



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Micro-organisms

MARKS: 50

TIME: 60 minutes

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 1.1.4 D.



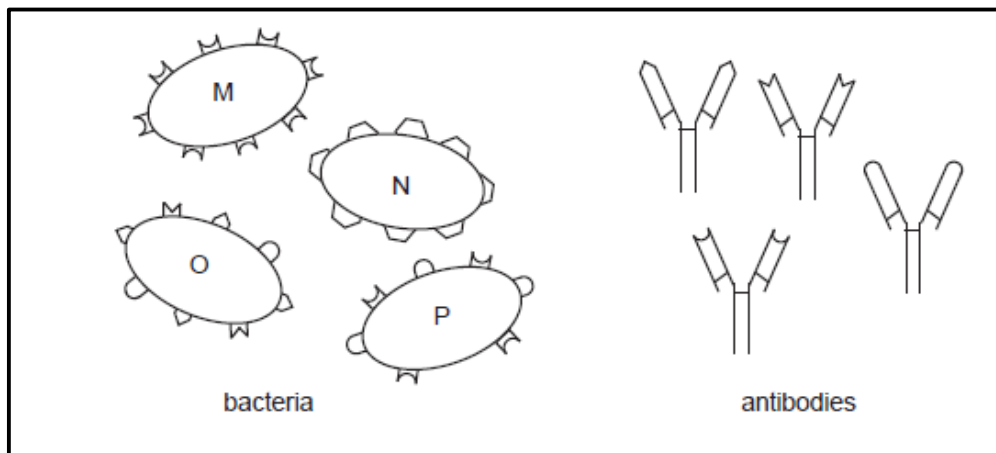
1.1.1 Viruses are mainly composed of ...

- A protein and nucleic acid.
- B DNA and RNA.
- C cytoplasm and nuclei.
- D cellulose and protein.

1.1.2 All viruses are ...

- A prokaryotes.
- B unicellular.
- C cellular in structure.
- D acellular and non-living.

- 1.1.3 A young woman stepped on a dirty, rusty nail. The following diagrams show bacteria isolated from the wound and a range of antibodies that were already present in her body. The antibodies have a specific shape that binds with the antigen found on the surface of the bacteria.



Which type of bacterium will most likely cause a severe infection?

- A M
B N
C O
D P



(3 x 2) (6)

- 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 Organisms that cause disease
- 1.2.2 Life forms that are so small that they cannot be seen with the naked eye
- 1.2.3 The mass of hyphae that makes up the vegetative part of a fungus
- 1.2.4 The kingdom to which the malarial parasite belongs (4 x 1) (4)

TOTAL SECTION A: 10

SECTION B**Question 2**

2.1 Study the extract below about malaria.

Malaria is a parasitic disease which occurs mainly in the tropical and subtropical regions of the world. It is transmitted in humans through the bite by a female mosquito of the *Anopheles species*, which is the vector for the parasite.

The most effective way of managing malaria is to destroy its vector. An insecticide which has been successful to date is DDT. The inner walls of the house are sprayed with DDT so that the mosquitos die if they sit on or near them. However, the use of DDT has been banned since 1972.

In South Africa, the incidence of malaria has been less than 10 000 cases per year. South Africa only stopped its use of DDT in 1996. The number of infections recorded since increased to 64 000 in 2000. When the use of DDT was re-introduced only for disease-vector control, the reported cases decreased to 7 000 in 2005 in South Africa.

- 2.1.1 State any TWO ways to avoid contracting malaria. (2)
- 2.1.2 What is a *vector*? (1)
- 2.1.3 Which genus is the vector for the malarial parasite? (1)
- 2.1.4 Describe how the malaria parasite is passed from one person to another. (2)
- 2.1.5 Explain how an increase in the number of malaria infections would affect the South African economy. (2)
- 2.1.6 Suggest ONE way in which the data about the number of infections may have been collected. (1)
- 2.1.7 Give ONE reason why the number of infections might have been more than the estimated 7 000 in the year 2005. (1)
- (10)**

- 2.2 The table below shows the number of cases of TB and the number of deaths from TB around the world in 2009. Use the information in the table to answer the questions that follow.

REGION	NUMBER OF CASES OF TB (in 1000s)	NUMBER OF DEATHS FROM TB (in 1000s)
Africa	3 900	430
The Americas	350	20
Eastern Mediterranean	1 000	99
Europe	560	62
South-East Asia	4 900	480
Western Pacific	2 900	240

- 2.2.1 State the total number of deaths from TB in Africa. (1)
- 2.2.2 Calculate the percentage of deaths from TB compared to the number of cases of TB in Africa. Show your working. (3)
- 2.2.3 Draw a bar graph to show the number of deaths from TB for the following 4 regions: Africa, Eastern Mediterranean, South-East Asia and Western Pacific. (6)

(10)

[20]



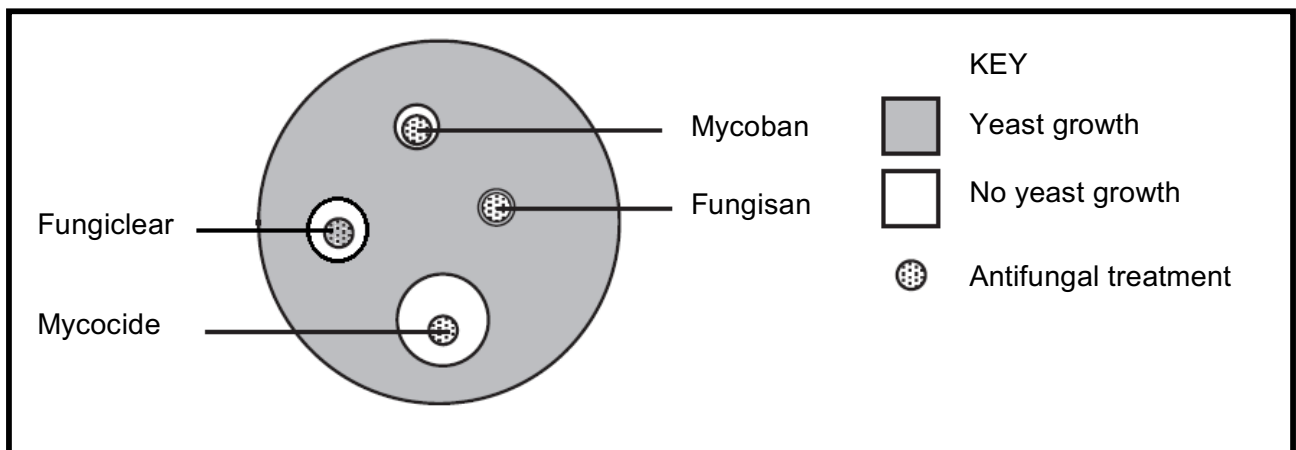
Question 3

- 3.1 Tabulate TWO general structural differences between bacteria and fungi. (5)
- 3.2 Describe the symbiotic relationship between bacteria and leguminous plants (5)

- 3.3 An investigation was carried out to test the effectiveness of four antifungal treatments (Fungiclear, Mycocide, Mycoban, and Fungisan) on preventing the growth of yeast in humans.

The petri dish with the treatments and yeast culture used in the investigation was placed in an incubator at 37 °C.

The results are shown in the diagram below.



- 3.3.1 For this investigation, state the:

- (a) Dependent variable (1)
- (b) Independent variable (1)

- 3.3.2 Explain why the investigator put the petri dish in an incubator at 37 °C. (2)

- 3.3.3 State any TWO factors that the investigator had to control in order for the investigation to be valid. (2)

- 3.3.4 State TWO ways in which the investigator could have increased the reliability of the investigation. (2)

- 3.3.5 Arrange the anti-fungal treatments in the order from MOST effective in preventing the growth of yeast to the LEAST effective in preventing the growth of yeast. (2)

(10)

[20]

TOTAL SECTION B: [40]

GRAND TOTAL: [50]





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

Grade 11

Topic Test Memorandum: Micro-organisms

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | | |
|-----|-------|-----------------------|-----|
| 1.1 | 1.1.1 | A✓✓ | |
| | 1.1.2 | D✓✓ | |
| | 1.1.3 | B✓✓ | (6) |
| 1.2 | 1.2.1 | Pathogens✓/pathogenic | |
| | 1.2.2 | Micro-organisms✓ | |
| | 1.2.3 | Mycelium✓ | |
| | 1.2.4 | Protista✓ | (4) |



TOTAL SECTION A [10]

SECTION B

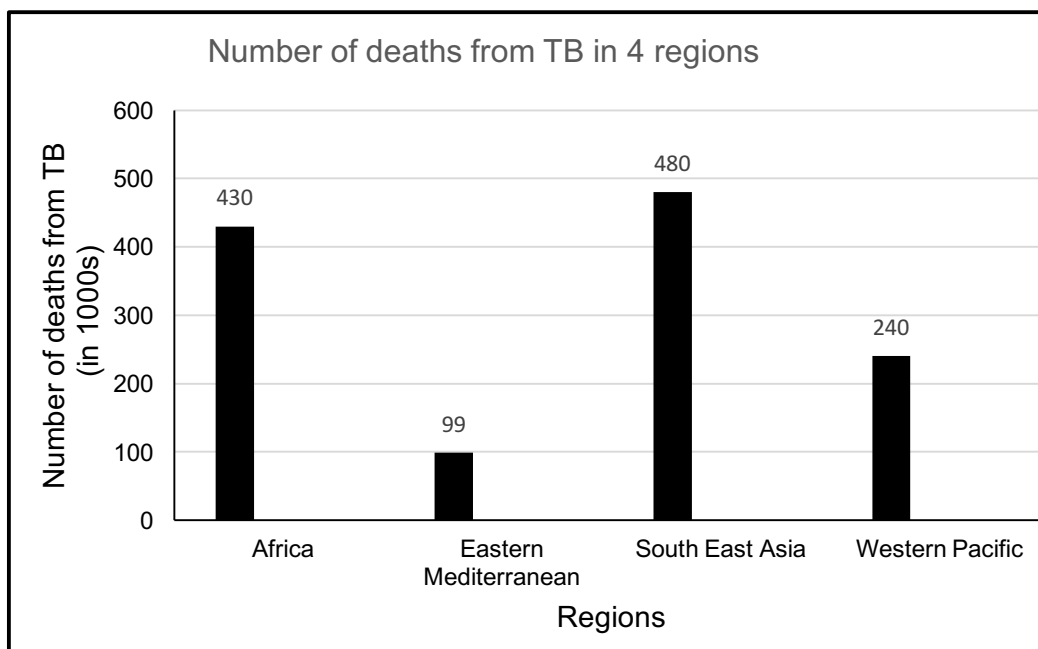
Question 2

- | | | | | |
|----------------------------|-------|--|-------------|-------------|
| 2.1 | 2.1.1 | <ul style="list-style-type: none"> - Take anti-malarial drugs✓ - Use insect repellents on exposed skin✓ - Sleep under bed-nets✓ - Empty areas of standing water to prevent breeding of mosquitoes✓ | (Any 2 x 1) | (2) |
| Mark first TWO only | | | | |
| | 2.1.2 | An organism that transmits a pathogen from one person to another✓ | | (1) |
| | 2.1.3 | <i>Anopheles</i> ✓ | | (1) |
| | 2.1.4 | <ul style="list-style-type: none"> - A female Anopheles mosquito bites an infected person✓ - and then bites another person where the parasite is transferred✓ | | (2) |
| | 2.1.5 | <ul style="list-style-type: none"> - The economy will be negatively affected✓ - because of high cost of malarial treatment✓/decreased work production | | (2) |
| | 2.1.6 | From hospital records✓ | | (1) |
| | 2.1.7 | Not all people affected go to hospital✓ in some areas | | (1) |
| | | | | (10) |

2.2 2.2.1 430 000✓ (1)

2.2.2 $430 / 3900 \checkmark \times 100 \checkmark$ OR $430\,000 / 3\,900\,000 \checkmark \times 100 \checkmark$
= 11.03 ✓ (Accept 11) (3)

2.2.3



Mark allocation of the graph

Criteria	Mark Allocation
Correct type of graph	1
Title of graph (has both variables)	1
Correct label and unit for X-axis and Y-axis	1
Correct scale for Y-axis and correct width of bars and spacing between bars on X-axis	1
Drawing of the graph	1: 1 to 3 bars drawn correctly 2: All 4 bars drawn correctly

(6)
(10)

[20]

Question 3

3.1

Bacteria	Fungi
1 All microscopic ✓	1 Some microscopic, many macroscopic ✓
2 Prokaryotic ✓	2 Eukaryotic ✓
3 All unicellular ✓	3 Unicellular and multicellular organisms ✓

Mark first TWO only

(Any 2 x 2 + 1 for table) (5)

3.2

- Bacteria traps free nitrogen from the soil ✓
- converts free nitrogen into ammonia ✓
- and then into amino acids ✓
- Plants use amino acids to make proteins ✓
- The bacteria, in turn, gets nutrients from the plants ✓
- This relationship is termed mutualism ✓
- Since both the bacteria and the legumes benefit ✓

Any 5 (5)

3.3

- 3.3.1 (a) Growth of yeast ✓ (1)
(b) Antifungal treatment ✓ (1)

- 3.3.2 - This represents the body temperature of humans ✓
- and the antifungal treatments are designed for use in humans ✓ (2)

- 3.3.3 - Amount of anti-fungal treatment used must be the same ✓
- Concentration of anti-fungal treatment must be the same ✓
- Yeast growth must cover 100% of the petri-dish ✓
- Same person should take all the readings ✓ (any 2 x 1) (2)

Mark first TWO only

- 3.3.4 - Repeat the investigation ✓
- Use many samples/petri-dishes with the same set-up ✓ (2)

Mark first TWO only

- 3.3.5 Mycoside – Fungiclear – Mycoban – Fungisan ✓ ✓ (2)
(Must have the correct sequence) (10)
[20]

TOTAL FOR SECTION B [40]

FINAL TOTAL [50]

Life Sciences Analysis Grid
Grade: 11
Topic Test - Micro-organisms

Question	Cognitive Levels			
	A	B	C	D
1.1.1	2			
1.1.2	2			
1.1.3				2
1.2.1	1			
1.2.2	1			
1.2.3	1			
1.2.4	1			
2.1.1	2			
2.1.2		1		
2.1.3		1		
2.1.4	2			
2.1.5			2	
2.1.6				1
2.1.7				1
2.2.1	1			
2.2.2		3		
2.2.3	1	3	2	
3.1	1	4		
3.2	5			
3.3.1 (a)				1
3.3.1 (b)				1
3.3.2			2	
3.3.3				2
3.3.4			2	
3.3.5				2
Actual Marks	20	12	8	10
Norm Marks	20	12,5	10	7,5



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: PLANT DIVERSITY

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

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 (1.1 to 1.5) in the ANSWER BOOK.



