Diaphragm muscles
1.3.2	C-shaped cartilaginous rings	A B	Oesophagus Bronchioles

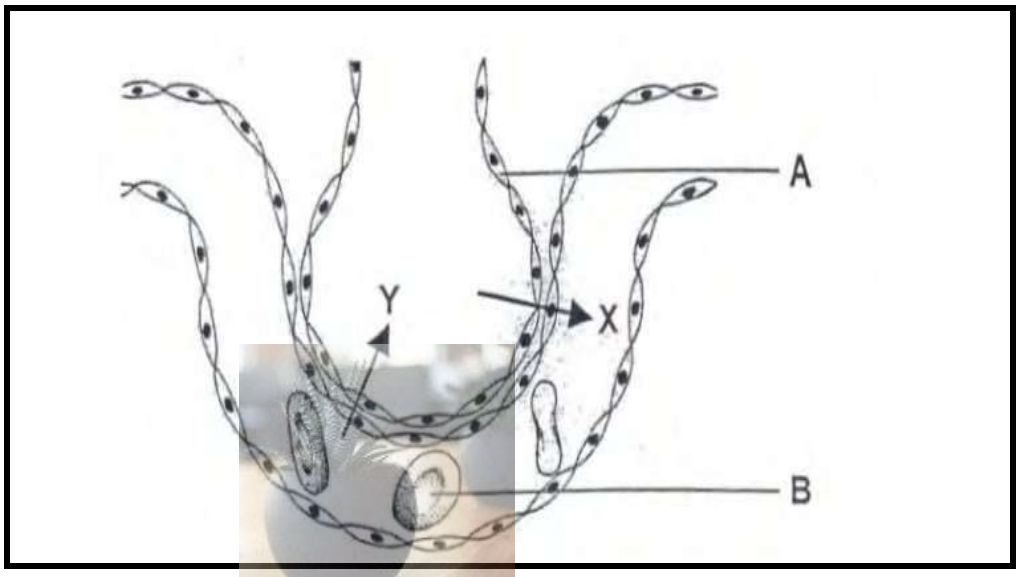
(2 x 2) **(4)**

TOTAL SECTION A: 12

SECTION B

QUESTION 2

2. The diagram represents a section of the internal structure of a part of the human lung.



2.1 Identify the structure labelled **B**. (1)

2.2 Name the gas at **X** and the gas at **Y**. (2)

2.3 State **TWO** forms in which gas **X** is transported in the body. (2)

2.4 Explain **TWO** ways in which structure **A** is adapted for its function.

(2 x2) (4)

[9]

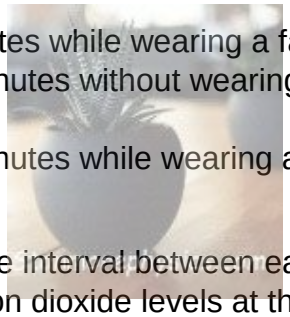
QUESTION 3

3. Wearing a face mask is recommended to reduce the spread of the corona virus. There are some concerns about the efficiency of breathing when wearing a face mask.

Scientists investigated the effect of wearing face masks on the carbon dioxide levels in blood.

They:

- Obtained permission from 150 healthy volunteers, aged 30, to participate in the investigation
- Applied a sensor to the participants' skin to measure the carbon dioxide levels in the blood
- Asked the participants to:
  - Sit still for 10 minutes without wearing a face mask
  - Sit still for 10 minutes while wearing a face mask
  - Exercise for 10 minutes without wearing a face mask
  - Exercise for 10 minutes while wearing a face mask



- Allowed a 15-minute interval between each 10-minute phase
- Recorded the carbon dioxide levels at the end of each 10-minute phase
- Ensured that the face mask covered the nose and mouth

3.1 Identify the:

(a) Independent variable (1)

(b) Dependent variable (1)

3.2 Give ONE reason why the results at the end of this investigation may be considered reliable. (1)

3.3 Give a reason why the carbon dioxide levels were measured while participants were sitting still. (1)

3.4 Describe the *homeostatic control* of carbon dioxide when it is high in blood. (5)

[9]

TOTAL SECTION B: 18

GRAND TOTAL: 30

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GRADE 11

LIFE SCIENCES-TERM 3

INFORMAL ASSESSMENT

TOPIC TEST: EXCRETION IN HUMANS

MARKS: 50

TIME: 50 Minutes

N.B. This question paper consists of 7 pages including this page.

INSTRUCTIONS AND INFORMATION

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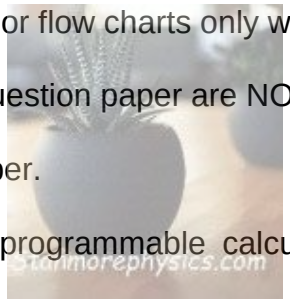


SECTION A

QUESTION 1

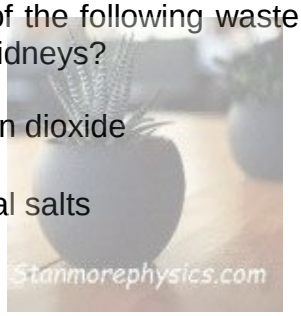
1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 What is the likely pH of urine produced when there is an excess of hydrogen ions in the blood?

A 9
B 5
C 7
D 8

1.1.2 Which ONE of the following waste products is excreted by the skin, lungs, and kidneys?

A Carbon dioxide
B Urea
C Mineral salts
D Water



(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 The process by which the body eliminates metabolic waste products

1.2.2 The region of the kidney where renal pyramids are found

1.2.3 The tubes transport urine from the kidney to the urinary bladder

1.2.4 The regulation of the water content in the body fluid by the kidneys

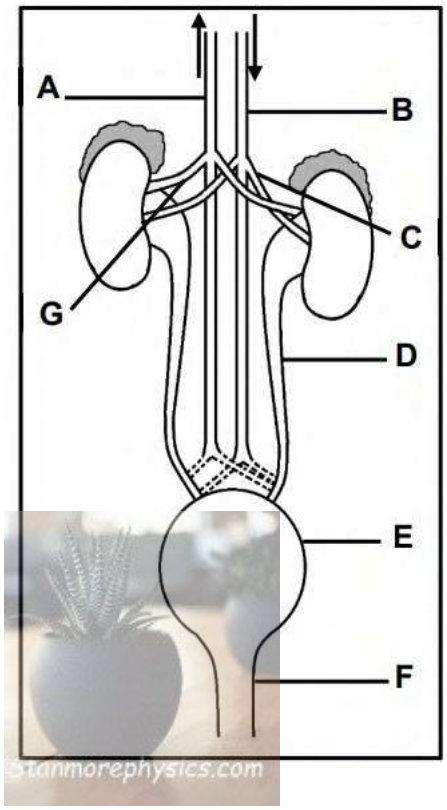
(4 x 1) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **AONLY**,**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 1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	A hormone that controls the salt content in a human body	A B	ADH Aldosterone
1.3.2	The structure which protects the kidneys	A B	Bowman's capsule Renal capsule
1.3.3	Hormone involved in the reabsorption of water	A: B:	ADH Glucagon

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

1.4 The diagram below represents the human urinary system.



1.4.1 Label parts:

(a) G (1)

(b) F (1)

1.4.2 Name the main blood vessel that:

(a) Transports deoxygenated blood back to the heart (1)

(b) Is under highest blood pressure (1)

1.4.3 Give the LETTER and NAME of the tube that transports urine from the kidney to part E (2)

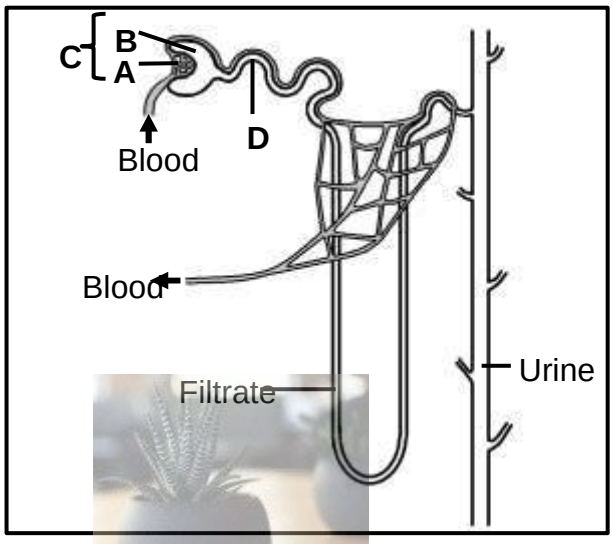
(6)

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2 The diagram below represents the structure of a nephron.



2.1 Identify the parts labelled A (1)

2.2 Name the process that takes place at **C**. (1)

2.3 The concentration of various substances in the blood, filtrate and urine are given below.

Location	**Urea g/100 cm³**	**Glucose g/100 cm³**	**Proteins g/100 cm³**	**Salts g/100 cm³**
Blood at part **A**	0,03	0,10	8,00	0,72
Filtrate	003	0,10	0,00	0,72
Urine	2,00	0,00	0,00	1,50

Which of the substances shown in the table …

(a) did not move from the part labelled **A** to **B**? (1)

(b) is present in the filtrate, but is completely reabsorbed at the part **D**? (1)

(c) reaches the highest concentration in the urine? (1)

2.4 Explain TWO structural adaptations of part the labelled **D** (4)

(9)

2.5 ADH plays a role in osmoregulation in the human body.

2.5.1 Name the gland that secretes ADH (1)

2.5.2 Describe osmoregulation on a cold day (3)

2.5.3 A person with a medical condition that causes the renal tubules to become resistant to the effects of ADH, always produces large volumes of urine.

Explain why the ADH levels in the blood will always be higher than normal for this person. (3)

(7)

[16]

QUESTION 3

Read the following passage and answer the questions that follow.

Hypernatremia is the medical term having too much sodium in the blood. Sodium is an important nutrient for proper functioning of the body. Most of the body's sodium is found in the blood. Hypernatremia can occur when there is too much water loss or too much sodium gained in the body. The result is too little body water for the amount of total body sodium

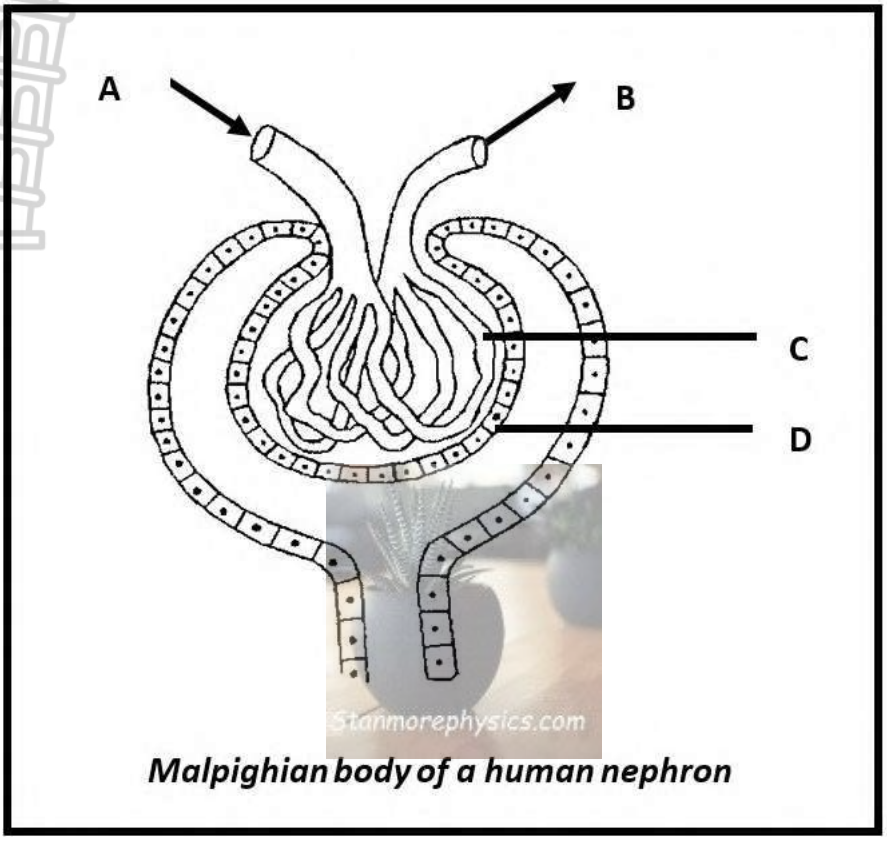
3.1 State TWO possible reasons for a person developing hypernatremia based on the extract above (2)

3.2 Explain why sodium ions are actively pumped out at certain regions of the loop of Henle into the medulla region of the kidney (3)

3.3 Describe how constant sodium concentration in the blood of a healthy human is maintained, when the level of sodium is decreased below the normal level (4)

(9)

3.4 Study the diagram below.



Malpighian body of a human nephron

3.4.1 In which region of the kidney would you find this structure? (1)

3.4.2 Name the process of urine formation that occurs in this structure. (1)

3.4.3 Identify part C. (1)

3.4.4 Part A is wider than part B. State why this important. (1)

3.4.5 Name the type of specialised cells found in part D. (1)

(5)

[14]

TOTAL SECTION B: 30

GRAND TOTAL: 50

KWAZULU-NATAL PROVINCE
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NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES
INFORMAL ASSESSMENT
TOPIC TEST: POPULATION ECOLOGY

MARKS: 30

TIME: 30 Minutes

N.B. This question paper consists of 6 pages including this page.