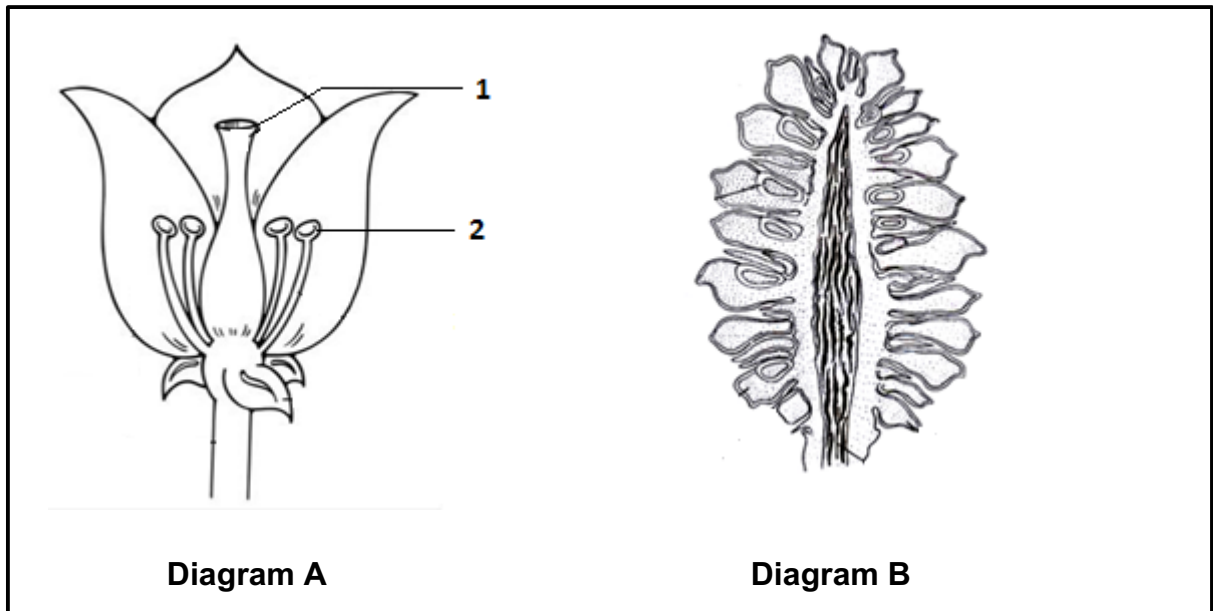
COLUMN I	COLUMN II
1.1 Vascular tissue	A: Xylem B: Phloem
1.2 Gametophyte is the dominant generation	A: Moss B: Fern
1.3 Dependent on water for fertilisation	A: Gymnospermae B: Pteridophyta
1.4 Ovule is inside an ovary	A: Gymnospermae B: Angiospermae
1.5 A part of the sporophyte generation	A: Seta B: Sorus

(5 x 2) (10)

TOTAL SECTION A: 10

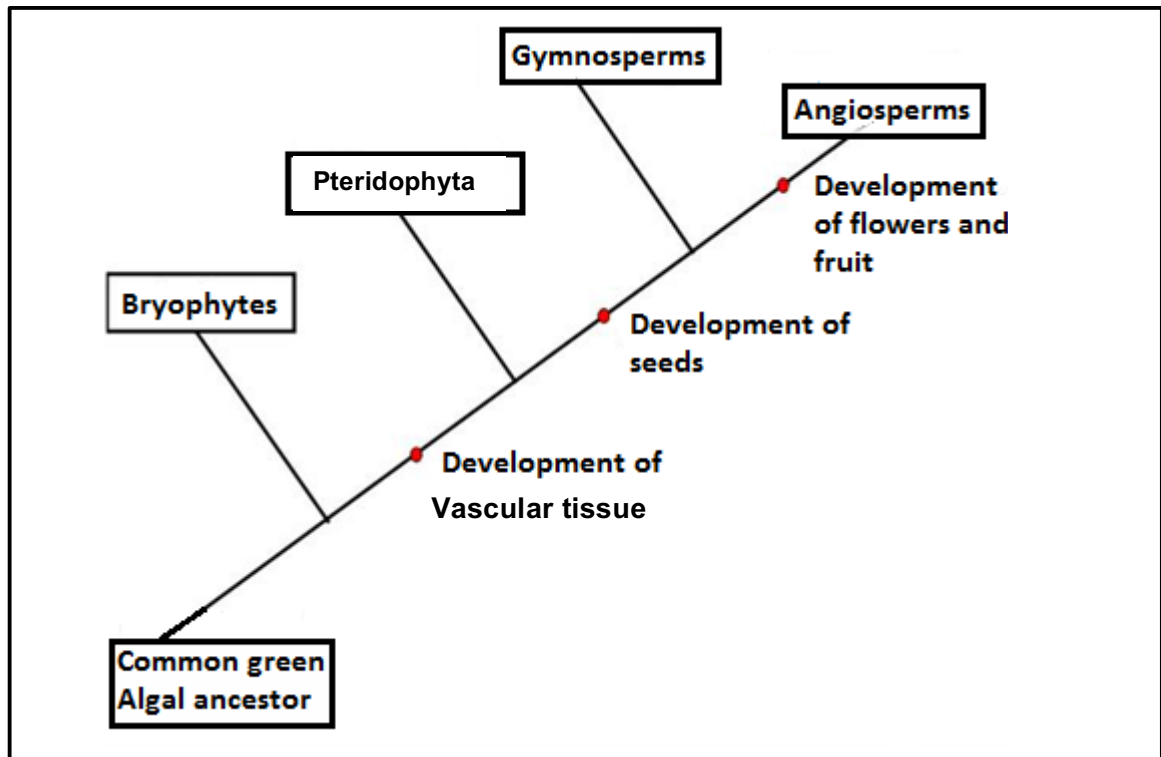
SECTION B**Question 2**

2.1 Study the diagrams below representing two plant organs.



- 2.1.1 Name the plant division that both the organs belong to. (1)
- 2.1.2 Identify the organ in **Diagram B**. (1)
- 2.1.3 Identify parts **1** and **2**. (2)
- 2.1.4 Explain ONE way in which the plant organ represented by **Diagram A** is more successful in reproduction than the plant organ represented by **Diagram B**. (2)
- (6)**

2.2 The diagram below shows the relationships between the plant groups studied.



- 2.2.1 Give a name for this type of diagram. (1)
- 2.2.2 Which terrestrial plant group is least suited to life on land? (1)
- 2.2.3 The **Gymnosperms** are more advanced than the **Bryophytes**.
State TWO pieces of information from the diagram that support this statement. (2)
- 2.2.4 What feature do all four plant groups have in common with their algal ancestor? (1)

(5)

[11]

QUESTION 3

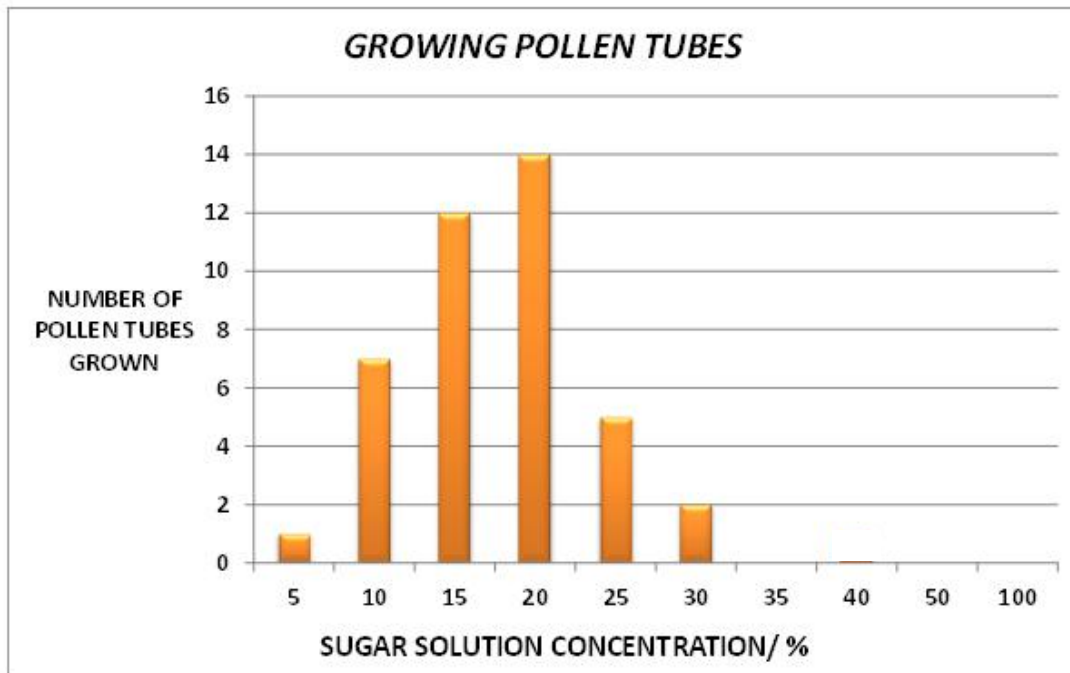
- 3.1 A Grade 11 learner wanted to investigate the preferences of two pollinating agents, hummingbirds and hawkmoths, to visit two different types of plant species, *A. formosa* and *A. pubescens*. The total number of visits to the flowers of these plant species was recorded over a period of 24 hours.

The results are shown in the table below.

Plant species	Number of visits to the flowers by pollinators	
	Hummingbirds	Hawkmoths
<i>A. formosa</i>	81	2
<i>A. pubescens</i>	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)
(5)

3.2 Study the graph below.



- 3.2.1 What concentration of sugar solution (%) is best suited for the growth of pollen tubes? (1)
- 3.2.2 Give a possible explanation for the results obtained when the concentration of the sugar solution was 35% and above. (2)
- 3.2.3 State ONE function of pollen tubes in the reproduction process of certain plant groups. (1)
- (4)
- [9]

TOTAL SECTION B: [20]

SECTION C**Question 4**

A trend in the evolution of plants has been an increase in the size of plants and a decreasing dependence on water for reproduction.

Explain the above trend with regard to the bryophytes and the angiosperms in relation to their respective modes of life.

Synthesis: (17)
(3)
(20)

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

TOTAL SECTION C: [20]
GRAND TOTAL: [50]





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

Topic Test Memorandum: Plant Diversity

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | |
|-----|----------------|------|
| 1.1 | Both A and B✓✓ | |
| 1.2 | A only✓✓ | |
| 1.3 | B only✓✓ | |
| 1.4 | B only✓✓ | |
| 1.5 | Both A and B✓✓ | (10) |

TOTAL SECTION A [10]

SECTION B

Question 2



- | | | | |
|-----|-------|--|------------|
| 2.1 | 2.1.1 | Spermatophyta✓ | (1) |
| | 2.1.2 | Female Cone✓ | (1) |
| | 2.1.3 | 1 - Stigma✓
2 - Anther✓ | (2) |
| | 2.1.4 | - Organ A / flower has a variety of pollinating agents✓including wind
- while organ B/the cone is pollinated by wind only✓
(Mark first ONE only) | (2)
(6) |
| 2.2 | 2.2.1 | Phylogenetic tree✓/cladogram | (1) |
| | 2.2.2 | Bryophytes✓ | (1) |
| | 2.2.3 | - Gymnosperms have seeds✓
- Gymnosperms have vascular tissue✓
(Mark FIRST TWO only) | (2) |
| | 2.2.4 | Chlorophyll✓/Photosynthetic | (1) |

(5)

[11]

Question 3

- 3.1 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✓ (Any 1) (1)
(Mark FIRST ONE only)
- 3.1.4 Hummingbirds prefer *A. formosa* plant species, while hawkmoths prefer *A. pubescens* plant species✓✓ (2)
(5)
- 3.2 3.2.1 20✓% (1)
- 3.2.2 - No pollen tubes grew✓
- Since the high concentration of sugar solution caused plasmolysis in the pollen grains✓ (2)
- 3.2.3 To carry the male gamete towards the female gamete✓ (1)
(Mark FIRST ONE only) (4)

**[9]****TOTAL SECTION B [20]**

SECTION C**Question 4****Size of the plants.**

- Bryophytes are small plants/few centimetres tall✓
- that do not have true strengthening tissue✓
- for keeping the plant upright✓
- and no conducting tissue✓
- to conduct water long distances✓
- In addition it does not contain true roots, stems and leaves✓
- and have no cuticle to reduce water loss✓

any 4/5

- Angiosperms may be very tall/grow up to a few metres✓
- since they have well-developed conducting tissue/xylem ✓
- which allows water to be pushed up to great heights✓
- They also have strengthening tissue✓
- to keep a tall plant upright✓
- They have well developed roots and stems✓
- and the leaves have cuticles to reduce water loss✓

any 4/5 (max 9)

Decreasing dependence on water for reproduction.

- Bryophytes depend on water for sexual reproduction✓
- The sperm cell need to swim in a film of water✓
- from the male sex organs ✓
- to reach the egg cell/ovum✓
- in the female sex organ✓
- These plants therefore always grow in a moist environment✓
- and the sex organs are found on the undersurface of the gametophyte✓

any 4

- In angiosperms water is not needed to carry sperm cells to the ovum✓
- During pollination✓
- wind/insects/birds carry the pollen grains to another plant✓
- A pollen tube containing the male gametes✓
- germinates towards the egg cell/ovum✓
- Angiosperms are therefore not restricted to moist habitats✓

any 4 (max 8)

Content: 17

Synthesis: 3

Total: 20

ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information is relevant to the topic	Ideas arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay in Q 4	Only information relevant to: - Size of the plants and - Decreasing dependence on water for reproduction is given for bryophytes and angiosperms. There is no irrelevant information	The description of: - Size of the plants and - Decreasing dependence on water for reproduction given for each of bryophytes and angiosperms is logical and sequential.	Essay contains at least the following as it relates to bryophytes and angiosperms: - Size of the plants (6/9) - Decreasing dependence on water for reproduction (5/8)
Mark	1	1	1

FINAL TOTAL [50]

Life Sciences Analysis Grid

Grade: 11

Topic Test - Plant Diversity

		Cognitive Levels				
Question	A	B	C	D		
1.1		10				
2.1.1		1				
2.1.2		1				
2.1.3	2					
2.1.4			2			
2.2.1	1					
2.2.2		1				
2.2.3			2			
2.2.4			1			
3.1.1				1		
3.1.2				1		
3.1.3				1		
3.1.4				2		
3.2.1			1			
3.2.2				2		
3.2.3	1					
4.	17			3		
Actual Marks	21	13	6	10		50
Norm Marks	20	12,5	10	7,5		50



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Animal Diversity

MARKS: 50

TIME: 60 minutes

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 1.1.4) in your ANSWER BOOK, for example 1.1.5 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

1.1.3 Which one of the following are triploblastic and lack a through gut and coelom?

- A Cnidarians
- B Platyhelminthes
- C Annelids
- D Arthropods

1.1.4 Which ONE of the following is an advantage of radial symmetry?

- A Cephalisation cannot develop
- B Can react to stimuli in all directions
- C Movement is rapid and in a forward direction
- D Specialised sensory organs cannot develop

(4 x 2) (8)

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 1.2.7) 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

1.2.5 Type of skeleton in cnidarians

1.2.6 The accumulation of sense organs at one end that often leads to the development of a head

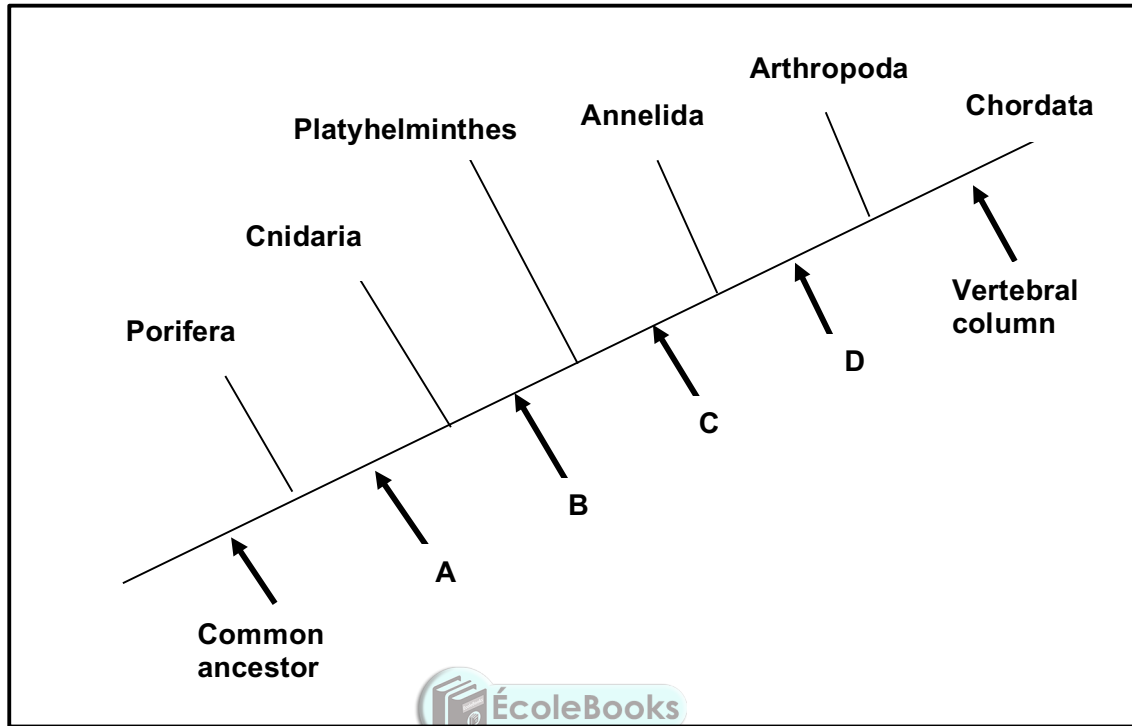
1.2.7 Phylum to which vertebrates belong (7)

TOTAL SECTION A: 15

SECTION B

Question 2

- 2.1 The diagram below represents a cladogram (phylogenetic tree) showing the relationships amongst some animal phyla. The letters **A** to **D** indicate the characteristics which are shared by the different phyla.



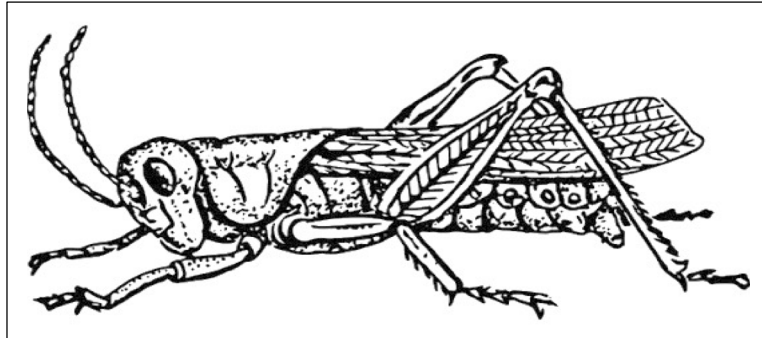
- 2.1.1 Study the following characteristics.

Bilateral symmetry	Coelom	Tissues
Asymmetry	Jointed appendages	

Which characteristic appeared at the time represented by the following letters in the cladogram above:

- (a) **A** (1)
 (b) **B** (1)
 (c) **C** (1)
 (d) **D** (1)
- 2.1.2 From the diagram above, state ONE characteristic that is not shared by the phyla Arthropoda and Chordata. (1)
- 2.1.3 Explain ONE advantage of the development of the coelom in some animals. (2)
- 2.1.4 Draw a labelled plan diagram of the body wall of a cnidarian in transverse section. (4)
(11)

- 2.2 The diagram below represents a locust which belongs to one phylum of the kingdom Animalia.



- 2.2.1 Identify the phylum to which the locust belongs. (1)
- 2.2.2 Name the type of skeleton found in a locust. (1)
- 2.2.3 State ONE disadvantage of having the type of skeleton mentioned in QUESTION 2.2.2. (1)
- 2.2.4 Explain how the locust overcomes the disadvantage stated in QUESTION 2.2.3. (2)
- 2.2.5 Explain why a blood system is necessary in a coelomate organism such as a locust, with regards to nutrition. (4)
- (9)**
- [20]**

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 forms 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 The information in the table is a record of the number of different animal species in South Africa and in the world.

Taxon		Number of species in SA	Number of species in the world
VERTEBRATES		X	59 811
Mammals		314	5 416
Birds		796	9 956
Reptiles		173	5 240
Amphibians		285	6 199
Fish	Freshwater	122	9 410
	Marine	3 294	20 590
INVERTEBRATES		66 185	1 203 375
Insects		-	950 000
Molluscs		-	81 000
Crustaceans		-	40 000
Corals		-	2 175

- 3.2.1 How many vertebrate animal species (**X**) occurs in South Africa? (1)
- 3.2.2 What percentage of the total number of marine fish in the world is represented by the South African marine fish? Show all your working. (3)
- 3.2.3 According to the table, which invertebrate animal species contributes the most to biodiversity in the world? (1)
- 3.2.4 Explain TWO ways in which humans would be affected if all the insects were to become extinct. (4)
- (9)
- [15]

TOTAL SECTION B: [35]

GRAND TOTAL: [50]



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

Topic Test Memorandum: Animal Diversity

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | |
|-----|-------|-----|
| 1.1 | 1.1.1 | C✓✓ |
| | 1.1.2 | B✓✓ |
| | 1.1.3 | B✓✓ |
| | 1.1.4 | B✓✓ |

(8)



- | | | |
|-----|-------|--------------------|
| 1.2 | 1.2.1 | Endoderm✓ |
| | 1.2.2 | Open blood system✓ |
| | 1.2.3 | Egestion✓ |
| | 1.2.4 | Sessile✓/sedentary |
| | 1.2.5 | Hydrostatic✓ |
| | 1.2.6 | Cephalisation✓ |
| | 1.2.7 | Chordata✓ |

(7)

TOTAL SECTION A [15]

SECTION B**Question 2**

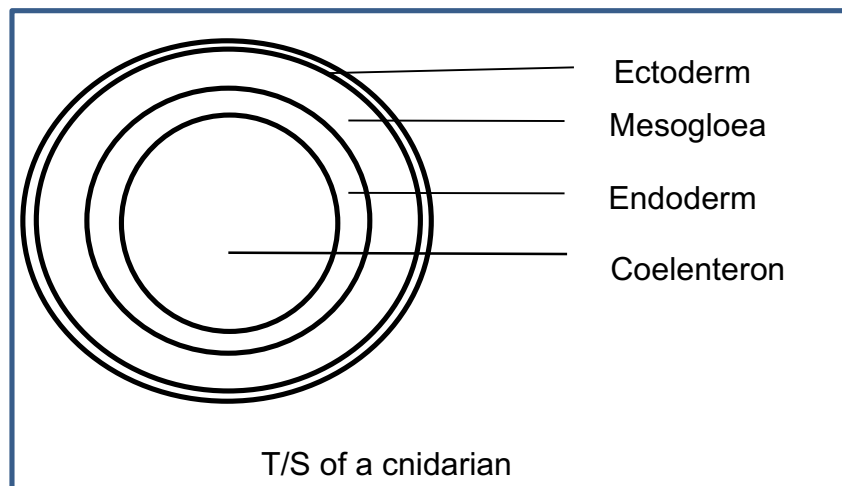
- 2.1 2.1.1 (a) Tissues✓ (1)
 (b) Bilateral symmetry✓ (1)
 (c) Coelom✓ (1)
 (d) Jointed appendages✓ (1)

2.1.2 Presence of a vertebral column✓ (1)

- 2.1.3
- The coelom separates the body wall from the gut wall✓
 - allowing the muscles of the body wall to function independently of the gut wall✓
 - Coelom provides a hydrostatic skeleton✓
 - against which the muscles can work✓
 - The coelom provides a space✓
 - to accommodate the various organs in the body✓/ to allow growth of the organs
 - The coelomic fluid✓
 - acts as a shock absorber✓/keeps the skin moist for gas exchange (Any 1 x 2) (2)

(Mark first ONE only)

2.1.4



Criteria	Marks
Caption	1
Any 3 correct labels	3

(4)
(11)

- | | | | | |
|-----|-------|---|-------------|-----|
| 2.2 | 2.2.1 | Arthropoda✓ | | (1) |
| | 2.2.2 | Exoskeleton✓ | | (1) |
| | 2.2.3 | - Skeleton cannot grow✓
- Skeleton is impermeable✓ | (Any 1) | (1) |
| | | (Mark first ONE only) | | |
| | 2.2.4 | - Locusts moult✓
- in order to grow✓

- They have spiracles✓
- to allow for gaseous exchange✓ | (Any 1 x 2) | (2) |
| | 2.2.5 | - The gut wall is separated from the body wall✓
- making the animal bigger✓
- so that diffusion of substances is not efficient/sufficient✓
- Blood system will help transport the food✓
- from the gut to the cells of the body wall✓ | (Any 4) | (4) |

(9)



[20]

Question 3

3.1	3.1.1	Number of egg pods formed✓	(1)
	3.1.2	<ul style="list-style-type: none"> - 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✓ 	(Any 3) (3)
		(Mark first THREE only)	
	3.1.3	An increase in the amount of water increases the number of pods formed up to a point but as the amount of water increases further, the number of pods formed decreases✓✓	(2)
			(6)
3.2	3.2.1	4984✓	(1)
	3.2.2	$3294/20590 \times 100 = 15,99/16$	(3)
	3.2.3	Insects✓	(1)
	3.2.4	<ul style="list-style-type: none"> - Food chains/webs would be affected✓ - indirectly leading to the death of organisms upon which humans feed✓ - Pollination of crop plants would stop✓ - decreasing the amount of food for humans✓ - No insects to carry disease✓ (e.g. mosquitoes, flies, bugs) - leading to fewer diseases in humans✓/increase in life-span 	(Any 2 x 2) (4)
		(Mark first TWO only)	(9)
			(15)
TOTAL SECTION B			[35]
GRAND TOTAL			[50]

Life Sciences Analysis Grid

Grade: 11

Topic Test - Animal Diversity

	Cognitive Levels					
Question	A	B	C	D		
1.1						
1.1.1	2					
1.1.2		2				
1.1.3		2				
1.1.4	2					
1.2						
1.2.1 - 1.2.7	7					
2.1						
2.1.1 (a) - (d)			4			
2.1.2		1				
2.1.3			2			
2.1.4	4					
2.2						
2.2.1	1					
2.2.2	1					
2.2.3		1				
2.2.4		2				
2.2.5			4			
3.1						
3.1.1				1		
3.1.2				3		
3.1.3				2		
3.2						
3.2.1		1				
3.2.2		3				
3.2.3				1		
3.2.4			4			
Actual Marks	17	12	14	7		50
Norm Marks	20	12.5	10	7.5		50





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: PHOTOSYNTHESIS

MARKS: 50

TIME: 60 minutes

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 1.1.4 D.