INSTRUCTIONS AND INFORMATION

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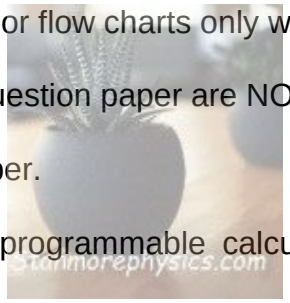


SECTION A

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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 The two factors that contribute to an INCREASE in population size.

A Natality and emigration
B Immigration and natality
C Emigration and immigration
D Mortality and natality

1.1.2 Which statement best describes the relationship between a parasite and its host?

A The host is harmed while the parasite benefits
B The parasite is harmed while the host benefits
C Both host and parasite benefit
D The parasite benefit and the host is not harmed

(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 Temporary movement of organisms into or out of an area due to seasonal changes in resources

1.2.2 The type of competition between members of different species

1.2.3 Method of determination of population size by counting the individuals in a representative sample area

1.2.4 Co-existence of different species living in the same habitat by using resources differently

(4x 1) **(4)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **AONLYB 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 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	A group of organisms of the same species occupying the same habitat at the same time.	A: Population B: Community
1.3.2	Doubling of the population size at different intervals.	A: Geometric growth B: Natality

(2 x 2) **(4)**

TOTAL SECTION A: 12

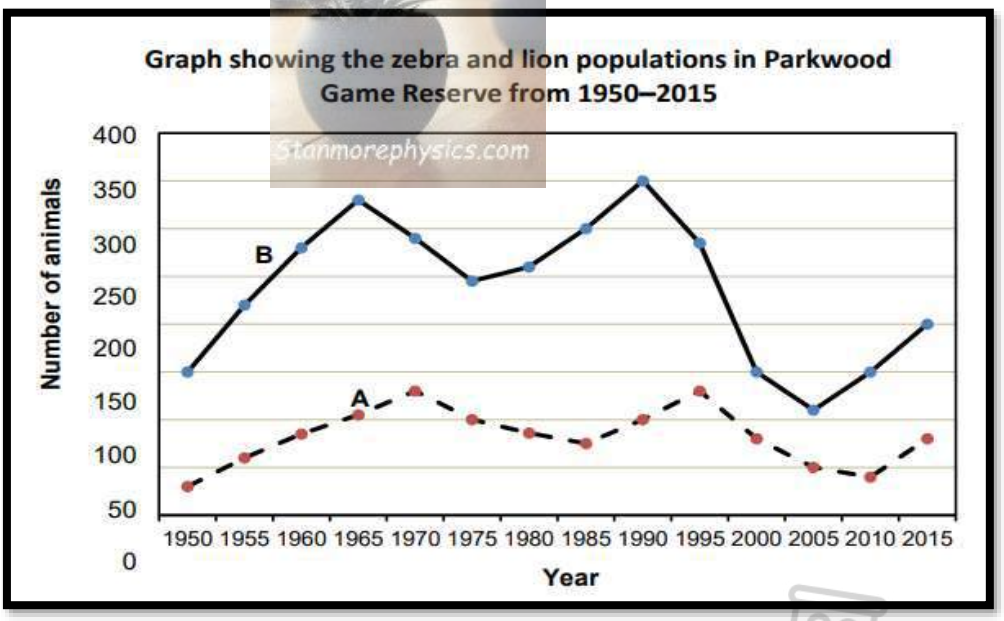
SECTION B

QUESTION 2

2. Read the extract below and study the graph showing the zebra and lion population in Parkwood Game Reserve over a period of 65 years.

The most important reason that lions are able to find enough food is that they usually do their hunting cooperatively. Normally, several lions circle around the herd they are attacking, slowly driving their victims towards the lionesses hiding in the tall grass. These lionesses then attack their prey from the sides or the rear. Lions are not fast predators. By working in groups they are able to tackle prey that would otherwise prove to be too fast for them. Lions also gain another advantage through group hunting when they kill an animal too large for one lion to tackle on its own. Zebras are one of the major prey of lions.

The graph below shows the number of zebras and lions in Parkwood Game Reserve over a period of 65 years.



2.1 Give TWO reasons mentioned in the extract why the social structure (hunting together) of lion prides makes them successful hunters. (2)

2.2 What type of relationship is shown between lions and zebras in the graph above? (1)

2.3 Which line (**A** or **B**) represents the lion population? (1)

2.4 Give TWO reasons for your answer to QUESTION 2.3. (2)

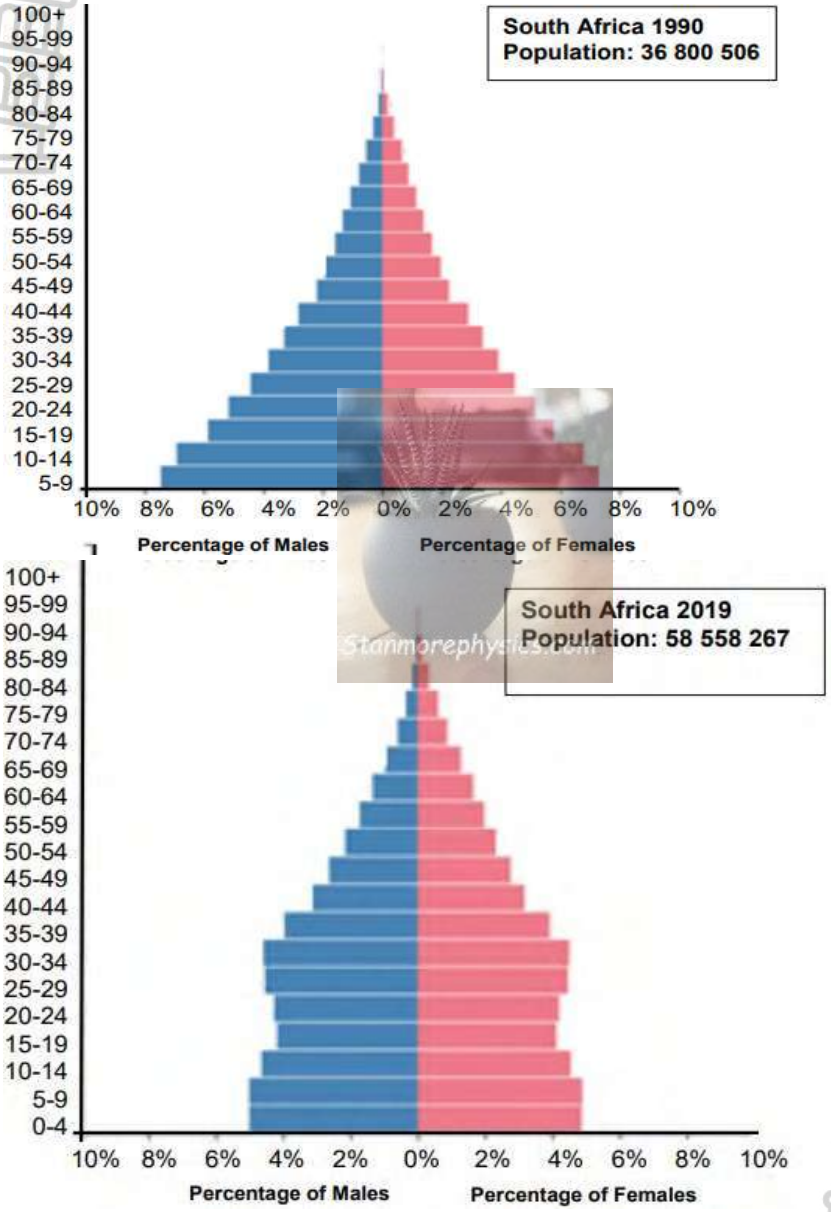
2.5 Zebra live in herds. Explain ONE reason why living in herds is an advantage. (2)

2.6 Explain why the chances of the zebra and lion population reaching carrying capacity are limited. (3)

[11]

QUESTION 3

The population pyramids below show the change in the South African population from 1990 to 2019. We can see that South Africa is moving from a developing country in 1990 to a more developed country in 2019. The data was collected by means of a census.



3.1 Define the term census. (1)

3.2 Which group(males or females) have a higher life expectancy? (1)

3.3 Which pyramid (1990 or 2019) shows:

(a) A rapidly increasing population (1)

(b) Low life expectancy (1)

3.4 Explain why is it important for government to have the information shown in a population pyramid? (3)

(7)

TOTAL SECTION B: 18

GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES- TERM 3
INFORMAL ASSESSMENT
TOPIC TEST: HUMAN IMPACT

MARKS: 50

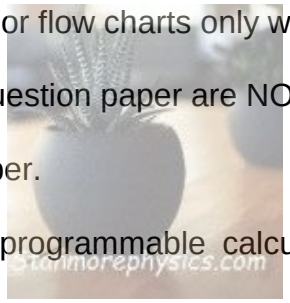
TIME: 60 Minutes

N.B. This question paper consists of 8 pages including this page.

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. Make 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 must 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 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 1.1.2) in your ANSWER BOOK, for example 1.1.3 D.

1.1.1 Which of the following is NOT an effective method of managing South Africa's landfill sites?

A Recycling of paper and cardboard
B Build new landfill sites closer to the city
C Encourage re-use of cold drink bottles
D Reduce the amount of plastic produced

1.1.2 Below is a list of factors that affect the waterways in South Africa.

(vi) Thermal pollution
(vii) Sewerage spills acid
(viii) Mine drainage
(ix) Over use of inorganic fertilisers

Which ONE of following combinations reduce the oxygen content of a river?

A (i) and (iv) only
B (i) only
C (i), (ii) and (iv) only
D (i), (ii), (iii) and (iv)

(2 x 2) **(4)**

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 1.2.4) in the ANSWER BOOK.

1.2.1 A layer in the stratosphere that filters out harmful UV light from the sun

1.2.2 Water-bearing rock from which water is obtained using bore-holes

1.2.3 The use of living organisms to regulate the numbers of a pest species

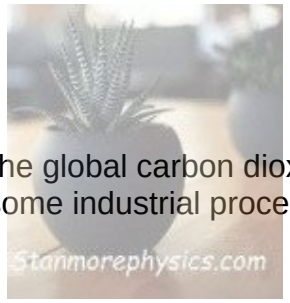
1.2.4 A plant species introduced into an environment from another country

(4x 1) **(4)**

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 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Greenhouse gas	A: Methane B: Nitrogen
1.3.2	The amount of carbon dioxide released by a country/person into the atmosphere	A: Global warming B: Carbon footprint
1.3.3	Climate change in SA	A: Desertification B: More frequent and severe veld fires

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



1.4 The table below shows the global carbon dioxide emissions from fossil fuel combustion and some industrial processes in 2008.

COUNTRY	CARBON DIOXIDE EMISSIONS (%)
China	23
European Union	13
USA	19
India and Russian Federation	12
Other	33

[Adapted from www.environmentalprotectionagency.gov/climatechange]

Draw a pie chart to represent the data in the table. (6)

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2. Read the extract below.

FOOD WASTAGE AROUND THE WORLD

Every year, a third of all food for human consumption, about 1,3 billion tons, is wasted in the world. The UN Food and Agriculture Organisation (FAO) estimated that the carbon footprint of wasted food was equivalent to 3, 3 billion tons of carbon dioxide a year. The FAO suggests that more efficient use of food could contribute to global efforts to cut greenhouse gases and thus limit global warming. In the industrial world, much of the waste comes from consumers buying too much and throwing away what they do not eat. In developing countries, it is mainly the result of inefficient farming and a lack of proper storage facilities.