- 1.1.1 Which ONE of the following is a requirement in the dark phase of photosynthesis?

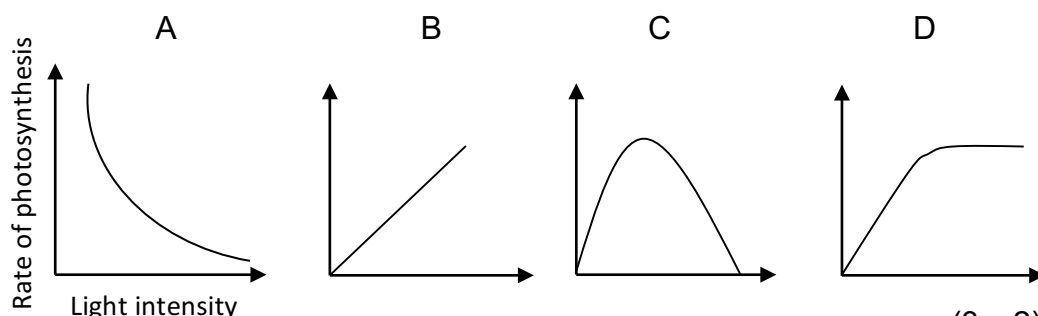
- A Carbon dioxide
- B Oxygen
- C Radiant energy
- D Water



- 1.1.2 The light phase of photosynthesis takes place ...

- A when light is absent.
- B when light is present.
- C during the night and day.
- D continuously.

- 1.1.3 Which ONE of the following graphs (A-D) represents the relationship between light intensity and the rate of photosynthesis most accurately?



(3 x 2)

(6)

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 phase of photosynthesis that is independent of light
- 1.2.2 Openings in a leaf through which gaseous exchange takes place during photosynthesis
- 1.2.3 An energy-rich carbohydrate that is formed during photosynthesis
- 1.2.4 A molecule that serves as an energy carrier during photosynthesis to help make organic molecules

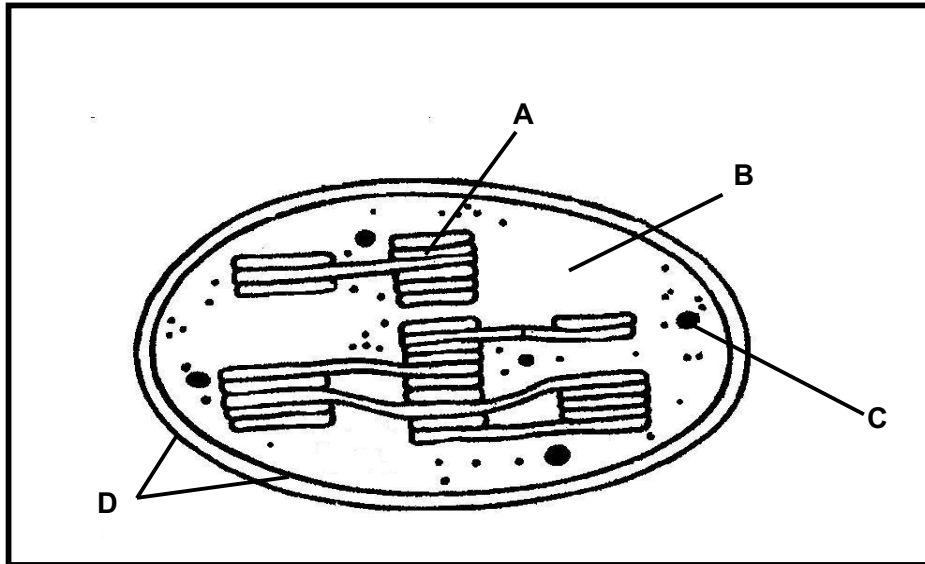
(4)

TOTAL SECTION A: 10



SECTION B**Question 2**

- 2.1 The diagram below represents the chloroplast in which photosynthesis takes place.



- 2.1.1 Give the LETTER and NAME of the part:
- (a) Which stores the product of photosynthesis (2)
 - (b) Where carbon dioxide is used (2)
 - (c) Which contains chlorophyll (2)
- 2.1.2 Describe the role of water as a requirement in photosynthesis. (2)
- 2.1.3 State TWO ways in which photosynthesis is biologically important. (2)
- (10)**

- 2.2 The passage below relates to the agricultural use and manipulation of the factors that affect the rate of photosynthesis.

**THE AGRICULTURAL USE OF THE FACTORS
THAT LIMIT PHOTOSYNTHESIS**

Flowers, fruit and vegetables can all be grown in plastic tunnels or greenhouses. The farmers use these structures to regulate the light intensity, temperature and carbon dioxide concentration.

Artificial lighting in greenhouses increases the light intensity. The glass or plastic walls of the greenhouses trap the heat of the sun within the structures, thereby raising the temperature. Carbon dioxide concentration of the air within the structure is increased by pumping carbon dioxide into the structure.

This ensures that plants grow as fast as possible and to maximize the crop yield.

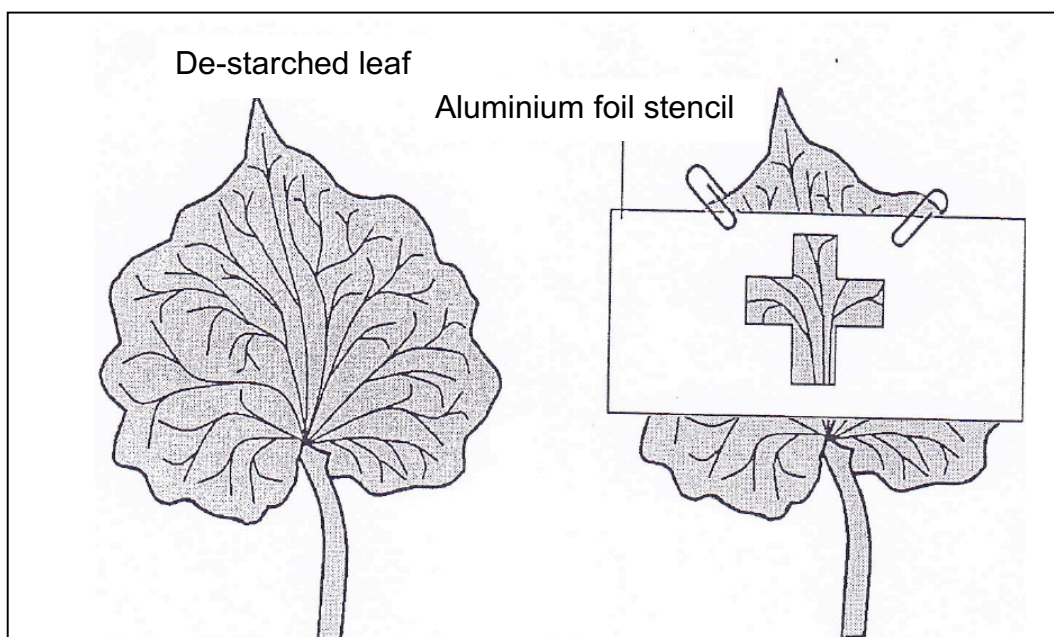
- 2.2.1 Name THREE limiting factors of photosynthesis that are mentioned in the passage. (3)
- 2.2.2 Explain why a continuous increase in carbon dioxide levels will not cause the rate of photosynthesis to increase continuously. (4)
- 2.2.3 Explain ONE other value of greenhouses to agriculture, besides its influence on the limiting factors of photosynthesis. (2)
- (9)**
- [19]**

Question 3

- 3.1 An investigation was conducted to find out whether light is necessary for photosynthesis.

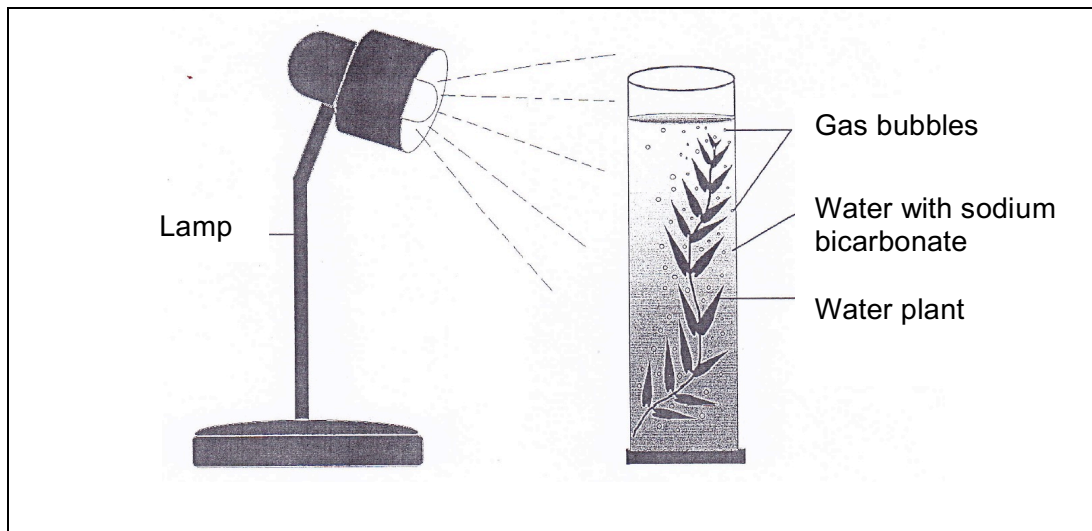
The procedure followed is given below:

- A geranium potted-plant was de-starched by placing it in a dark cupboard for 48 hours.
- A cross-shaped light-slit was cut out on aluminium foil.
- The aluminium foil stencil was then clipped onto one of the de-starched leaves, as shown in the diagram below.
- The potted plant was exposed to bright sunlight for 5 hours.
- After 5 hours, the aluminium foil stencil was removed and the leaf was tested for starch.



- 3.1.1 Explain why the plant was de-starched. (2)
- 3.1.2 Describe the steps, in the correct sequence, that were followed during the starch test. (4)
- 3.1.3 Draw a labelled diagram of the leaf showing the result of the investigation. Use a pencil and shade the parts which tested positive for starch. (3)
- (9)**

- 3.2 The apparatus shown below was used in an investigation to determine the effect of light intensity on the rate of photosynthesis.



The distance between the light source (lamp) and the apparatus (with a water plant) was changed at regular intervals, recording the number of bubbles released by the water plant at each distance.

The results are shown in the table below.

Distance between lamp and plant (mm)	40	80	120	160	200	240	280	320	360	400	440
Bubbles formed per minute	30	30	30	25	15	10	5	3	2	0	0

- 3.2.1 For the above investigation, state:

- (a) The dependent variable (1)
- (b) How the dependent variable was measured (1)
- (c) The independent variable (1)
- (d) How the independent variable was varied (1)

- 3.2.2 State the function of sodium bicarbonate in this investigation. (1)

- 3.2.3 State ONE way in which the reliability of the investigation could be increased. (1)

- 3.2.4 Plot a line graph to represent the data obtained during this investigation. (6)
(12)
(21)

TOTAL SECTION B: [40]
GRAND TOTAL: [50]



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

Topic Test Memorandum: Photosynthesis

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | | |
|-----|-------|-----|-----|
| 1.1 | 1.1.1 | A✓✓ | |
| | 1.1.2 | B✓✓ | |
| | 1.1.3 | D✓✓ | (6) |

- | | | | |
|-----|-------|-----------------------------|--|
| 1.2 | 1.2.1 | Dark phase✓ | |
| | 1.2.2 | Stomata✓ | |
| | 1.2.3 | Glucose✓ | |
| | 1.2.4 | ATP✓/Adenosine-triphosphate | |



(4)

TOTAL SECTION A [10]

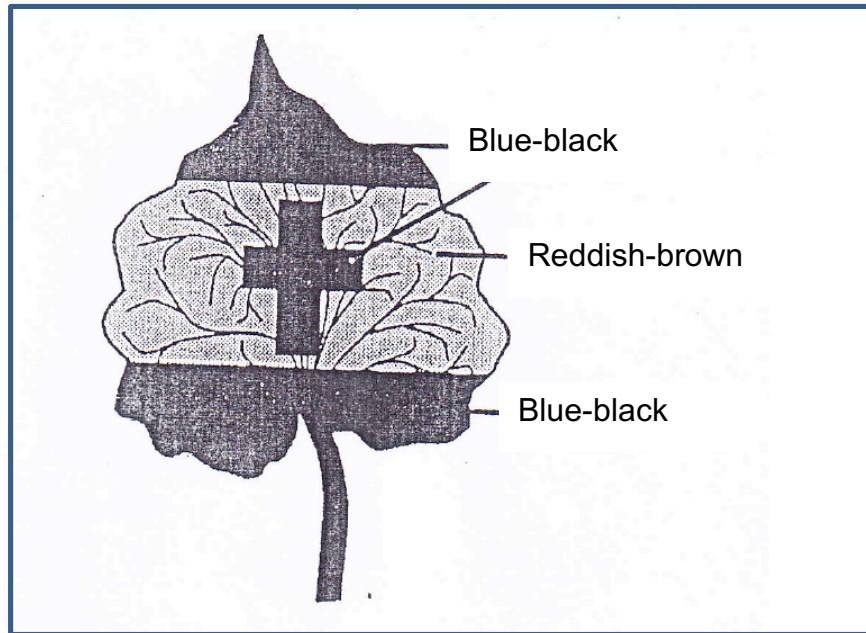
SECTION B**Question 2**

- 2.1 2.1.1 (a) C✓ – starch grain✓ (2)
 (b) B✓ – stroma✓ (2)
 (c) A✓ – granum✓ (2)
- 2.1.2 - The hydrogen from the splitting of water✓ (2)
 - combines with CO₂ to form glucose✓
- 2.1.3 - Provides food/energy for organisms in higher trophic levels✓ (2)
 - Maintains a balance of CO₂/O₂ levels in the atmosphere✓
 (Mark first TWO only) (10)
- 2.2 2.2.1 - Light intensity✓
 - Environmental temperature✓
 - Carbon dioxide concentration✓ (3)
 (Mark first THREE only)
- 2.2.2 - Excess carbon dioxide will combine with water to form carbonic acid✓
 - which causes the pH to decrease✓
 - The enzymes of photosynthesis will become denatured✓
 - causing the rate of photosynthesis to decrease✓ (4)
- 2.2.3 - Less chance of pests✓/better control of pests/less water lost through evaporation
 - which increases crop yield✓ (2)
 (Mark first ONE only) (9)
- [19]**

Question 3

- 3.1 3.1.1 - To ensure that any starch present✓in leaf
- was produced during the investigation/in the 5 hours✓ (2)
- 3.1.2 - Boil leaf in water for 3-4 minutes✓
- Boil leaf in alcohol for about 2 minutes✓
- Rinse the leaf in cold water✓
- Add a few drops of iodine solution to the leaf✓ (4)

3.1.3



Leaf after starch test

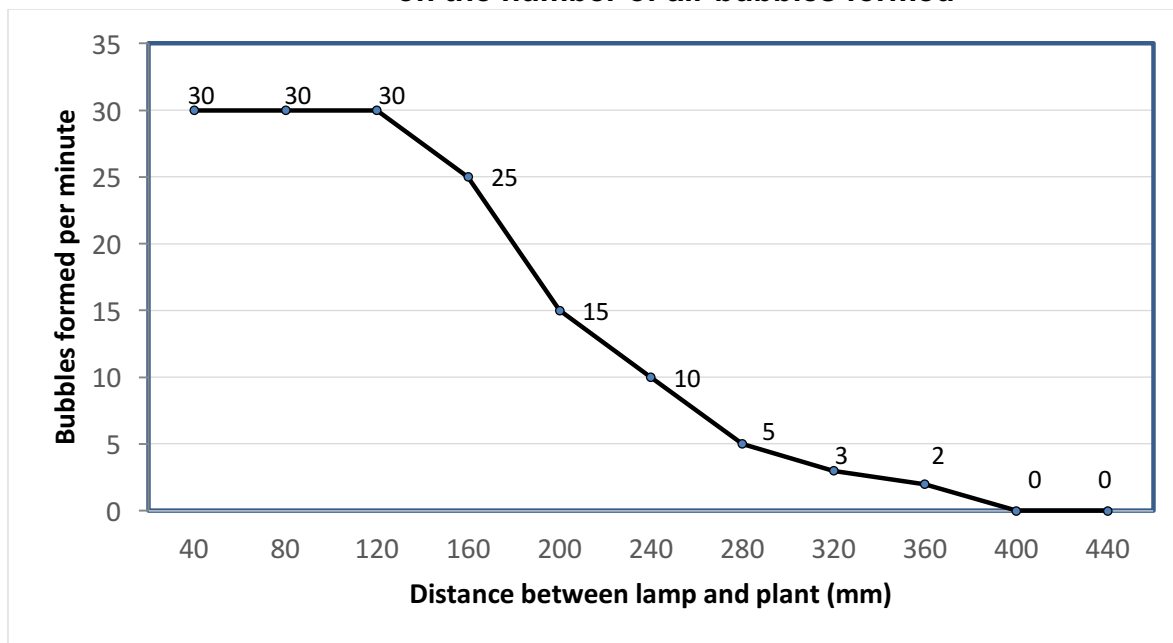
Criterion	Mark
Correct caption	1
Any 2 correct labels	2

(3)
(9)

- 3.2 3.2.1 (a) Rate of photosynthesis✓ (1)
(b) Counting the number of bubbles formed per minute✓ (1)
(c) Light intensity✓ (1)
(d) Changing the distance of the lamp from the plant✓ (1)
- 3.2.2 To provide carbon dioxide within the apparatus✓ (1)
- 3.2.3 - Repeat the investigation✓
- Take more readings/average at each distance✓ Any 1 (1)
(Mark first ONE only)

3.2.4

**The effect of distance between the lamp and the apparatus
on the number of air bubbles formed**



Criterion	Elaboration	Mark
Type of graph	Line graph drawn	1
Caption	Includes both variables-distance between lamp and plant and no. of bubbles formed per minute	1
Scale	Appropriate scale for x-axis and y-axis	1
Labelling of axis	Correct label and units for x-axis and y-axis	1
Plotting of points	1-10 points plotted correctly – 1 mark All 11 points correctly plotted – 2 marks	2

(6)
(12)
(21)

TOTAL SECTION B [40]

GRAND TOTAL [50]

Life Sciences Analysis Grid**Grade: 11****Topic Test - Photosynthesis**

		Cognitive Levels				
Question	A	B	C	D		
1.1						
1.1.1	2					
1.1.2	2					
1.1.3				2		
1.2						
1.2.1 - 1.2.4	4					
2.1						
2.1.1	3	3				
2.1.2		2				
2.1.3	2					
2.2						
2.2.1		3				
2.2.2			4			
2.2.3				2		
3.1						
3.1.1		2				
3.1.2	4					
3.1.3			3			
3.2						
3.2.1 (a)				1		
3.2.1 (b)			1			
3.2.1 (c)				1		
3.2.1 (d)			1			
3.2.2	1					
3.2.3				1		
3.2.4	1	3	2			
Actual Marks	19	13	11	7		50
Norm Marks	20	12.5	10	7.5		50





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Nutrition

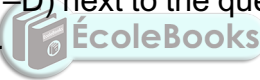
MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A –D) next to the question number 1.1 to 1.5 in your ANSWER BOOK , for example 1.6 D.



1.1 Which ONE of the following can be absorbed into the blood without further digestion?

- A Starch
- B Glycogen
- C Glucose
- D Fats

1.2 If the pancreatic duct is cut ...

- A protein digestion will not be affected.
- B homeostatic control of the glucose level will be affected.
- C carbohydrate digestion will be affected.
- D lipid digestion will not be affected.

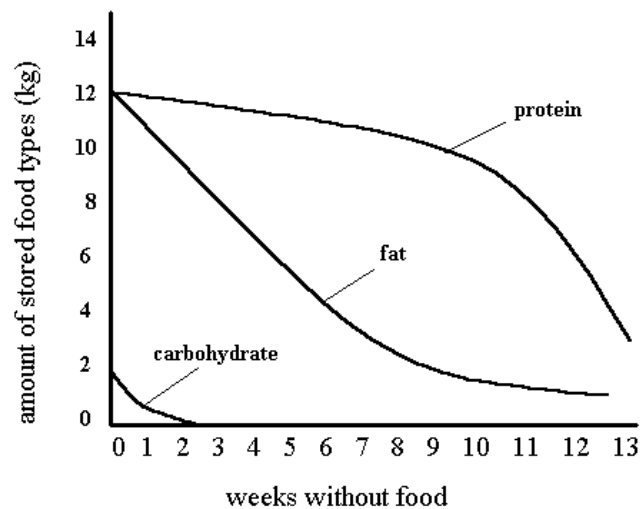
1.3 Which ONE of the following is not part of the alimentary canal?

- A Stomach
- B Colon
- C Pancreas
- D Appendix

1.4 Which ONE of the following combinations of temperature and pH values will give the best conditions for a protein digesting enzyme found in the stomach?

- A 25°C, pH 2
- B 30°C, pH 5
- C 37°C, pH 3
- D 40°C, pH 7

1.5 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...

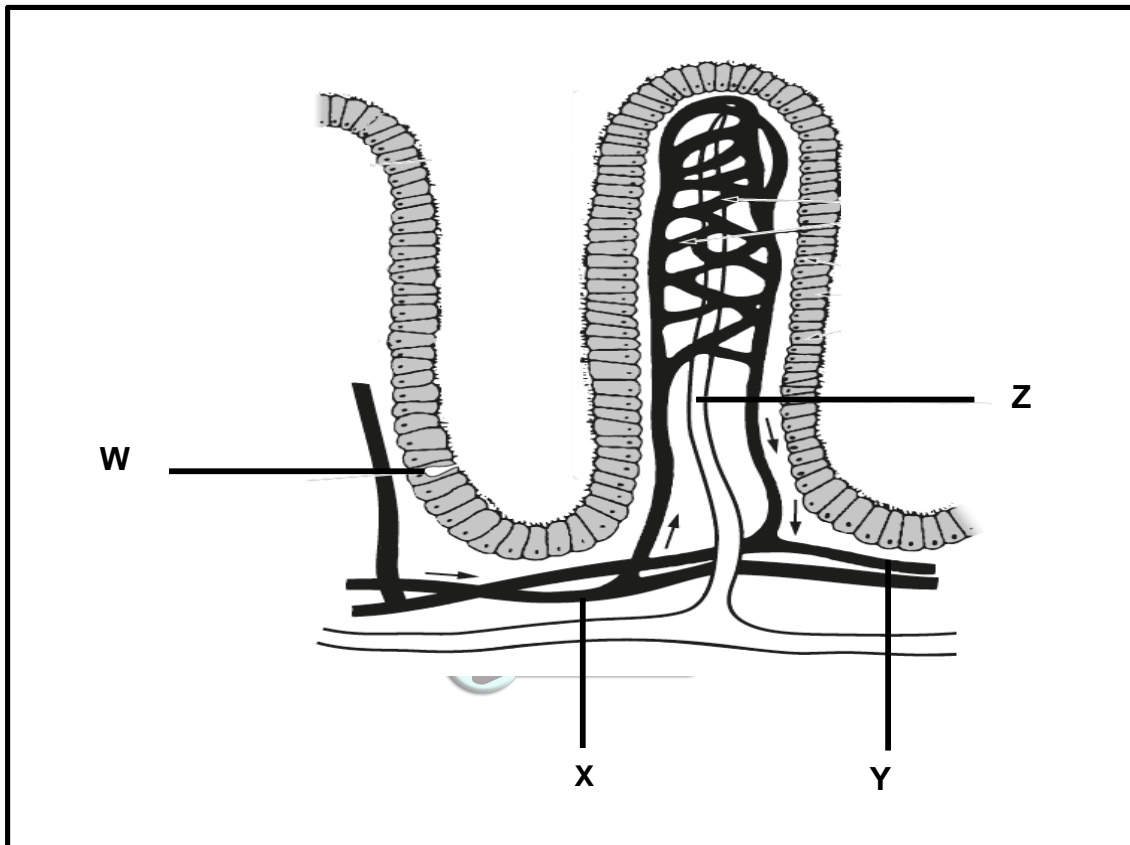
- A carbohydrates; proteins; fats.
- B fats; proteins; carbohydrates.
- C proteins; fats; carbohydrates.
- D carbohydrates; fats; proteins.

(5 x 2) (10)

SECTION B

Question 2

The diagram below shows the diagram of a villus found in the small intestine.



- 2.1 Explain ONE way in which cell **W** is adapted for its function. (2)
- 2.2 Describe how nutrients are absorbed into vessel **Z**. (2)
- 2.3 Explain TWO ways in which the structure represented in the diagram is adapted to increase the amount of nutrients that are absorbed. (4)
- 2.4 Explain ONE difference in the nutrient content of vessel **Y** as compared to vessel **X**. (2)

(10)

Question 3

The table below shows the nutritional information on a 360g breakfast cereal packet bought at a local supermarket.

Nutrients and energy	Average values per 30g of cereal only	Average values per 30g of cereal with 100ml of skim milk
Energy (kJ)	430	572
Protein (g)	4,8	9,2
Carbohydrates(g)	23,0	28,0
Dietary fibre (g)	4,2	4,2
Fat (g)	1,8	2,4
Sodium (mg)	110	260
Cholesterol (mg)	0	1,8

- 3.1. Calculate the amount of energy (in kJ) that is provided by 100ml of skim milk. Show all working. (2)
- 3.2. State TWO ways in which the dietary fibre/roughage contained in the cereal is important. (2)
- 3.3 Draw a bar graph comparing the average values of protein, carbohydrates and fat found in 30g of cereal only and in 30g of cereal with 100ml of skim milk. (6)
(10)
- TOTAL SECTION B [20]**

SECTION C**Question 4**

Describe the role of the liver in fat digestion and how it functions with the pancreas to bring about homeostasis when glucose levels are high. Also describe the role of the liver and kidney when there are excess amino acids in the blood.