2.1 Define the term food security? (2)

2.2 Explain how wastage of food contributes to loss of energy and global warming. (3)

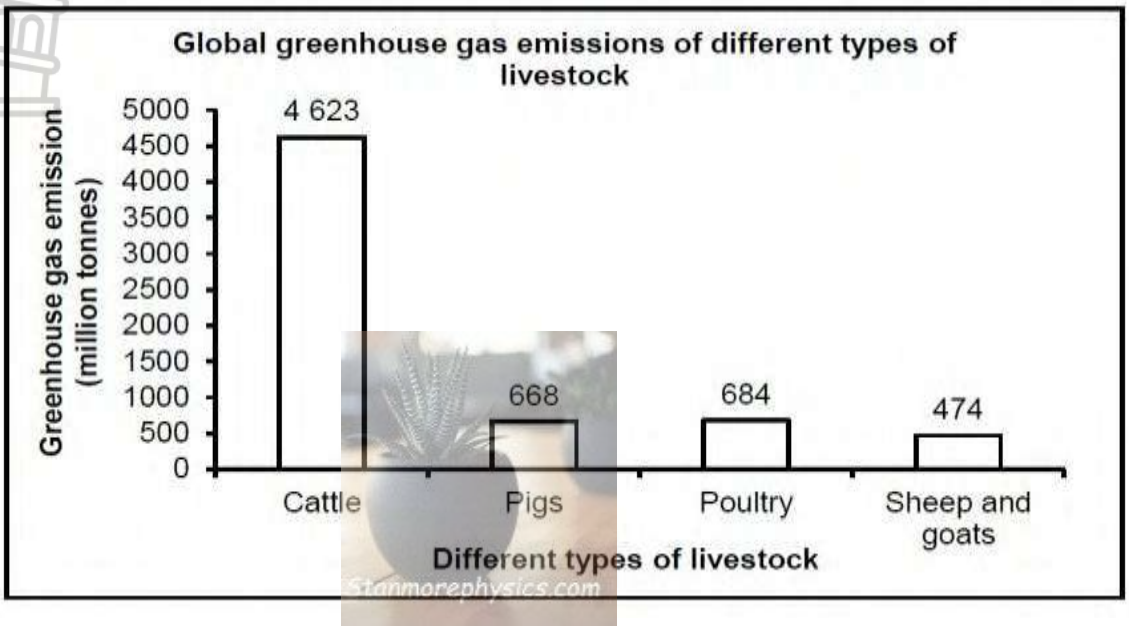
2.3 State TWO effects of global warming. (2)

2.4 Use the information in the passage to suggest TWO ways in which food wastage could be reduced. (2)

(9)

2.5. Livestock farming contributes to approximately 14,6% of all global greenhouse gas emissions (release into atmosphere).

The graph below shows the global greenhouse gas emissions of different types of livestock.



2.5 2.5.1 Name the livestock farming that contributes the least to greenhouse gas emissions. (1)

2.5.2 Give ONE advantage of greenhouse gases. (1)

2.5.3 Calculate how much more greenhouse gases are emitted by cattle compared to all other types of livestock combined.
Show ALL your workings. (2)

2.5.4 One of the greenhouse gases emitted by livestock is methane.

Name ONE other source of methane. (1)

(5)

[14]

QUESTION 3

3. A farmer conducted an investigation to determine which type of fertiliser (**A** or **B**) would provide a better yield for her wheat crop.

The investigation was carried out as follows:

- She divided her farm into two plots (1 and 2) of the same size.
- She planted the same type of crop, namely wheat, in both plots.
- She used a different type of fertiliser in each plot.
- She used water from a river which flows through the farm to irrigate her crop.
- She recorded the yield of wheat per plot

The results were as follows:

Plot	Fertiliser	Yield of wheat (tons)
1	A	7,8
2	B	12,6

3.1 Identify the dependent variable in this investigation. (1)

3.2 List TWO factors that were kept constant in this investigation. (2)

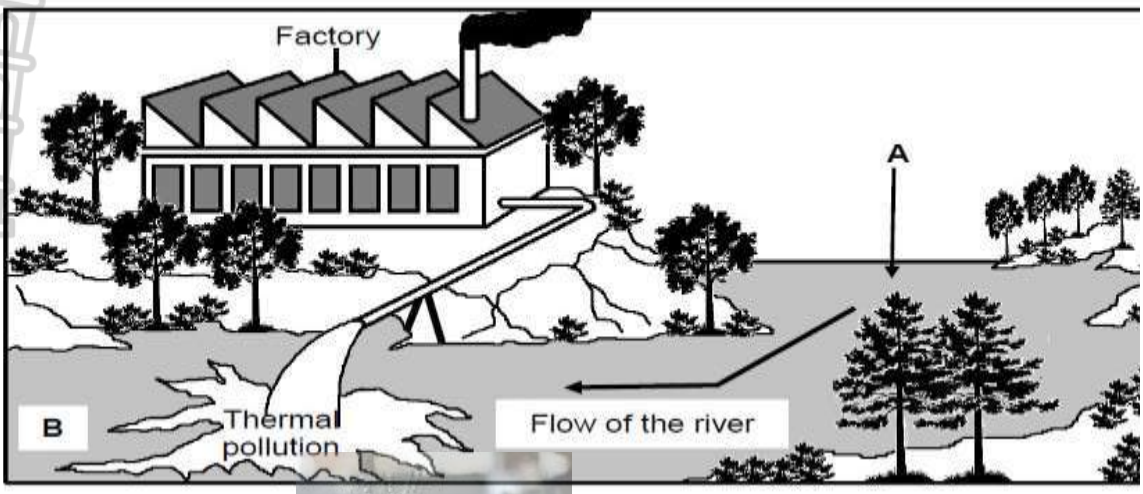
3.3 Other than repeating the investigation, state ONE way in which the reliability of the results could be increased. (1)

3.4 Explain how the excessive use of fertilisers can affect biodiversity if they are washed into the river. (4)

3.5 If the farmer plants wheat repeatedly over many years, state ONE negative effect this may have. (1)

[9]

3.6 A factory was built on the banks of a river close to a fishing village.
The factory used water from the river to cool down the machinery.
The water was then released back into the river causing thermal pollution.



3.6 3.6.1 Describe how thermal pollution affects the water quality. (2)

3.6.2 Suggest ONE way in which the factory can reduce thermal pollution. (1)

3.6.3 How will thermal pollution affect the fishermen in the village, economically? (2)

3.6.4 During the lockdown of the country due to Covid-19 restrictions, the factory was closed for a period of 4 months.

Suggest, with a reason, the impact that this would have had on the biodiversity in area B. (2)

(7)

[16]

TOTAL SECTION B: 30

GRAND TOTAL: 50

Part B

TERM 2 TOPICS SELF STUDY NOTES

1.1 GENERAL TIPS FOR WRITING LIFE SCIENCES:

- The final external examination in Grade 11 consist of two (2) question papers of 150 marks each. Each question paper covers a variety of content topics. Ask your teacher for an outline of the content topics and weighting of each topic in each question paper.
- The duration of each of the final question papers in Grade 11 is 2½ hours.
- All questions in each question paper are COMPULSORY.
- You need to do all your drawings and graphs in pencil and labels should be in blue or black ink. You may not use graph paper when drawing graphs.
- Make sure that you have all the necessary stationery for your examination e.g. blue or black pens, a pencil, an eraser, a ruler, a non-programmable calculator, protractor and a compass.

1.2 HOW TO APPROACH YOUR LIFE SCIENCES EXAMINATION:

- Each Life Sciences question paper consists of TWO sections i.e. SECTION A (50 marks) and SECTION B (two questions of 50 marks)
- When answering a multiple choice question in Section A, read the question and four options carefully, evaluate each option and eliminate each incorrect option.
- In questions that require only a LETTER you only need to write down a LETTER e.g. 'Give only the LETTER of the part where pollen is produced in the diagram of a flower'. Other questions might require you to write down both the LETTER and a NAME e.g. 'Give the LETTER and NAME of the part of the flower in the diagram that receives the pollen'.
- Use the correct spelling when you use biological terminology in your answers. Use scientific names in terminology and avoid using common names.
- The **instructional verbs (in italics)** e.g. **name, give, describe, explain** etc. and the **mark allocation per question** give an indication of what and how much information you should provide in your answer.

Table 1: Instruction verbs and meaning

Instructional verb	Meaning
Name	Give the name of something
Differentiate	Use differences to qualify between two or more categories
Tabulate	Draw a table and indicate the answers as direct pairs.
Describe	State in sentences the main points of a process
Explain	Give your answer in a cause-effect or statement and reason sequence

Compare	Give similarities and differences between concepts

TERM 2 CONTENT

Study the core content below on the topics photosynthesis, animal nutrition and cellular respiration.

2. PHOTOSYNTHESIS

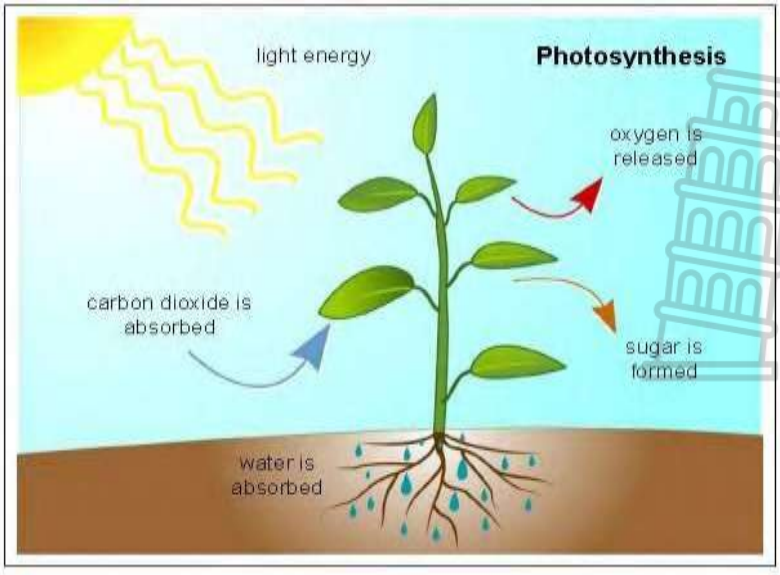
Revise basic cell structure with focus on the chloroplast and leave structure from Grade 10.

2.1 PROCESS OF PHOTOSYNTHESIS

- 'P*hoto*' means light and '*synthesis*' means to produce.
- **Photosynthesis** is the process by which *chlorophyll* in the chloroplasts of green plants absorbs *radiant energy* from the sun, *carbon dioxide* from the atmosphere and *water* from the soil to produce *carbohydrates (e.g. glucose)* which is stored in the plant.
- *Oxygen* is released into the atmosphere during the photosynthesis.
- Enzymes in the cell are also needed for the process
- Excess glucose is converted into starch in the plant.
- The process of photosynthesis can be represented by the following equation:
-

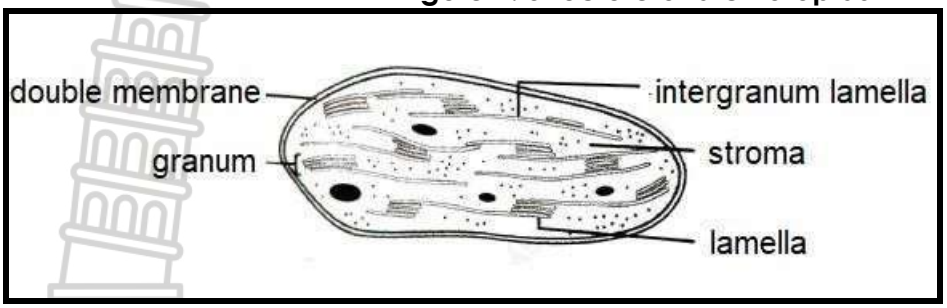
$$\text{Carbon dioxide } (CO_2) + \text{water } (H_2O) + \text{radiant energy} \xrightarrow[\text{enzymes}]{\text{chlorophyll}} \text{glucose} + \text{oxygen } (O_2)$$

Figure 1: Diagram showing the requirements and products of photosynthesis



- Photosynthesis takes place in the **chloroplasts** of plant cells.