Content: (17)
Synthesis: (3)

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

TOTAL SECTION C: [20]
GRAND TOTAL: [50]

LIFE SCIENCES**Topic Test Memorandum: NUTRITION****MARKS: 50****TIME: 60 minutes****SECTION A****Question 1**

- 1.1 C✓✓
 1.2 C✓✓
 1.3 C✓✓
 1.4 C✓✓
 1.5 D✓✓

5 x 2 **(10)****TOTAL SECTION A [10]****SECTION B****Question 2**

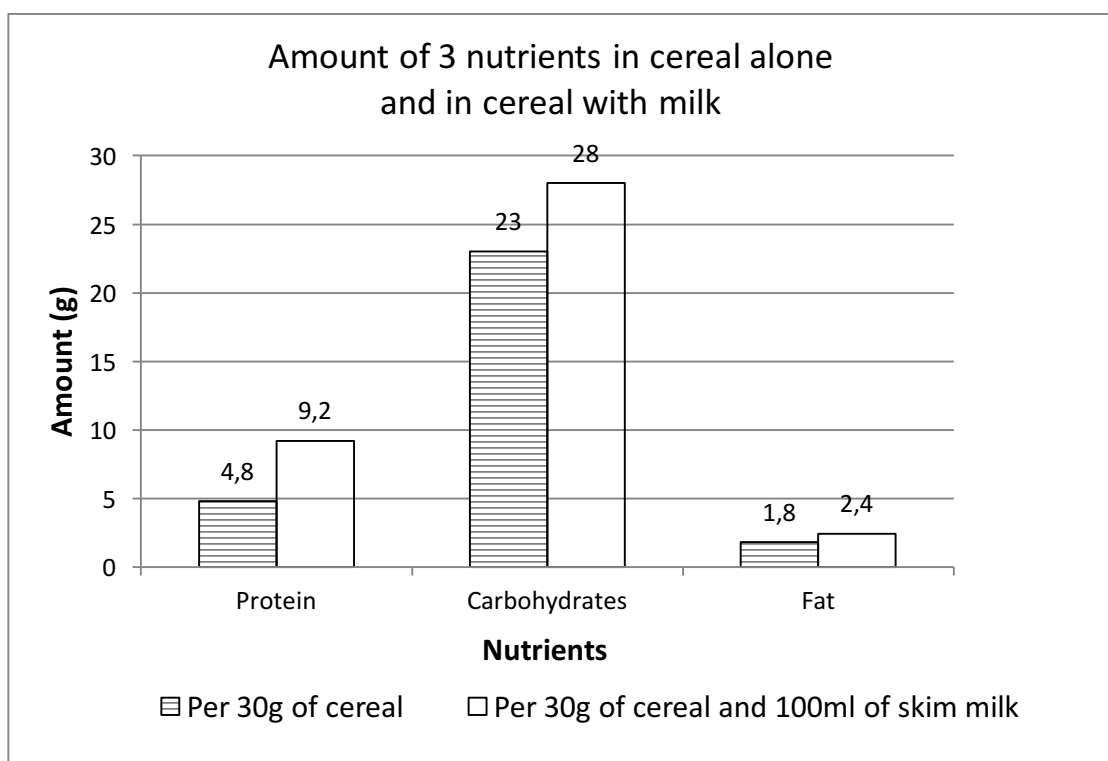
- 2.1. - Produces mucous✓
 - to keep the intestine wall moist✓ **(2)**
- 2.2 - Glycerol and fatty acids combine with bile salts✓
 - and are absorbed into the lacteal by diffusion✓ **(2)**
- 2.3 - Villus is a finger-like projection✓
 - which provides a large surface area for maximum absorption of nutrients✓
 - Transport system present✓/lacteal and capillary network
 - to transport absorbed nutrients away from the intestine✓
 - Single layer of columnar epithelium lines the villus✓
 - providing a thin surface for diffusion of nutrients✓
 - Columnar epithelium have microvilli✓
 - to further increase the surface area for absorption✓
(Mark first TWO only) Any 2 x 2 **(4)**
- 2.4 - Vessel **Y** contains a high concentration of glucose✓/amino acids
 - whereas vessel **X** contains a low concentration of glucose✓/amino acids
(Mark first ONE only) **(2)**
(10)

Question 3

3.1 $572-430\checkmark$
 $= 142\checkmark$ kJ (2)

- 3.2
- Adds bulk to the faeces✓
 - Enhances peristalsis✓
 - Stretches colon walls to ensure defecation✓
 - Absorbs water to keep faeces moist/Prevents faeces from becoming dry and hard✓
- (Any 2) (2)

3.3



Criterion	Elaboration	Mark
Type of graph	Bar graph drawn	1
Caption	Includes both variables	1
Scale	Appropriate scale for X and Y axis	1
Labelling of axis	Correct label and units for X and Y axis	1
Drawing of bars	All bars drawn – 2 marks 1 - 5 bars drawn – 1 mark	2

TOTAL SECTION B [20]

SECTION C**Question 4****Role of liver in fat digestion**

- Liver secretes bile✓
 - Bile is stored in the gall bladder✓
 - and released via the bile duct✓
 - into the duodenum✓
 - Bile emulsifies fats✓/breaks up fat globules into smaller droplets
 - Bile salts make fatty acids✓/glycerol
 - more soluble in water✓
 - Enzymes now have a larger surface area to break down fats✓
- Any 6 (6)

Homeostasis of glucose when level is high

- The pancreas is stimulated✓
 - and it secretes the hormone insulin✓
 - which is transported by the blood to the liver✓
 - The liver/muscles are stimulated to convert the excess glucose✓
 - into glycogen/fat✓
 - which is then stored✓
 - Insulin also increases the rate of glucose absorption✓
 - into the liver cells✓/body cells
- Any 7 (7)

Homeostasis of amino acids

- Excess amino acids✓
 - are de-aminated in the liver✓
 - to form urea/uric acid✓
 - which is excreted by the kidneys✓
 - The liver converts a part of the amino acid (not containing nitrogen) into glucose✓
- Any 4 (4)

Content: (17)
Synthesis: (3)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logical sequence	Comprehensive
All information on the following is relevant to the topic: <ul style="list-style-type: none"> - Role of liver in fat digestion - Control of glucose - Control of amino acids There is no irrelevant information.	Ideas arranged in a logical/ cause-effect sequence for: <ul style="list-style-type: none"> - Role of liver in fat digestion. - Control of glucose - Control of amino acids 	Answered all aspects required by the essay in sufficient detail with at least the following:: <ul style="list-style-type: none"> - Role of liver in fat digestion (4/6) - Control of glucose (5/7) - Control of amino acids (2/4)
1 mark	1 mark	1 mark

FINAL TOTAL [50]**Analysis Grid**

Question	Cognitive Levels			
	A	B	C	D
1.1	2			
1.2				2
1.3		2		
1.4		2		
1.5				2
2.1			2	
2.2		2		
2.3			4	
2.4				2
3.1		2		
3.2	2			
3.3	1	3	2	
4	17			3
Actual Marks	22	11	8	9
Norm Marks	20	12,5	10	7,5



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Cellular Respiration

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B**, or **none** next to the question number (1.1 to 1.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.1 Forms during anaerobic respiration in animals	A: Lactic Acid B: Pyruvic acid
1.2 A phase in anaerobic respiration	A: Krebs cycle B: Oxidative phosphorylation
1.3 Occurs during the Krebs cycle	A: Release of CO ₂ B: Formation of ATP
1.4 Only takes place when oxygen is present	A: Glycolysis B: Krebs Cycle
1.5 Application of anaerobic respiration	A: Wine-making B: Bread-making

(5 x 2) (10)

TOTAL SECTION A: [10]

SECTION B**Question 2**

2.1 In cellular respiration glucose is broken down in a step-wise process to release energy as ATP.

2.1.1 Describe how ATP is used as an energy carrier. (3)

2.1.2 Describe the events of:

(a) Glycolysis (4)

(b) Oxidative Phosphorylation (4)

(11)

2.2 Study the extract below and answer the questions that follow.

GAS FROM BUGS

At a sewage works, the filter bed systems produce water fit for return to the river. Much of the solid material is settled out as “sludge”. The sludge digester provides warm, anaerobic conditions needed by the bacteria involved in decomposing the solids.

The sludge contains organic chemicals. The first stage in the breakdown of the organic chemicals produces simple organic acids. If the digester is warm enough, some of these molecules are broken down further to gases, mainly methane and carbon dioxide.

When the digester is running well, a lot of methane gas is made. Methane is used as fuel to heat the digester to 37°C. Usually there is enough spare gas to heat the offices and buildings too.

2.2.1 Name the organism involved in the reaction in the sludge digester. (1)

2.2.2 What does the organism named in Question 2.2.1 feed on? (1)

2.2.3 Name the type of respiration that takes place in the organism named in Question 2.2.2. (1)

2.2.4 State TWO conditions that are ideal for the type of respiration named in Question 2.2.3. (2)

2.2.5 Explain ONE energy benefit of the digester. (2)

2.2.6 Explain why the digester is kept at a temperature of 37 °C. (2)

(9)

[20]

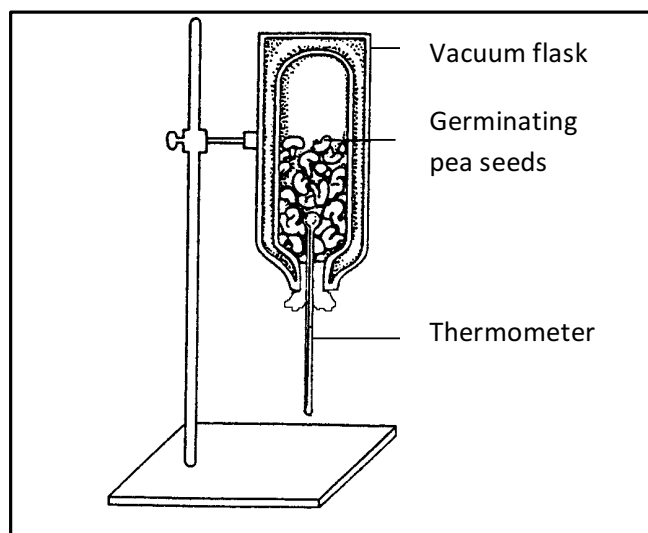
Question 3

- 3.1 An investigation was carried out to find out if living organisms give off heat energy during cellular respiration.

The procedure followed was:

- 120 pea seeds were used
- The pea seeds were divided into 3 groups of 40 seeds and then treated as follows:
 - Flask A: 40 pea seeds were soaked in water at 18°C for 24 hours, then placed in a sterilised vacuum flask
 - Flask B: 40 pea seeds were soaked in water at 18°C for 24 hours, boiled, cooled to 18 °C and then placed in a sterilised vacuum flask
 - Flask C: 40 pea seeds were soaked in water at 18°C for 24 hours, washed with a very mild disinfectant, and then placed in the sterilised vacuum flask.

The set-up of one of the flasks is shown in the diagram below.



The temperatures inside the three flasks (**A**, **B** and **C**) were observed every 12 hours for three days and recorded in a table below.

Time (hours)	Flask A (°C)	Flask B (°C)	Flask C (°C)
0	18	18	18
12	26	18	20
24	40	18	23
36	48	18	26
48	50	18	29
60	52	18	33
72	54	18	40

- 3.1.1 For this investigation, state the:
- (a) Independent variable (1)
 - (b) Dependent variable (1)
- 3.1.2 Draw a line graph to show the results obtained in flask **C**. (6)
- 3.1.3 State TWO ways in which the reliability of the investigation can be improved. (2)
- 3.1.4 Identify TWO factors that were kept constant in this investigation. (2)
- 3.1.5 Provide an explanation for:
- (a) Soaking the pea seeds in water before placing them in the flasks (2)
 - (b) The absence of any increase in temperature in Flask **B** (2)
 - (c) The greater rise in temperature in Flask **A** compared to Flask **C** (2)
 - (d) The inclusion of Flask **B** in the investigation (2)
- GRAND TOTAL: [50]**

**[20]**



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

GRADE 11

Topic Test Memorandum: Cellular Respiration

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | | |
|-----|-----------------|---------|------|
| 1.1 | Both A and B ✓✓ | | |
| 1.2 | None ✓✓ | | |
| 1.3 | A only ✓✓ | | |
| 1.4 | B only ✓✓ | | |
| 1.5 | Both A and B ✓✓ | (5 x 2) | (10) |

TOTAL SECTION A [10]

SECTION B

Question 2



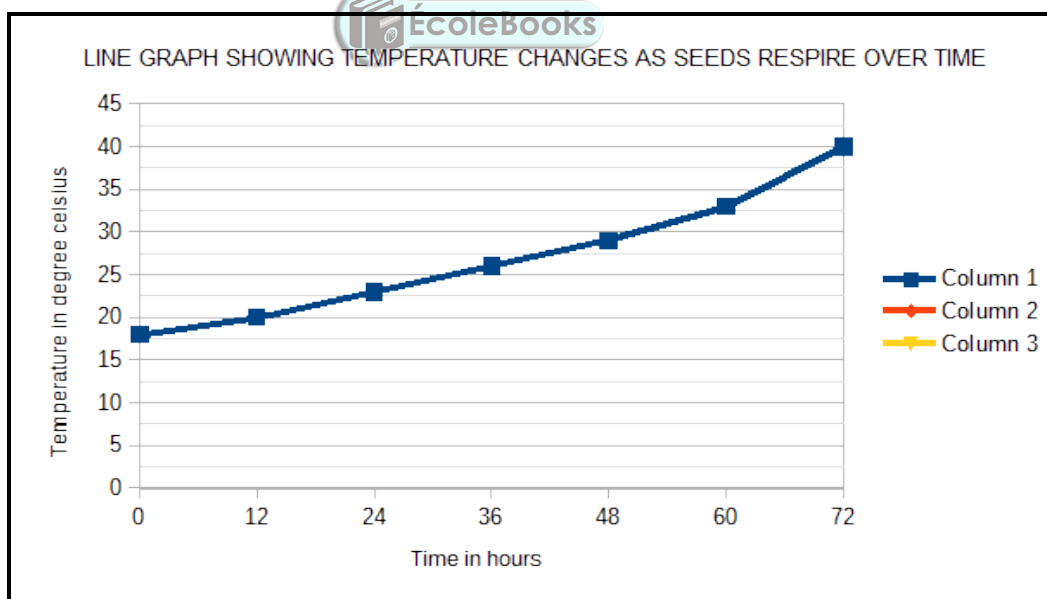
- | | | | |
|-----|-------|--|--|
| 2.1 | 2.1.1 | <ul style="list-style-type: none"> - ATP breaks down ✓ - into ADP+P ✓ - with a resulting release of energy ✓ | (3) |
| | 2.1.2 | <p>(a)</p> <ul style="list-style-type: none"> - Glucose is broken down ✓ - into 2 molecules of pyruvic acid ✓ - Some energy is released ✓ - and trapped as ATP ✓ - Energised hydrogen is released ✓ - and received by carriers/co-enzymes ✓ <p>(b)</p> <ul style="list-style-type: none"> - Energised hydrogen ✓ - from glycolysis and Krebs's cycle ✓ - is transferred through a series of acceptors/co-enzymes ✓ - Energy is released ✓ - and trapped as ATP ✓ - The final acceptor is oxygen ✓ - Which joins with the exhausted hydrogen to form water ✓ | <p>Any 4 (4)</p> <p>Any 4 (4)</p> <p>(11)</p> |