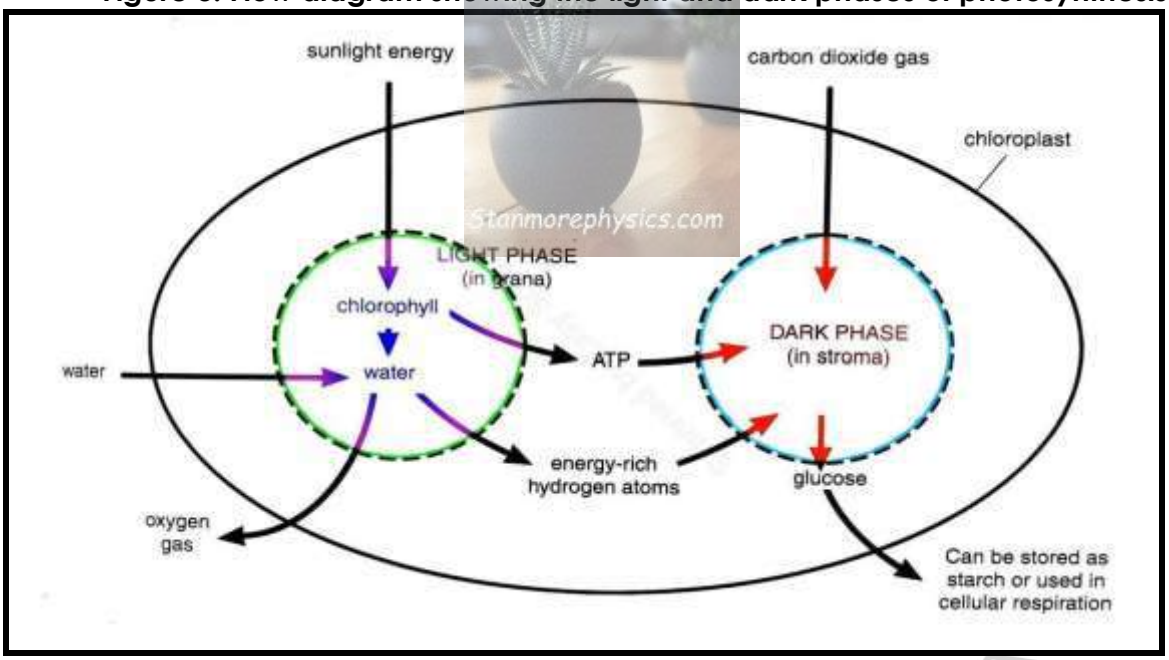
Figure 2: Structure of a chloroplast



The process of photosynthesis occurs in two phases:

- Light phase: light is required
- Dark phase: no light is required

Figure 3: Flow diagram showing the light and dark phases of photosynthesis.



LIGHT PHASE:

- The light phase of photosynthesis takes place in the **grana** of chloroplasts.
- Radiant energy from the sun is absorbed by chlorophyll in the grana and transformed into chemical energy
- Chemical energy is used to to split water molecules (H_2O) into energy -rich hydrogen atoms (H) and oxygen atoms (O). The process is known as **photolysis.**
- Energy rich hydrogen atoms are transferred to the dark phase.
- Oxygen is released into the atmosphere
- Radiant energy also causes the energy carrier ATP to be formed which will be used in the dark phase.

DARK PHASE:

- The dark phase of photosynthesis takes place in the **stroma** of chloroplasts.
- Carbon dioxide is absorbed from the atmosphere and combines with the energy-rich hydrogen atoms from the light phase using the energy that is released from ATP.

- Energy-rich carbohydrates (glucose) are formed.
- Excess glucose is stored as starch.

2.2 IMPORTANCE OF PHOTOSYNTHESIS

- Photosynthesis keeps the oxygen concentration in the atmosphere and water constant. Oxygen is needed by living organisms for **cellular respiration**.
- Photosynthesis keeps the level of carbon dioxide constant in the atmosphere and water.
- Carbon dioxide is released by organisms during cellular respiration.
- Photosynthesis provides food for heterotrophic organisms.

2.3 ATP AS ENERGY CARRIER IN CELLS

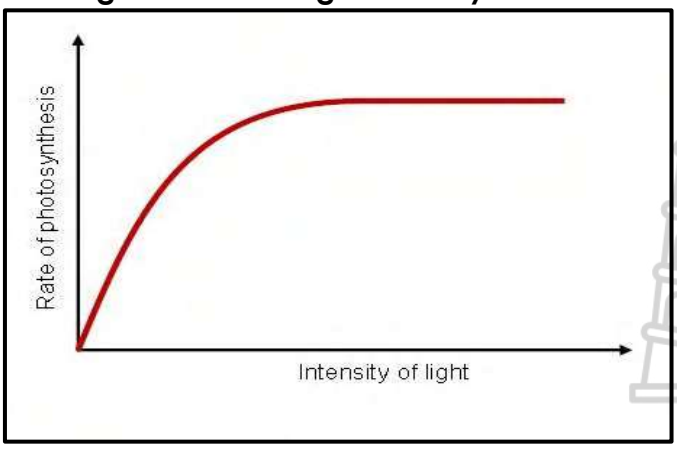
- When a cell needs energy ATP is broken down and the energy is released. Cells use this energy to produce important molecules such as proteins, fats etc.
- Muscle cells need energy provided by ATP to contract.
- Energy provided by ATP is needed to move substances across cell membranes.

2.4 FACTORS THAT INFLUENCE THE RATE OF PHOTOSYNTHESIS

Light intensity

- At low light intensity, the rate of photosynthesis is low.
- As light intensity increases, the rate of photosynthesis also increases. This will happen up to a certain point.
- If light intensity increases above the optimum, the rate of photosynthesis will remain constant.
- Factors such as carbon dioxide become limiting factors which reduces the rate of photosynthesis

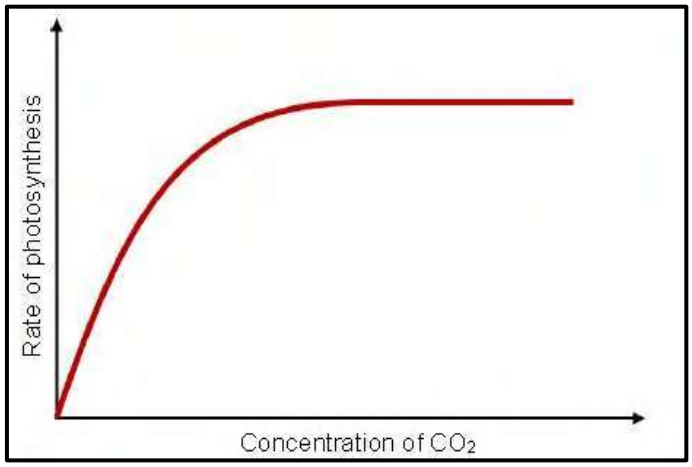
Figure 4: Line graph showing the effect of light intensity on the rate of photosynthesis



Carbon dioxide (CO_2) concentration

- At a low carbon dioxide concentration, the rate of photosynthesis is low.
- As the carbon dioxide concentration level increases, the rate of photosynthesis also increases. This will happen up to a certain point.
- If the carbon dioxide concentration is higher than the optimum amount, then photosynthesis will remain constant.

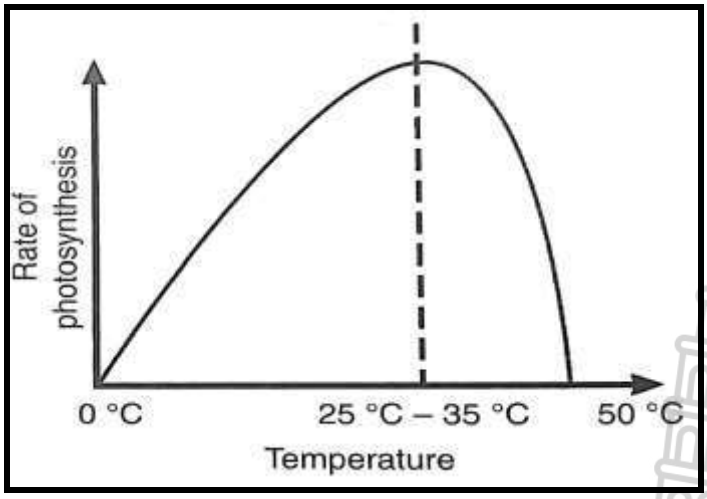
Figure 5: Line graph showing the effect of carbon dioxide concentration on the rate of photosynthesis



Temperature

- When temperature is low, the rate of photosynthesis is low.
- As temperature increases, the rate of photosynthesis also increases.
- If the temperature is higher than the optimum amount, then the rate of photosynthesis will decrease. This is because the enzymes used in the process will denature at high temperatures and will no longer function.
- At low temperatures enzymes become inactive.

Figure 6: Line graph showing the effect of temperature on the rate of photosynthesis



2.5 THE ROLE OF OPTIMUM LIGHT, TEMPERATURE AND CARBON DIOXIDE IN A GREENHOUSE TO IMPROVE CROP YIELD

- A greenhouse is a structure with a glass or plastic roof in which farmers grow plants such as tomatoes. Warm air is trapped in a greenhouse. The aim of a greenhouse is to provide optimal conditions of light, temperature and carbon dioxide for maximum growth of plants.
- Optimum light intensity and temperature increases the rate of photosynthesis and stimulates the growth of plants. Carbon dioxide levels in the greenhouse decreases because of photosynthesis. Carbon dioxide gas can be pumped into a greenhouse to increase the rate of photosynthesis of the plants.

2.6 EXPERIMENT TO SHOW THAT LIGHT IS NECESSARY FOR PHOTOSYNTHESIS

- Destarch a potted plant by placing it in a dark cupboard for 48 hours
- Cover a portion of the leaf, still attached to the plant, with tinfoil
- Place the plant in a sunny area for 48 hours
- Pick the leaf and remove the foil
- Test for the presence of starch using iodine.
- The iodine solution remains light brown in the leaf covered with tin foil.
- The iodine solution turns blue-black in the parts that were left uncovered.
- The parts that turn blue-black in colour contain starch.
- The part which remains light brown does not contain starch.

Figure 7: Diagram showing that light is necessary for photosynthesis

3. ANIMAL NUTRITION

3.1 DIFFERENCES IN DENTITION FOR HERBIVORES, CARNIVORES AND OMNIVOROUS LYFESTYLES

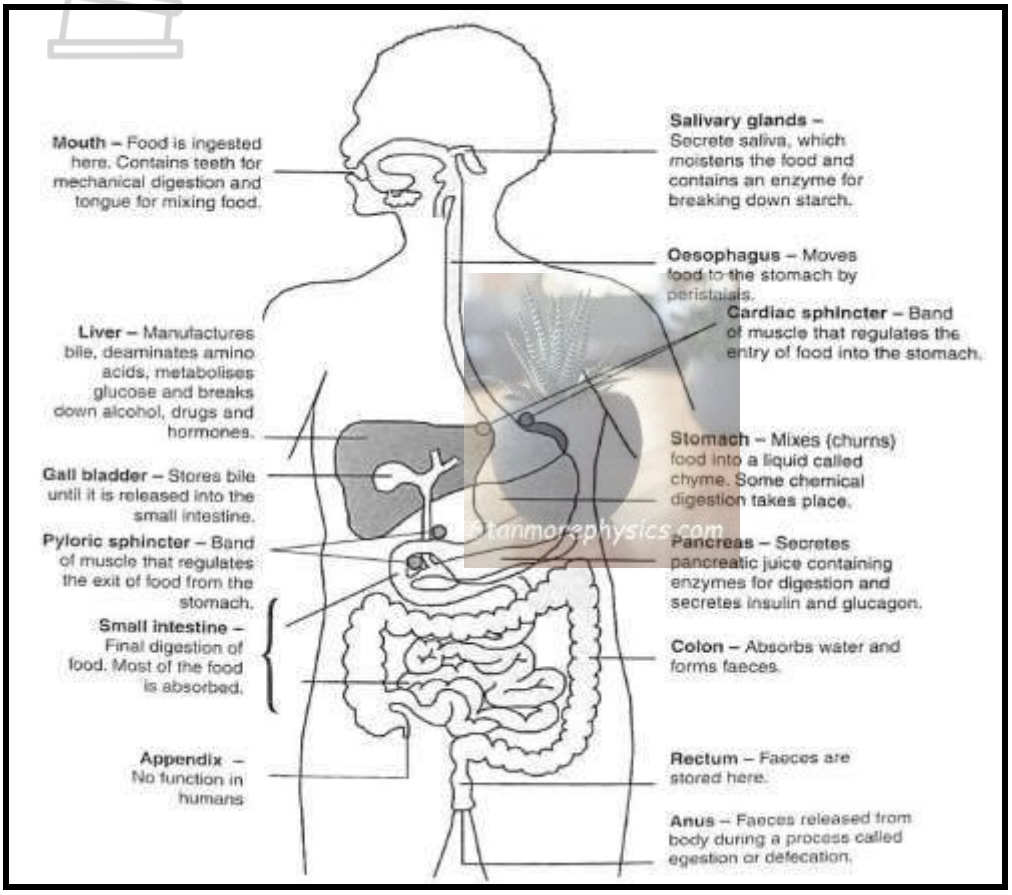
Table 2: Dentition in herbivores, carnivores and omnivores

Type of nutrition	Dentition
Herbivores	• Feed on plant material • Large volumes of food are ingested, as plantmaterial has a low energy value • Inscisors are sharp to cut off plant material • Canines are usually absent • Premolars and molars are large and flat to grind plant material
Carnivores	• Feed on animal material • Ingest less food as the proteins and fats in meat have a much higher energy value • Inscisors have sharp ends to bite off food • Canines are large to catch, hold and tear meat • Molars and premolars have protusions with sharp edges to cut off food
Omnivores	• Feed on both plant and animal material • Amount of food consumed depends on the energy value of the food • Similar teeth as carnivores but molars do not have such prominent protusions

3.2 HUMAN NUTRITION

- The digestive system is responsible for breaking down complex molecules into simplest forms to be absorbed into the body to sustain life.
- The human digestive system is made up of an alimentary canal (tube from mouth to anus) and accessory organs (e.g. liver, pancreas) that aid in the digestive process

Figure 8: The human digestive system



3.2.1 MECHANICAL DIGESTION

- During mechanical digestion food is broken down into smaller particles.
- Mechanical digestion includes:
  - The **chewing** process (mastication) – food is broken down by the teeth and tongue
  - **Bolus** formation – chewed food is mixed with saliva and rolled into a ball by the tongue. The tongue pushes the bolus down to the oesophagus
  - **Churning** movements – this takes place by the contraction and relaxation of the muscles of the stomach wall. Food is broken down further and mixed with gastric juice
  - **Peristaltic** movements – rhythmic contraction and relaxation of the muscles in the wall of the alimentary canal. It helps to move food particles forward.

- Humans have four types of teeth with different functions:

Table 3: Types and functions of teeth in humans

Type of teeth	Function
Incisors	Bite and cut off food
Canines	Hold food in place and tear it off
Premolars	Chew and grind the food
Molars	Chew and grind the food

- The human dental formula is: $\frac{2.1.2.3}{2.1.2.3}$

3.2.2 CHEMICAL DIGESTION

- Chemical digestion is the breaking down of large, insoluble molecules in food into smaller, soluble molecules by the addition of water. The reaction is known as **hydrolysis.**

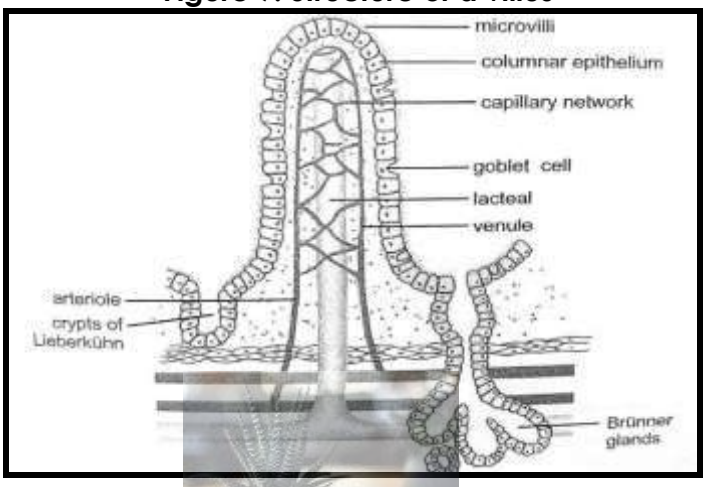
Table 4: Enzymes involved in chemical digestion

Substrate	Enzymes	End product of digestion
Carbohydrates	Carbohydrases e.g. salivary amilase (produced in mouth), Pancreatic amylase (produced in pancreas), Maltase, Sucrase, Lactase (produced in small intestine)	Glucose
Proteins	Proteases e.g. pepsin and renin (produced in stomach) and trypsin (in pancreas)	Amino acids
Lipids	Lipase (produced in pancreas and small intestine)	Glycerol and fatty acids

3.2.3 ABSORPTION

• The end products of digestion i.e. glucose, amino acids, fatty acids and glycerol as well as vitamins, mineral salts and water are absorbed by the **villi** in the small intestine.

Figure 9: Structure of a villus



The villi that are responsible for nutrient absorption are adapted for absorption in the following ways:

- The **epithelium** is only one-cell layer thick allowing nutrients to pass through quickly.
- **Goblet cells** secrete mucus to ensure the absorptive surface is moist and to allow nutrients to be dissolved and then to be absorbed.
- The epithelium contains many **mitochondria** to supply energy for **active absorption** of nutrients.
- **Microvilli** further increase the surface area.
- There is a lymph vessel called a **lacteal** in each villus which absorbs and transports lipids.

3.2.4 TRANSPORT AND ASSIMILATION OF ABSORBED NUTRIENTS

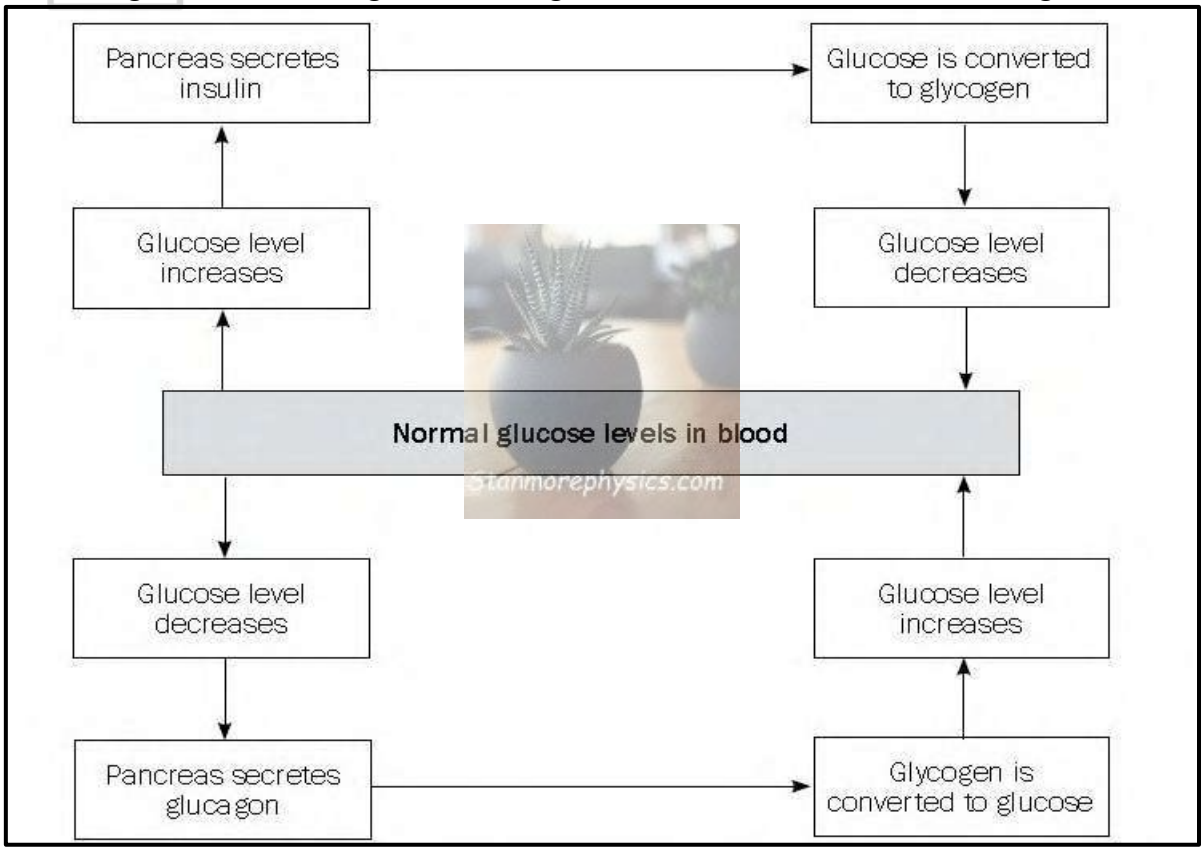
- Glucose, amino acids, vitamins, mineral salts and water are absorbed through the blood capillaries in the villi.
- The capillaries join to form large veins that eventually open into the **hepatic portal vein**
- The hepatic portal vein transports the absorbed nutrients to the liver where most of the glucose is converted into glycogen and stored.
- Excess amino acids undergo **deamination** in the liver to form **urea** and **glucose**. The urea is transported to the kidneys and excreted as part of urine
- The remaining glucose and amino acids leave the liver through the **hepatic veins** and are transported to the heart and to the rest of the body.
- The body cells absorb the required nutrients. This process is known as **assimilation**.

3.2.5 EGESTION

- All undigested materials are transported through the colon where most water and mineral salts are absorbed
- The undigested material is temporarily stored in the rectum until it is excreted through the anus.
- The undigested waste is then referred to as faeces

3.3 HOMEOSTATIC CONTROL - THE HORMONAL CONTROL OF BLOOD SUGAR LEVELS

Figure 10: Flow diagram showing the hormonal control of blood sugar levels



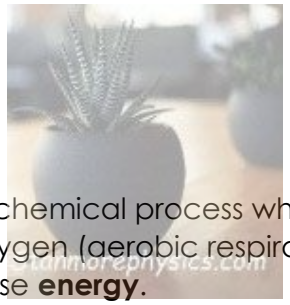
3.3.1 When the glucose levels in the blood increases above the normal level:

- The pancreas is stimulated to secrete **insulin** into the blood
- Insulin is transported to the liver by the blood
- In the liver and muscles, the **insulin** stimulates the conversion of excess **glucose** into **glycogen**
- Insulin also stimulates the absorption of glucose from the blood into the body cells
- Glucose is removed from the blood and the glucose concentration in the body decreases
- The pancreas is stimulated to secrete **glucagon** into the blood.
- Glucagon is transported to the liver by the blood
- In the liver and muscles, the **glucagon** stimulates the conversion of
- **glycogen** into **glucose**
- Glucose is released into the blood and the glucose concentration in the body increases.

3.3.3 Diabetes mellitus:

- A metabolic disease characterized by high glucose levels in the blood
- When insulin is absent or not functioning effectively, most of the glucose
- remains in the human body and this causes an increased blood glucose level, called **hyperglycaemia.**
- There are two types of diabetes:
- **Type 1 diabetes –** little or no insulin is produced and the person needs daily insulin injections

Type 2 diabetes – the pancreas produces insulin but the body cells cannot use it effectively. The person needs oral medication or insulin.



4. CELLULAR RESPIRATION

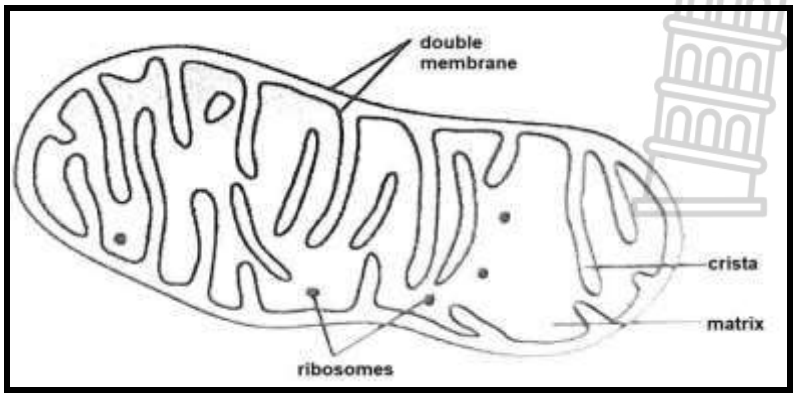
• Cellular respiration is the chemical process where glucose is broken down gradually, in the **presence** of oxygen (aerobic respiration) or in the **absence** of oxygen (anaerobic respiration), to release **energy**.