- 2.2 2.2.1 Bacteria✓ (1)
- 2.2.2 Sludge✓/organic chemicals/sewage (1)
- 2.2.3 Anaerobic respiration✓ (1)
- 2.2.4 - No oxygen✓
- Warm✓ (2)
(Mark first TWO only)
- 2.2.5 - Methane released✓
- can be burnt to release heat✓ (2)
(Mark first ONE only)
- 2.2.6 - This is the optimum temperature✓
- for bacteria to thrive✓ (2)
- (9)**
[20]

Question 3

- 3.1 3.1.1 (a) Respiration✓ (1)
- (b) Heat✓/temperature (1)

3.1.2



Criteria	Mark Allocation
Type of graph	1✓
Title of graph including both variables	1✓
Correct label for X-axis and Y-axis	1✓
Correct scale for X-axis and Y-axis	1✓
Plotting of points	1- 1 to 6 points plotted correctly✓ 2- All 7 points plotted correctly✓✓

(6)

- 3.1.3 - Take more temperature readings at each time interval✓/use the average temperature
 - Repeat the investigation✓ (2)
(Mark first TWO only)

- 3.1.4 - Same number of seeds was used in each flask✓
 - Seeds were kept at the same temperature in each flask ✓
 - Seeds were soaked for the same amount of time✓/24 hours in each flask
 - Seeds in each flask were soaked in water✓ Any 2 (2)
(Mark first TWO only)

- 3.1.5 (a)
 - Allows the testa to break✓
 - thereby allowing germination✓ (2)
 (b)
 - Boiled seeds do not respire✓
 - so no heat was liberated✓ (2)
 (c)
 - Flask A had bacteria✓
 - which also respired and liberated heat✓ (2)
OR
 - Flask C had no bacteria✓
 - so less heat was liberated✓ (2)
 (d)
 - Flask B had dead seeds✓/no respiration
 - so it acted as a control✓/served as comparison (2)

(20)

FINAL TOTAL [50]



LIFE SCIENCES ANALYSIS GRID
TOPIC TEST: CELLULAR RESPIRATION
GRADE 11

QUESTION	COGNITIVE LEVELS			
	A	B	C	D
1.1		2		
1.2		2		
1.3		2		
1.4		2		
1.5		2		
2.1.1	3			
2.1.2 (a)	4			
2.1.2 (b)	4			
2.2.1	1			
2.2.2				
2.2.3	1			
2.2.4	2			
2.2.5	2			
2.2.6			2	
3.1.1 (a)				1
3.1.1 (b)				1
3.1.2	1	3	2	
3.1.3				2
3.1.4				2
3.1.5 (a)			2	
3.1.5 (b)			2	
3.1.5 (c)			2	
3.1.5 (d)				2
ACTUAL MARK	18	14	10	8
NORM MARK	20	12,5	10	7.5



KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Gaseous Exchange

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.1 to 1.8) in the ANSWER BOOK.

- 1.1 A protective membrane surrounding the lungs
- 1.2 A pigment that transports oxygen in earthworms
- 1.3 The main form in which carbon dioxide is transported in the blood
- 1.4 A cartilaginous, leaf-shaped structure which covers the opening of the trachea
- 1.5 The pores on the leaves of plants through which gas exchange takes place
- 1.6 The gas exchange openings in insects
- 1.7 A part of the brain that controls the breathing rate
- 1.8 The tissue making up the rings that surround the trachea (8)

TOTAL SECTION A: [8]

SECTION B**Question 2**

2.1 The respiratory tubes of the gas exchange system allow for the passage of air during inhalation and exhalation.

2.1.1 Make a fully labelled drawing of the structure of the respiratory tubes from, and including, the larynx until it enters the alveolus of the lungs. (5)

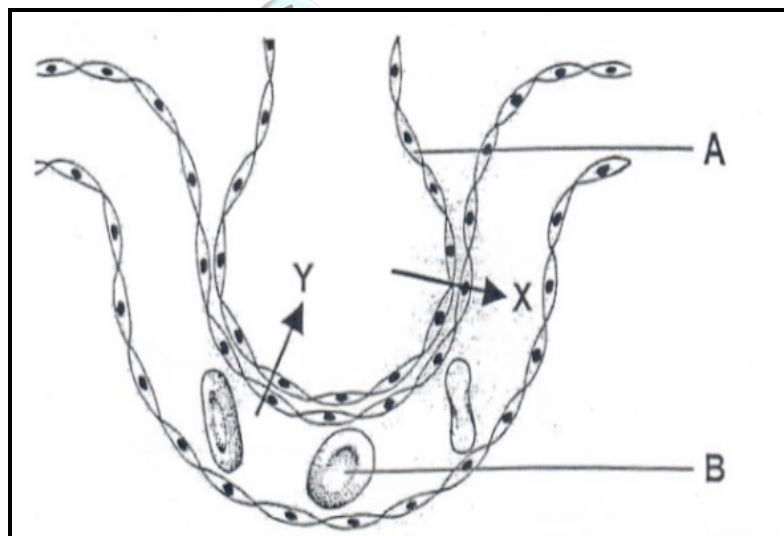
2.1.2 Describe how inhalation takes place. (5)

2.1.3 Inhaled air has 0,03% carbon dioxide but exhaled air has 4,1% carbon dioxide.

Account for the above difference in the amount of carbon dioxide. (3)

(13)

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



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

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

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

2.2.4 Explain **TWO** ways in which structure **A** is adapted for its function. (4)

(2 x 2) (9)

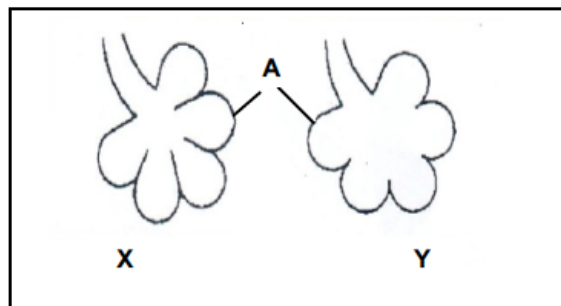
[22]

QUESTION 3

The table below shows the results of an investigation showing the smoking habits of men aged 40 – 79 and the number that die from lung cancer.

Smoking habits of men	Number of deaths per 100 000
Non-smokers	10
cigar only	20
Pipes only	22
Mixed	85
Cigarette smoking	110
TOTAL	247

- 3.1 Represent the information in the above table as a pie chart. Show ALL calculations. (6)
- 3.2 State TWO ways in which the reliability of the above investigation can be increased. (2)
- 3.3 Identify TWO factors that were kept constant in the above investigation. (2)
- 3.4 Which habit had the least influence in causing death from lung cancer? (1)
- 3.5 How many times more likely is a cigarette-smoker to die of lung cancer than a non-smoker? Show ALL working. (2)
- 3.6 Smoking destroys the cilia in the breathing tract.
Explain the consequence of this to a person. (3)
- 3.7 Diagram X shows the alveoli of a healthy person. Diagram Y shows the alveoli of a person suffering from the disease emphysema.



Describe the effect of emphysema on part labeled A and explain the consequences in its efficiency to function normally.

(4)
(20)

TOTAL SECTION B:

GRAND TOTAL:

[40]
[50]



PINETOWN AND ILEMBE DISTRICTS

Topic Test Memorandum: Gaseous Exchange

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- 1.1 Pleura✓
- 1.2 Haemoglobin✓
- 1.3 Bicarbonate ions✓
- 1.4 Epiglottis✓
- 1.5 Stomata✓
- 1.6 Spiracles✓
- 1.7 Medulla oblongata✓
- 1.8 Cartilage✓

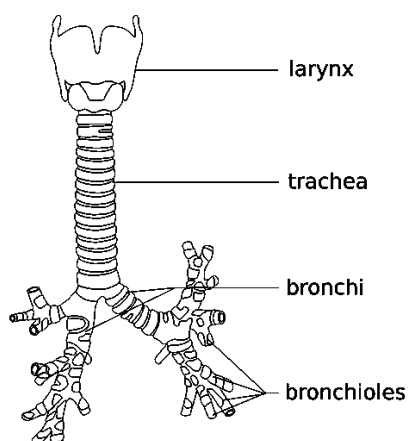
TOTAL SECTION A [8]

SECTION B

Question 2



2.1 2.1.1



Structure of Respiratory Tubes ✓

CRITERIA	MARK
Caption	1
Correct diagram	1
Any 3 correct labels	3

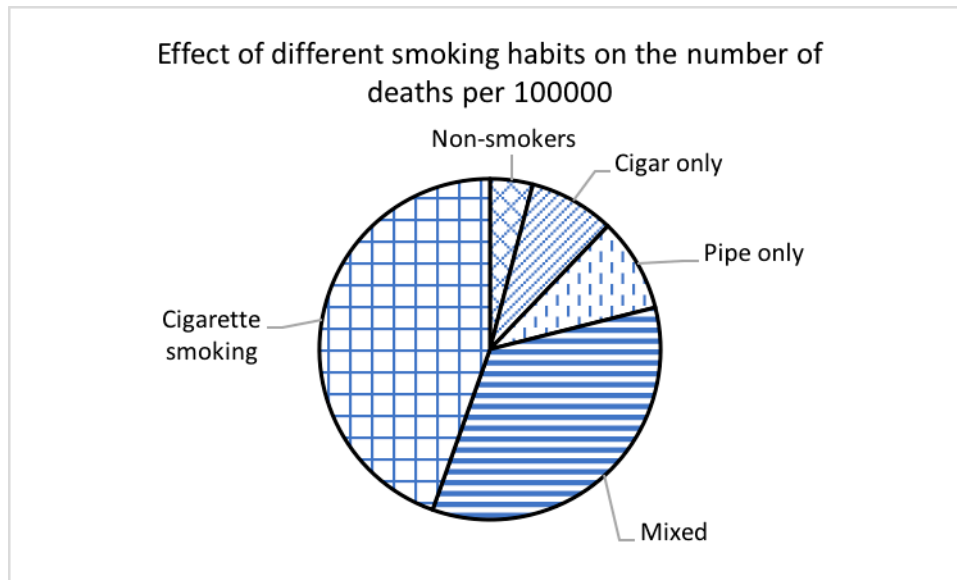
- 2.1.2
- The diaphragm contracts✓
 - and becomes flattened✓
 - The external intercostal muscles relax✓
 - raising the rib-cage✓
 - The volume of the thoracic cavity increases✓
 - and the pressure in the thoracic cavity decreases✓
 - causing air to rush into the lungs✓
- (Any 5) (5)
- 2.1.3
- Atmospheric air consists of 0.03% carbon dioxide, this is what is inhaled✓
 - Due to gaseous exchange in the lungs, carbon dioxide from cellular respiration✓ diffuses out of the blood capillaries and enters the alveoli to be exhaled✓
 - this makes up the additional part of the 4.1%✓
- (Any 3) (3)
(13)
- 2.2
- 2.2.1 Red blood cell/ corpuscle✓/erythrocyte (1)
- 2.2.2 X - Oxygen
Y - Carbon dioxide✓ (2)
- 2.2.3
- Oxyhaemoglobin✓
 - Dissolved in the plasma✓
- (2)
- (Mark first TWO only)**
- 2.2.4
- 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✓
- (Any 2 x 2) (4)
(9)

[22]

Question 3

3.1

The effect of different smoking habits on the number of men aged 40 – 79 who die from lung cancer ✓



Mark allocation for the graph	
Criteria	Mark allocation
Caption	1
Correct type of graph	1
Calculations	No calculations correct - 0 mark 1-4 calculations correct - 1 mark All calculations correct - 2 marks
Correct proportion of each labelled slice	No proportions correct – 0 mark 1-3 proportions correct – 1 mark All proportions correct – 2 marks

(6)

Calculations:

Non-smokers: $10/247 \times 360^\circ = 14,57^\circ$ (Accept 15°)

Cigars only: $20/247 \times 360^\circ = 29,14^\circ$ (Accept 29°)

Pipes only: $22/247 \times 360^\circ = 32,06^\circ$ (Accept 32°)

Mixed: $85/247 \times 360^\circ = 123,88^\circ$ (Accept 124°)

Cigarette smoking: $110/247 \times 360^\circ = 160,32^\circ$ (Accept 160°)

- 3.2 - Increase the number of men participating in the investigation✓
- Repeat the investigation✓ (2)
(Mark first TWO only)
- 3.3 - Same gender✓/only men
- Same age group✓/40-79 years (2)
(Mark first TWO only)
- 3.4 Non – smokers✓ (1)
- 3.5 $110 / 10✓ = 11$ times more✓ (2)
- 3.6 - Dust, and germs, and mucus will not be removed effectively✓
- so the gaseous exchange surface can become infected✓/destroyed
- leading to poor supply of oxygen✓ to cells/ and poor removal of carbon dioxide from body. (3)
- 3.7 - Part A becomes less lobed✓
- Which decreases the surface area✓
- Therefore, less oxygen can diffuse into the blood,✓
- resulting in shortness of breath/ difficulty in breathing✓ (Any 4) (4)
[20]

**TOTAL SECTION B [40]****FINAL TOTAL [50]**

Life Sciences Analysis Grid

Grade: 11

Topic Test - Gaseous Exchange

		Cognitive Levels				
Question	A	B	C	D		
1.1 - 1.1.10	8					
2.1						
2.1.1	5					
2.1.2	5					
2.1.3		3				
2.2						
2.2.1	1					
2.2.2		2				
2.2.3		2				
2.2.4			4			
3.						
3.1	1	2	3			
3.2				2		
3.3				2		
3.4				1		
3.5		2				
3.6			3			
3.7				4		
Actual Marks	20	11	10	9		50
Norm Marks	20	12.5	10	7.5		50





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Excretion in Humans

MARKS: 50

TIME: 60 minutes

SECTION A

Question 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 to 1.5) in your ANSWER BOOK, for example 1.6 C.