4.1 AEROBIC RESPIRATION

- Aerobic respiration occurs in the presence of **oxygen** in the cytoplasm and the mitochondria of cells.
- The process of aerobic respiration can be represented by the following equation:

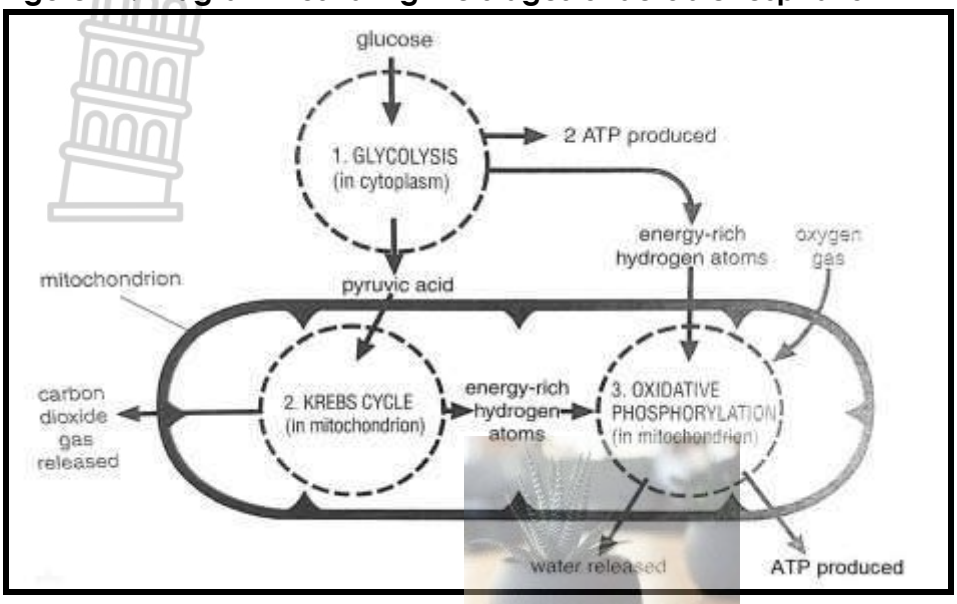
$$\text{Glucose} + \text{oxygen } (O_2) \xrightarrow{\textit{enzymes}} \text{Carbon dioxide } (CO_2) + \text{water } (H_2O) + \text{ATP}$$

Figure 11: Structure of a mitochondrion



4.1.1 STAGES OF AEROBIC RESPIRATION

Figure 12: Diagram illustrating the stages of aerobic respiration



Glycolysis:

- Glycolysis occurs in the cytoplasm of the cell outside the mitochondrion
- Glucose is broken down into pyruvic acid
- Energy-rich hydrogen atoms are given off and move into the mitochondrion
- ATP is formed during glycolysis

Krebs cycle:

- The Krebs cycle is a series of cyclic reactions that takes place inside mitochondrion
- Pyruvic acid that entered the mitochondrion is broken down into energy-rogen atoms and carbon dioxide
- The carbon dioxide is released and given off as a gas

Oxidative phosphorylation

- Oxidative phosphorylation takes place in the mitochondrion
- The energy from the hydrogen atoms is used to form energy-rich ATP
- The hydrogen atoms combine with oxygen to form water

4.2 ANAEROBIC RESPIRATION

- Takes place in the absence of oxygen
- Glucose is only partially broken down and less energy is released.

Lactic acid fermentation– anaerobic respiration that occurs in muscle cells.

- Pyruvic acid is converted into lactic acid. Mucles become tired and painful. A small amount of ATP is produced.
- **Alcoholic fermentation –** anaerobic respiration that occurs in yeast cells.

Carbon dioxide and alcohol(ethanol) is formed.

4.3 ROLE OF ANAEROBIC RESPIRATION IN THE INDUSTRY

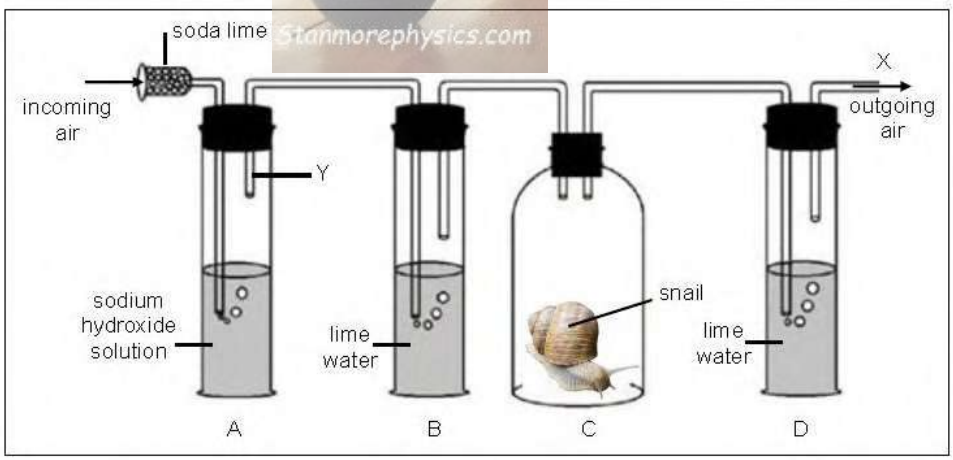
- Yeast and other fungi respire anaerobically and are used to produce alcoholic beverages such as beer and wine.
- Yeast cells are also used to cause bread to rise during the baking process.
- The fermentation process is also used to produce cheese.

Table 5: Comparison between aerobic and anaerobic respiration

Aerobic respiration	Anaerobic respiration
Occurs in the presence of oxygen	Occurs in the absence of oxygen
Products are carbon dioxide and water	Products are lactic acid (animals) or carbon dioxide and ethanol (plants/yeast cells)
A large amount of energy is released	A small amount of energy is released

4.4 EXPERIMENT TO SHOW THAT CARBON DIOXIDE IS PRODUCED BY LIVING ORGANISMS DURING CELLULAR RESPIRATION

Figure 13: Diagram to show that carbon dioxide is produced by living organisms during respiration



- Use a small organism (e.g. snail).
- Sterilise the equipment so that no micro-organisms can influence the result.
- Place a snail in a large jar.
- Set- up the apparatus as shown in diagram above, making sure that the test tubes are tightly sealed.
- Examine the test tubes the following day and record the results.
- The lime water remains clear in test tube B because carbon dioxide was removed by the soda lime and sodium hydroxide.
- The lime water turns milky in test tube D due to carbon dioxide produced by the snail.

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CURRICULUM DIRECTORATE

GRADE 10 -12

TOPIC TESTS

MARKING GUIDELINES

LIFE SCIENCES

GRADE 11

2024

SCHOOL NAME:	
LEARNER NAME:	

TABLE OF CONTENTS:

KWAZULU-NATAL PROVINCE
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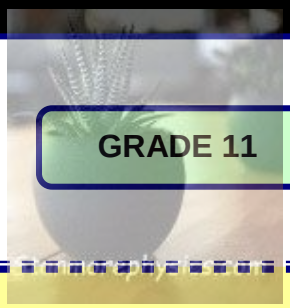

GRADE 11

LIFE SCIENCES-TERM 1
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: MICRO-ORGANISMS

MARKS: 30 MARKS

TIME: 30 MINUTES

N.B. This question paper consists of 5 pages including this page.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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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.

SECTION A

QUESTION 1

1.1 1.1.1 D ✓✓ (2)
1.1.2 A ✓✓ (2)
(4)

1.2 1.2.1 Biodiversity ✓ (1)
1.2.2 Parasitism ✓ (1)
1.2.3 Vector ✓
1.2.4 Saprophytes ✓ (1)
(4)

1.3 1.3.1 Both A and B ✓✓ (2)
1.3.2 None ✓✓ (2)
(4)

QUESTION 2

2.1. (1)

2.1.1 Protista✓

2.1.2 -Most people are not aware they have contracted the disease✓
- They do not seek medical attention which leads to death✓

OR

-People do not have sufficient knowledge about malaria✓
-Hence they don't take proper precautions when visiting stricken countries✓

Any 1x 2 (2)

2.1.3. -Educate people about the causes of malaria/awareness campaigns✓
-So that they are well informed about the disease and its causes✓ (1)
(Mark the first ONE ONLY)

2.1.4. $\frac{10\ 000\ X\ 100}{655\ 000}$ ✓

1,5 % ✓ (2)

2.1.5. -Decrease the economy ✓
-As more money will be spent buying medicine ✓

OR

-They will be a high number of people absent from work due to illness✓
-Decreases productivity and economy of the country✓
Any (1 x 2) (2)

Question 3

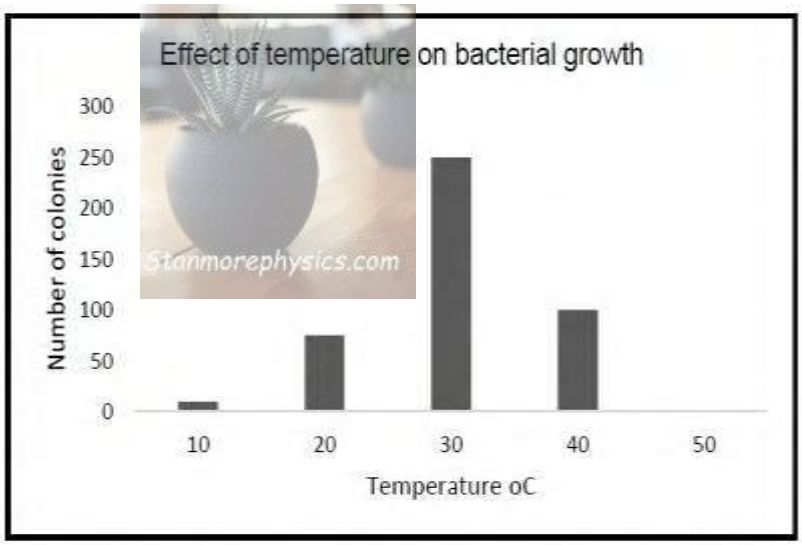
3.1 3.1.1 -Temperature✓ (1)

3.1.2 -Experiment was not repeated✓
- Only one Petri dish was used per temperature treatment✓ (1)

3.1.3.
- Use the same stain/ species of bacteria✓
- Same duration of incubation✓
- Same amount/quantity of agar✓
- Same type/quality of agar✓

(Mark first ONE only) (1)

3.1.3



Type of graph	1
Heading for graph	1
Correct label and scale X axis	1
Correct label and scale of Y axis	1
Plotting of points	1–4 points correctly plotted: 1 5 points correctly plotted: 2

(6)

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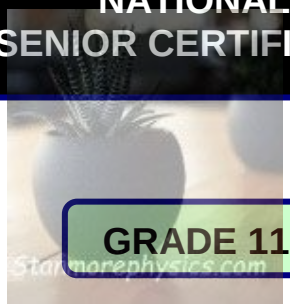

GRADE 11

LIFE SCIENCES-TERM 1
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: PLANT BIODIVERSITY

MARKS: 30

This marking guideline consists of 4 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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All illustrations (diagrams, graphs, tables, etc.) must have a caption.

SECTION A

QUESTION 1

1.1 1.1.1 C ✓✓ (2)

1.1.2 D ✓✓ (2)

(4)

1.2 1.2.1 Phylogenetic✓
1.2.2 Calyptra✓
1.2.3 Cross pollination✓
1.2.4 Sexual Reproduction✓

(4X1) **(4)**

1.3 1.3.1 B only✓✓ (2)

1.3.2 B only✓✓ (2)

(4)

SECTION B
QUESTION 2

2.1 2.1.1 (a) Plantae✓ (1)

(b) Charophytes, Bryophytes, Pterophytes, Gymnosperms ✓
(any 1) (1)

(c) Bryophytes ✓ (1)

2.1.2 350 ✓ MYA (1)

2.1.3 -Pollen grains are protected by resistant✓ walls to prevent desiccation ✓
-Pollen grains have air sacs✓ for wind pollination✓
-Seeds are protected by resistant coat/testa✓to prevent desiccation✓
-Leaves have cuticle and stomata ✓ to reduce water loss✓
-They have conducting tissue ✓ to ensure efficient transport of water and minerals✓ (4)
Mark the first TWO only

QUESTION 3

3.1.1 Number of visits to flower✓ (1)

3.1.2 The duration of the investigation was the same✓ /24 hours for both plant species (1)

(Mark FIRST ONE only)

3.1.3
- Same environmental conditions✓
- Same number of flowers for each plant species✓
- Same number of hummingbirds and hawkmoths✓

(Mark FIRST ONE only) (Any 1) (1)

3.1.4 Hummingbirds prefer A. formosa plant species, while hawkmoths preferA. pubescens plant species✓✓ (2)

3.1.5

Wind-pollinated	**Bird-pollinated**
Sepals and petals are absent or small and are not brightly coloured. ✓	Flowers are brightly coloured to attract birds✓
Flowers do not produce nectar. ✓	Flowers produce large quantities of dilute nectar. ✓
Anthers are large and have long filaments that hang outside the flower. ✓	Stamens and stigmas protrude beyond the petals✓
	(Mark FIRST ONE only)

(3)

3.2 Possess vascular / conducting tissue ✓ which provide support, enabling plants to grow taller (2)

TOTAL SECTION B: 18
GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
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GRADE 11

LIFE SCIENCES-TERM 1
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: BIODIVERSITY OF ANIMALS

MARKS: 30

This marking guideline consists of 4 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		(2)
	1.1.2	B✓✓		(2)
			(2 x 2)	**(4)**
1.2	1.2.1	Endoderm✓		
	1.2.2	Open blood system✓		
	1.2.3	Egestion✓		
	1.2.4	Sessile✓		
			(4 X 1)	**(4)**
1.3	1.3.1	A only✓✓		(2)
	1.3.2	B only✓✓		(2)
				(4)
			TOTAL SECTION A	**[12]**

SECTION B

QUESTION 2

2.1	2.1.1	Phylogenetic tree✓		(1)
	2.1.2	Multicellular✓		(1)
	2.1.3	(a) A✓		(1)
		(b) C✓/D		(1)
		(c) D✓		(1)
	2.1.4	- 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✓		
		Mark the first TWO only	Any (2X2)	(4)

QUESTION 3

3.1 3.1.1 - Number of egg pods formed✓ (1)

3.1.2 - The person counting the egg pods✓
- Counting egg pods at the same time✓
- Age/size of the locusts✓
- Size of the troughs✓
- Type of soil✓
- Diet of the locusts✓

(Mark first THREE only) Any 3 (3)

3.1.3 An increase in the amount of water increases the number of pods formed up to a point but as the a
mount of water increases further, (2)
the number of pods formed decreases✓✓ **(6)**

3.2 - Insects are pollinating agents✓ resulting in reproduction of plants✓

- Earthworms and insects are decomposers✓ and recycle nutrients✓

- Earthworms and insects aerate soil✓ and make oxygen available✓ to plant roots and animals/help drainage✓ of soil for plant growth **(3)**

Any 3 **(9)**

TOTAL SECTION B: 18
GRAND TOTAL: 30

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GRADE 11

LIFE SCIENCES

PHOTOSYNTHESIS

MARKING GUIDELINES

MARKS: 30

This marking guideline consists of 4 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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SECTION A

QUESTION 1

1.1	1.1.1 1.1.10	A✓✓ B✓✓		(2 x 2)	**(4)**
1.2	1.2.1 1.2.2 1.2.3 1.2.4	Chlorophyll✓ Grana✓ Starch✓ Enzymes✓	(1 X 4)		**(4)**
1.3	1.3.1 1.3.2	A only✓✓ Both A & B✓✓			(2) (2) **(4)** **(12)**

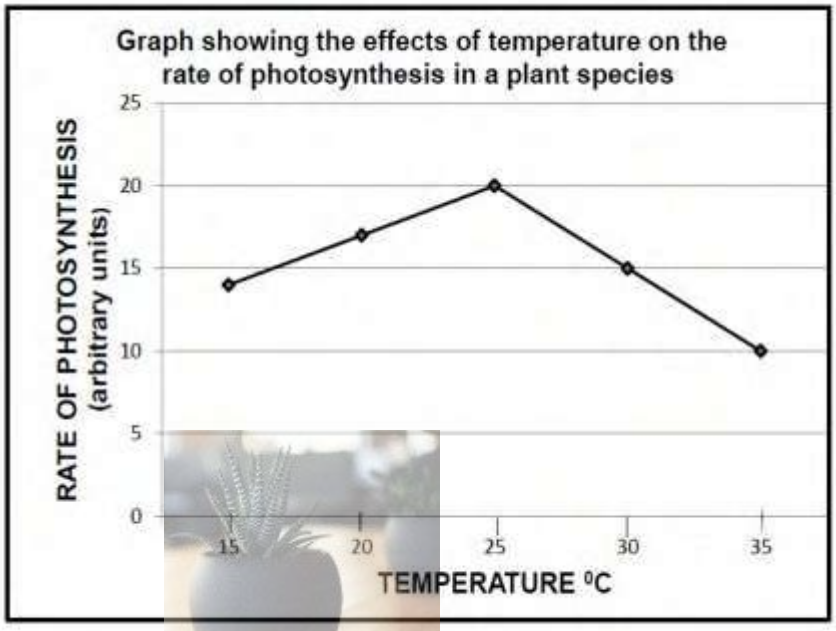
SECTION B

QUESTION 2

2.1	2.1.1	Photosynthesis✓	(1)
	2.1.2	Same species of plants ✓ Same amount of water✓ Same age of plants✓	(3)
	2.1.3	Repeat the investigation ✓ Increase the Sample size by using more pot plants✓	(2)
	2.1.4	Blue-black✓	(1)
	2.1.5	Light is essential for photosynthesis✓	(2)
			(9)

QUESTION 3

3.1 3.1.1



criterion	Elaboration	Mark
Type of graph	Line graph drawn	1
Caption	Includes both variables	1
X-axis	Correct label of X- axis (temperature) and appropriate scale	1
Y-axis	Appropriate scale AND correct label and units for Y-axis	1
Plotting of points	1-4 points plotted correctly- 1 mark All 5 points plotted correctly-2 marks	2

(6)

(6)

3.1.2 Enzymes controlling the process are inactive at very low temperatures✓ (1)

3.1.3 Other factors of may be in short supply✓

OR

A large increase in the concentration of carbon dioxide could affect the pH of the cell✓ which may not be optimum for enzymes✓ controlling this process

Any (2)

TOTAL SECTION B: 18
GRAND TOTAL: 30

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GRADE 11

LIFE SCIENCES-TERM 2
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: CELLULAR RESPIRATION

MARKS: 30

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SECTION A

QUESTION 1

1.1	1.1.1	C✓✓		(2)
	1.1.2	B ✓✓		(2)
			(2 x 2)	**(4)**
1.2	1.2.1	Cristae✓		
	1.2.2	Alcoholic fermentation✓		
	1.2.3	Glycolysis✓		
	1.2.4	Oxidative Phosphorylation✓	(1 X 4)	**(4)**
1.3	1.3.1	Both A & B✓✓		(2)
	1.3.2	A only✓✓		(2)
				(4)

SECTION B

QUESTION 2

2.1 2.1.1 To determine whether carbon dioxide is released during cellular respiration✓✓ (2)

2.1.2 To remove any micro – organism that may affect the results✓/To ensure that carbon dioxide present is only produced by germinating seeds. (1)

2.1.3 Same kind of seeds were used✓

OR

All seeds were placed in a dark cupboard✓

OR

All seeds were kept at same room temperature /35 ^{O}C✓ (1)

Any

2.1.4 The apparatus will be set – up in the exact same way✓

except by using no seeds✓ / Seeds that were boiled to ensure that the changes observed in the investigation were caused by cellular respiration/ germinating seeds✓ (3)

2.1.5 Germinating seeds require a lot of energy for growth✓
and the rate of cellular respiration will be higher✓

2.1.6 resulting in a more carbon dioxide released ✓ (2)

Any 2 **(9)**

QUESTION 3

3.1 3.1.1 - Anaerobic respiration / Lactic Acid fermentation✓ (1)

- Skeletal muscles✓ (1)

3.1.2 19 arbitrary units✓ (1)

3.1.3 10 ✓ minutes ✓ (2)

3.1.4 The strenuous physical activity leads to an increased rate of cellular respiration ✓

causing an accumulation of carbon dioxide ✓

and decreased level of available oxygen✓

and therefore only glycolysis takes place ✓ (4)

(9)

TOTAL SECTION B: 18
GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES TERM2
INFORMAL ASSESSMENT -TOPIC TEST
MARKING GUIDELINES
ANIMAL NUTRITION

MARKS: 50

This marking guideline consists of 4 pages

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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50. **Be sensitive to the sense of an answer, which may be stated in a different way.**

51. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.

SECTION A

QUESTION 1

1.1 1.1.1 C✓✓

1.1.2 D✓✓

(2x2) **(4)**

1.2 1.2.1 villi✓
1.2.2 epiglottis✓
1.2.3 peristalsis✓
1.2.4 mastication✓

(1x4) **(4)**

1.3 1.3.1 None✓✓ (2)

1.3.2 A only✓✓ (2)

1.3,3 None✓✓ (2)

(3x2) **(6)**

1.4 1.4.1 Villus ✓ (1)

1.4.2 (a) Lacteal ✓ (1)

(b) (Network of) blood capillaries✓ (1)

1.4.3 A✓ (1)

1.4.4 Diffusion and active transport ✓✓ (2)

(2x2) **(6)**

TOTAL SECTION A: 20

SECTION B

QUESTION 2

2.1 2.1 (a) B✓ (1)

(b) G✓ (1)

(c) D✓ (1)

2..2 - Acids and enzymes will not be secreted✓ (2)
- digestion of food will be negatively affected✓

2.3 - Has a single layer of epithelial cells✓
- to facilitate diffusion✓

- Has a lacteal✓
- to transport absorbed fats✓

- Has capillaries✓
- for transport of absorbed nutrients✓

- Columnar epithelial cells have many mitochondria✓
- which provides energy for the active absorption of nutrients✓

- Goblet cells have mucus✓
- which protects the villi and aids absorption✓

- Brunner's glands secrete an alkaline mucus✓
- which lubricates and protect the lining of the intestine against the acidic chyme

(4)

Any(2 X 2)

(9)

QUESTION 3

3.1 3.1 Pancreas✓ (1)

3.2 The glucose is the source of energy ✓ as it is oxidised (broken down) during cellular respiration (1)

3.3 - When a person develops insulin resistance,
- The body cells become incapable of using insulin effectively✓/unable to absorb sufficient amounts of glucose
- This leads to an increase in the level of glucose in the blood✓
- Which stimulates the pancreas to secrete extra insulin✓
- To enable the cells to absorb sufficient amounts of glucose✓
- Over a period of time, the pancreas's ability to secrete extra insulin begins to decrease✓
- Which leads to the development of type 2 diabetes

(Any 4)

(4)

3.4
- The glucose level in the blood increases above the normal levels✓
- The pancreas is stimulated✓
- To secrete insulin in the blood✓
- Insulin travels in the blood to the liver✓
- Where it stimulates the conversion of excess glucose to glycogen✓ Which is then stored
- The glucose level in the blood now decreases✓ and returns to normal✓ (Any 3)

(3)

(9)

3.5

3.5.1 The level increases✓ (1)

3.5.2 100 (mg/dl) ✓✓ (2)

3.5.4
- A diabetic may not produce sufficient insulin✓
- When eating many smaller meals, less glucose✓ enters the blood
- less insulin✓ is needed
- to return blood glucose to normal✓

OR
- A diabetic may not produce sufficient insulin✓
- When eating fewer larger meals, more glucose✓ enters the blood
- more insulin✓ is needed
- to return blood glucose to normal✓

(4)

(12)

TOTAL SECTION B: 30

GRAND TOTAL: 50

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES TERM3
INFORMAL ASSESSMENT
MARKING GUIDELINES
GASEOUS EXCHANGE

MARKS: 30

This marking guideline consists of 4 page

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

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SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	C ✓✓		**(4)**
1.2	1.2.1	Pleura✓		
	1.2.2	Epiglottis✓		
	1.2.3	Medulla oblongata✓		
	1.2.4	Cartilage✓	(4 x 1)	**(4)**
1.3	1.3.1	Both A and B✓✓		(2)
	1.3.2	None ✓✓		(2)
				(4)

TOTAL SECTION A: 12

SECTION B

QUESTION 2

2	2.1	Red blood cell/ corpuscle/erythrocyte✓		(1)
	2.2	X - Oxygen✓		(1)
		Y - Carbon dioxide✓		(1)
	2.3	- Oxyhaemoglobin✓		(1)
		- Dissolved in the plasma✓		(1)
	2.4	- One cell layer of squamous✓ - providing a thin surface for the diffusion of gases✓ - Alveoli lobed/cup-shaped✓ - to increase the surface area for exchange of gases✓ - Moist surface of alveolus✓ - facilitates diffusion✓ - Richly supplied with blood vessels✓ - for rapid transport of oxygen from the alveolus and carbon dioxide to the alveolus✓ **(Mark first TWO only)**	(Any 2 x 2)	(4) **(9)**

QUESTION 3

3 3.1 (a) Wearing of a facemask✓ (1)

(b) Carbon dioxide level in the blood✓ (1)

3.2 150 volunteers were used✓ (1)
(Mark first ONE only)

3.3 - To act as a control ✓/baseline
- To see if it is the facemask that affects the carbon dioxide levels and not the physical activity✓ (Any 1) (1)

3.4 - Receptors in the carotid artery are stimulated✓ and
- impulses are sent to the medulla oblongata✓
- The medulla oblongata stimulates the heart✓
- to beat faster✓ causing
- more carbon dioxide to be taken to the lungs✓
- The breathing muscles✓/intercostal muscles and diaphragm
- contract more actively✓ and
- the rate/ depth of breathing increases✓
- More carbon dioxide is exhaled✓
- The carbon dioxide level in the blood decreases✓ /returns to normal

(Any 5) (5)

(9)

TOTAL SECTION B: 18
GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES TERM3
INFOEMAL ASSESSMENT
MARKING GUIDELINES
EXCRETION IN HUMANS

MARKS: 50

This marking guideline consists of 4 pages

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SECTION A

QUESTION 1

1.1 1.1. B✓✓ (2)
1.1.2 D✓✓ (2)
(4)

1.2 1.2.1 Excretion✓
1.2.2 Medulla✓
1.2.3 Ureter✓
1.2.4 Osmoregulation✓ (4 x1) **(4)**

1.3 1.3.1 B only✓✓
1.3.2 B only✓✓
1.3.3 A only✓✓

(3x2) **(6)**

1.4 1.4.1

(a) Renal vein ✓ (1)

(b) Urethra ✓ (1)

1.4.2

(a) Inferior vena cava✓ (1)

(b) (b) Aorta ✓ (1)

1.4.3 D✓ – Ureter ✓ (2)

[6]

TOTAL SECTION A: 20

SECTION B
QUESTION 2

2. 2.1 Glomerulus ✓ (1)

2.2 (Ultra) filtration ✓ (1)

2.3 (a)Proteins ✓ (1)

(b)Glucose ✓ (1)

(c)Urea ✓ (1)

2.4 - The tubule is convoluted, ✓✓to allow sufficient time for re-absorption of useful nutrients ✓/ increases surface area for maximum absorption
- The capillary network is in close contact with the tubule✓✓ to facilitate faster re-absorption of nutrients✓✓
- The cells of the inner wall of the tubule are richly supplied with many mitochondria ✓✓ to generate energy for active absorption✓ ✓ (active transport) of nutrients back to the surrounding capillaries
- The cells of the tubule have microvilli ✓✓ to increase the surface area for maximum absorption ✓ ✓ (Any 2 x 2) (4)

(9)

2. 2.5.1 Pituitary gland✓ /Hypophysis/Hypothalamus (1)

2.5,2 - Water levels are higher than normal in blood✓
- since less water is lost through sweating✓
- therefore less/no ADH will be secreted✓
- renal tubules become less permeable to water✓
- Therefore, less water is reabsorbed/ ✓ more urine is produced (3)
Any

2.5.3 - Water cannot be reabsorbed✓ /the water is in the urine since renal tubules are resistant to the effects of ADH
- Water levels are lower than normal in blood✓
- therefore, more ADH is secreted✓ (3)

(7)

QUESTION 3

3 3.1 Too much water loss✓ (1)
High intake of salt✓ / sodium
(1)

3.2 -The high concentration of sodium✓creates
- a steeper concentration gradient✓
- Which leads to the passive absorption of water✓
- From the collecting tubule into the surrounding fluid✓
- Surrounding the cells at the medulla✓ (Any 3) (3)

3.3 The lower level of sodium in the blood stimulates✓
- the adrenal gland✓to secrete and release
- More aldosterone into the blood✓
- Which causes reabsorption of more sodium by the capillaries✓
- At the distal and collecting tubules✓ / less sodium ions are excreted
- From the kidneys✓
- Sodium ions are reabsorbed until its level in the blood returns to normal ✓ (Any 4) (4)

(9)

3.4 3.4.1 In the cortex✓ (1)

3.4.2 Glomerular filtration✓ (1)

3.4.3 Glomerulus✓ (1)

3.4.4 To create a high pressure✓ in C (1)

3.4.5 Podocytes ✓ (1)

(5)

TOTAL SECTION B: 30

GRAND TOTAL: 50

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

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SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES TERM3
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: POPULATION ECOLOGY

MARKS: 30

This marking guideline consists of 4 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	A✓✓	(2 x 2)	**(4)**
1.2	1.2.1	Migration✓		
	1.2.2	Interspecific competition✓		
	1.2.3	Simple sampling✓		
	1.2.4	Resource partitioning✓	(1 X 4)	**(4)**
1.3	1.3.1	A only✓✓		(2)
	1.3.2	A only✓✓		(2)
				(4)

SECTION B

QUESTION 2

2.1	They can capture prey too fast for them✓ and they can tackle prey too large for them✓	(2)
2.2	Predation✓ / predator-prey	(1)
2.3	A✓	(1)
2.4	- Graph A increases / decreases after graph B✓ - There are fewer individuals in A than B✓ - There is less fluctuation in numbers in A than in B✓(any 2)	(2)
2.5	Large numbers mean that an individual is less likely to be caught by a predator✓ / prey have a better opportunity to escape. As there are many eyes to spot the predator early✓/ as running in herds may reduce the ability of a predator to focus on one individual to attack.	(2)
2.5	If the prey numbers increase the predator numbers will increase✓ Causing the prey numbers to decrease✓ which will cause the predator numbers to decrease ✓ **OR** The predator and prey numbers depend on each other✓ This helps to control the population size in each group✓ If one increases, the other one will cause it to decrease again✓	(3) **(11)**

QUESTION 3

3.1 The total count of all the individuals in a population✓ (1)

3.2 Females✓ (1)

3.3 (a) 1990✓ (1)

(b) 1990✓ (1)

3.4 - There is a **decrease in birth rate**✓ due to better education✓ / access to birth control / improved lifestyle with fewer children / better employment opportunities for women - There is an increase in life expectancy✓ due to better health care available✓ (3)

(7)

TOTAL SECTION B: 18
GRAND TOTAL: 30

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES TERM4
INFORMAL ASSESSMENT
MARKING GUIDELINES
TOPIC TEST: HUMAN IMPACT

MARKS: 50

This marking guideline consists of 4 pages

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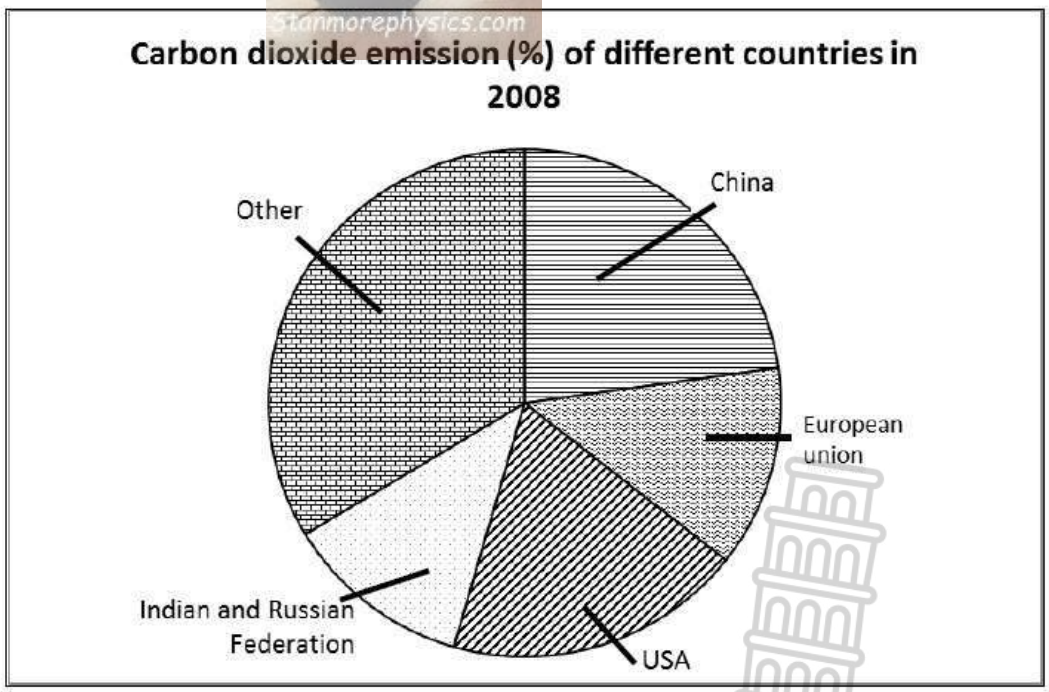
SECTION A

QUESTION 1

1.1	1.1.1	B✓✓		
	1.1.2	C✓✓	(2 x 2)	**(4)**
1.2	1.2.1	Ozone layer✓		
	1.2.2	Aquifer✓		
	1.2.3	Biological control✓		
	1.2.4	Alien/ exotic✓	(1 X 4)	**(4)**
1.3	1.3.1	A only✓✓		(2)
	1.3.2	B only✓✓		(2)
				(4)

1.4

China: 23/100 x 3600 = 82.80
European Union: 13/100 x 3600 = 46.80
USA: 19/100 x 3600 = 68.40
India and Russian Federation: 12/100 x 3600 = 43.20
Other: 33/100 x 3600 = 118.80



Correct type of graph	1 mark
Caption	1 mark
Correct calculations	1: 1–4 calculations correct 2: All 5 calculations correct
Correct proportion and labelling sectors	1: 1–3 sectors correct 2: 4–5 sectors correct

(6)

TOTAL SECTION A: 12

SECTION B

QUESTION 2

2. 2.1
- Food security refers to the availability and access✓
- to adequate, safe and nutritious food✓
- to people at all time✓ (any 2) (2)

2.2
- More food will need to be produced✓
- thus utilising more energy needed to produce / package✓
- as well as energy needed to dispose of food✓
- this contributes to the increase in carbon dioxide emissions✓
- which eventually lead to global warming✓ (any 3) (3)

2.3
- Changes in weather patterns✓/ such as an increase in rainfall in some areas and drought in others
- An increase in the number and intensity of extreme weather events✓/ for example: cyclones, high winds and hail storms
- Changes in food production due to temperature changes✓
- Reduction in availability of water supplies✓ due to droughts
- Increase in evaporation from water surfaces✓ such as oceans, lakes, dams and rivers due to high temperatures
- Changes in the composition and location of forests✓ due to changes in weather patterns
- Reduction in biodiversity✓
- Rise in sea levels✓/ due to polar ice melting, flooding low lying
- coastal towns
- Threats to human health✓ due to changes in weather patterns/ flooding/drought

(Mark first TWO only) (Any 2) (2)

2.4
- Buy only what is needed in sufficient quantities✓
- Give to others what is not used instead of throwing away✓
- Educate about efficient farming methods✓
- Educate about ways to preserve food✓
- Improve storage facilities✓

(Mark first FOUR only) (Any 2) (2)

(9)

2.5 2.5.1 Sheep and goats✓ (1)

2.5.2 To trap heat energy/keep earth warm enough to sustain life✓ (1)

2.5.3 4 623 – 1 826✓ (668+684+474) million tonnes
= 2 797✓ million tonnes (2)

2.5.4 Landfills✓, rice paddles✓, waterlogged soil✓/wetlands, mining of coal, f✓ossil fuel✓s, biofuels✓, fracking✓, sewage✓, decomposition, ✓melting of ice in glaciers✓
(any one) (1)

(5)

([14]

QUESTION 3

3. 3.1 Yield of wheat✓ (1)

3.2 - Same size of plot✓
- Same crop✓ /wheat
- Same source of water✓
(Mark first TWO only) (Any 2) (2)

3.3 - Increase the size of the plots
- Use more than one plot for each type of fertilizer
(Mark first ONE only) (Any 2) (1)

3.4 - It increases the nutrient content of the water✓/eutrophication occurs
- This causes an increase in algal growth✓
- The algae block out the light✓
- reducing photosynthesis✓
- Plants and animals depending on them die✓
- increasing decomposition✓
- leading to a depletion of oxygen✓ (Any 4) (4)

3.5 - Depletes nutrients from the soil✓
- Decreases quality of topsoil✓
- Leads to decreased yield✓
- Increases pests✓
- Leads to soil erosion✓
- Decreases biodiversity✓
(Mark first ONE only) (Any 1) (1)
(9)

3.6 3.6.1 Thermal pollution lowers the oxygen content✓ /causes algal bloom/increased number of bacteria in the water which reduces✓ the quality of the water. (2)

3.6.2 The hot water can be stored until it is cooled down✓ before it is released into the river.
After cooling down the hot water, it can be re-used to cool down the plant again. ✓ Use fans/other technology to cool down the machinery✓ (1)

(Any One)

3.6.3 The warm water may cause fish to die✓ /move away which will cause a loss of income ✓ to the fishermen (2)

3.6.4 The biodiversity increased ✓ because no thermal pc :)
occurred✓

(7)

[16]

TOTAL SECTION B: 30
GRAND TOTAL: 50