- 1.1 Which ONE of the following structures protects the kidneys?
- A Pyramid
 - B Ureter
 - C Bowman's capsule
 - D Renal capsule
- 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
- 1.3 The nephrons of the kidney of an animal have long loops of Henle.
- Which ONE of the following is a likely habitat for that animal?
- A Soil
 - B Forest
 - C Desert
 - D River

1.4 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

1.5 The glucose concentration of dialysis fluid is ...

- A the same as that of blood.
- B higher than that of blood.
- C lower than that of blood.
- D always 0g/ml of blood.

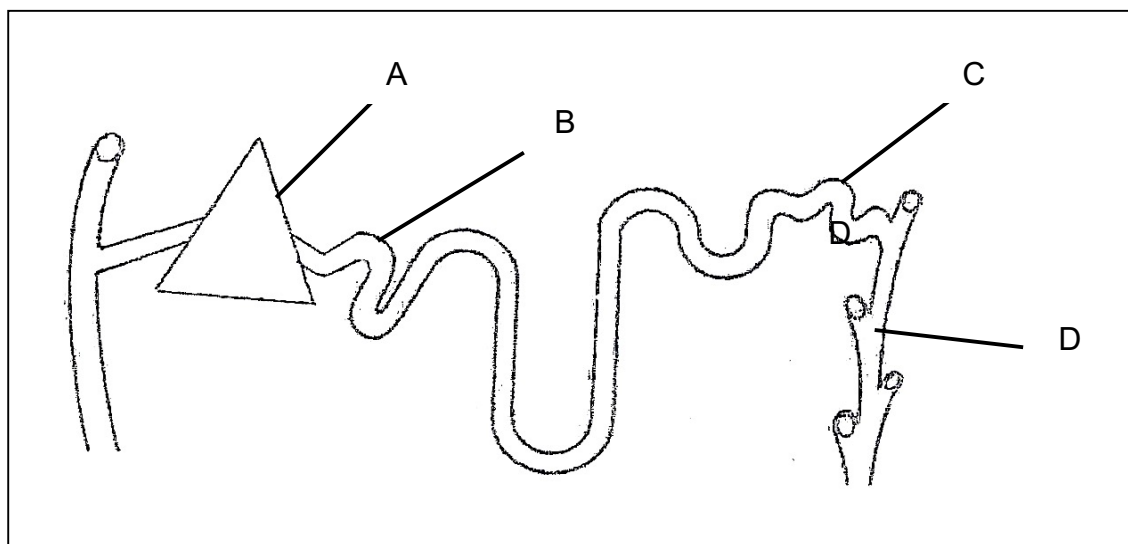
(5 × 2) (10)

TOTAL SECTION A: [10]

SECTION B

Question 2

2.1 Study the diagrammatic representation of the nephron of the human kidney below. The triangle labelled **A** represents a part of the nephron that has been left out of the diagrammatic representation.



2.1.1 Identify the parts labelled **B** and **D**. (2)

2.1.2 State TWO functions of part **C**. (2)

2.1.3 Draw a labelled diagram of the structure represented by **A**. (5)
(9)

- 2.2 Through homeostasis, the kidneys control the composition and volume of blood and tissue fluid.

The table below compares the concentration of different substances in blood, filtrate and urine.

Substance	Blood g/100ml	Filtrate g/100ml	Urine g/100ml
Glucose	0,1	0,1	0
Protein	7,0	0	0
Urea	0,03	0,03	2,0
Ammonium ions	0	0	0,04
Water	92	98	95

- 2.2.1 State what is meant by *homeostasis*. (2)
- 2.2.2 Explain the difference in concentration of: (3)
- (a) Glucose in the filtrate and in urine (3)
- (b) Ammonium ions in blood and in urine (3)
- 2.2.3 What deduction could you make about the functioning of the nephron if the concentration of protein in urine was 0,4g/100ml? (2)
- 2.2.4 State the percentage of glucose reabsorbed in the nephron, based on the results shown in the table. (1)
- (11)**

TOTAL SECTION B: [20]

SECTION C

Question 3

Describe the role of ADH and aldosterone when the water content and salt concentration of the blood is low. Also explain TWO ways in which the nephrons of the kidneys are structurally adapted for reabsorption of water and other useful substances.

Content:

Synthesis: (17)
(3)
(20)

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

TOTAL SECTION C: [20]

GRAND TOTAL: [50]





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES – Grade 11

Topic Test Memorandum: Excretion in Humans

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | |
|-----|-------|-----|
| 1.1 | 1.1.1 | D✓✓ |
| | 1.1.2 | D✓✓ |
| | 1.1.3 | C✓✓ |
| | 1.1.4 | B✓✓ |
| | 1.1.5 | A✓✓ |



(5 x 2) **(10)**

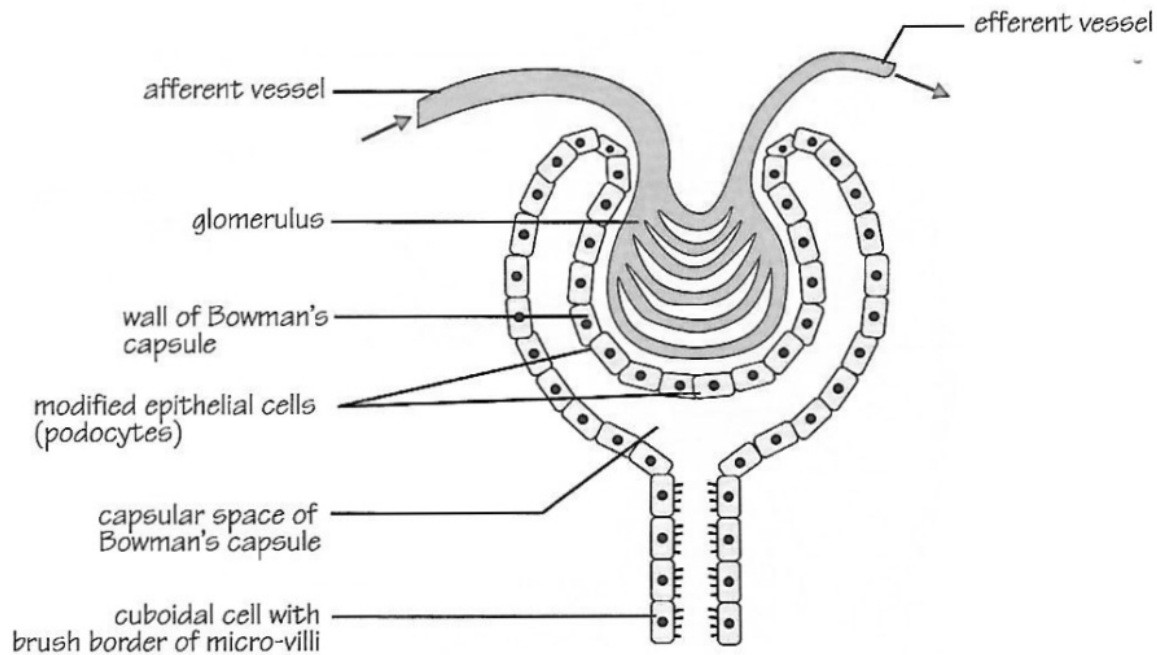
TOTAL SECTION A: 10

SECTION B

Question 2

- | | | | |
|-----|-------|--|-----|
| 2.1 | 2.1.1 | B - proximal convoluted tubule✓ | |
| | | D - collecting tubule✓/duct | (2) |
| | 2.1.2 | - Tubular reabsorption✓/Re-absorption of water | |
| | | - Tubular excretion✓ | (2) |
| | | (Mark first 2 only) | |

2.1.3

**A Malpighian body**

Checklist to mark diagram	
Criterion	Marks
Caption	1
Correct Labels	3
Correct Drawing	1
TOTAL	5

(5)
(9)

- 2.2 2.2.1 - Homeostasis is the maintenance✓
 - of a constant internal environment✓ (2)
- 2.2.2 (a) - Glucose is completely reabsorbed✓
 - in the proximal convoluted tubule✓
 - by active absorption✓/against a concentration gradient
 - and passed into the 2nd capillary network✓ (Any 3) (3)
- (b) - Ammonium ions are excreted✓
 - from the 2nd capillary network✓
 - by the epithelial cells of the distal convoluted tubule✓
 - into the tubular fluid✓ (Any 3) (3)
- 2.2.3 - The ultrafiltration membranes are damaged✓✓
 OR
 - Blood pressure is much higher than normal✓✓ (2)
- 2.2.4 100% (1)

(11)

TOTAL SECTION B:**20**

SECTION C**Question 3****The role of ADH**

- Osmoreceptors✓/the hypothalamus are/is stimulated✓
 - An impulse is sent to the pituitary gland✓
 - to release more ADH✓ into the bloodstream
 - The walls of the distal convoluted tubule✓/collecting tubules
 - become more permeable to water✓
 - Also, as a result of the sodium pump✓/pumping of sodium ions into the medulla
 - a gradient is set up✓ for osmosis
 - Water leaves the tubules✓
 - by osmosis✓
 - and enters the medulla✓
 - Water enters the bloodstream✓/second capillary network from the medulla
 - The water content of blood is increased✓ back to normal
- Any (8)

The role of aldosterone

- More aldosterone is secreted✓
 - by the adrenal glands✓
 - The walls of the distal convoluted tubule✓/collecting tubules
 - become more permeable to sodium ions✓
 - More sodium leaves the kidney tubules✓
 - and enters the medulla✓
 - from where it is absorbed into the second capillary network✓/bloodstream
 - The salt content in the blood is thus increased✓ back to normal
- Any (5)

Structural adaptations of the nephron for reabsorption

- The renal tubule is long✓/convoluted
 - allowing sufficient time✓/increasing the surface area for reabsorption
 - The ascending limb of Henle is impermeable✓ to water
 - allowing a steep osmotic gradient✓ to develop between the distal convoluted/collecting tubules and the medulla
 - The presence of the second capillary network✓
 - makes the reabsorption of water into the bloodstream possible✓
 - Cuboidal cell lining the tubules have microvilli✓
 - which increases the surface area for absorption✓
 - The cells of the tubules contain numerous mitochondria✓
 - which supplies energy for active absorption✓
- (Any 2 × 2) (4)
- Content: (17)
Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the topic	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay in sufficient detail
All information provided is relevant to : - the role of ADH - the role of aldosterone - the structural adaptations of the nephron for reabsorption There is no irrelevant information	All ideas relating to - the role of ADH - the role of aldosterone - the structural adaptations of the nephron for reabsorption are arranged in a logical sequence.	Essay contains at least the following: - The role of ADH 6/8 - The role of aldosterone 3/5 - the structural adaptations of the nephron for re-absorption 2/4
1 mark	1 mark	1 mark

TOTAL SECTION C: 20**FINAL TOTAL [50]**

Life Sciences Analysis Grid
Grade: 11
Topic Test - Excretion in Humans

	Cognitive Levels					
Question	A	B	C	D		
1.1.1	2					
1.1.2		2				
1.1.3				2		
1.1.4		2				
1.1.5		2				
2.1.1	2					
2.1.2		2				
2.1.3		5				
2.2.1	2					
2.2.2 (a)						
2.2.2 (b)						
2.2.3				2		
2.2.4		1				
3	13		4	3		
Actual Marks	19	14	10	7		50
Norm Marks	20	12,5	10	7,5		50





Basic Education

KwaZulu-Natal Department of Basic Education

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: Human Impact on the Environment

MARKS: 50

TIME: 60 minutes

SECTION A

QUESTION 1

- 1.1 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.1.1 to 1.1.9) in the ANSWER BOOK.

- 1.1.1 The illegal hunting and killing of organisms for food
- 1.1.2 A plant species introduced into an environment from another country
- 1.1.3 A layer in the stratosphere that filters out harmful UV light from the sun
- 1.1.4 An increased growth of algae due to a large input of nutrients
- 1.1.5 Water-bearing rock from which water is obtained using bore-holes
- 1.1.6 Removal of trees from an area
- 1.1.7 The use of living organisms to regulate the numbers of a pest species
- 1.1.8 The growing of one type of crop over large areas of land year after year
- 1.1.9 The use of resources without harming the ability of future generations to use that resource (9 x 1)

(9)

- 1.2 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 (1.2.1 to 1.2.3) in the ANSWER BOOK.

COLUMN I		COLUMN II
1.2.1	Common water-borne disease	A: TB B: Cholera
1.2.2	Greenhouse gas	A: Methane B: Nitrogen
1.2.3	The amount of carbon dioxide released by a country/person into the atmosphere	A: Carbon footprint B: Global warming

(3 x 2)

(6)

TOTAL SECTION A: [15]**SECTION B****QUESTION 2**

Typhoid affects humans only and is a severe illness that is caused by drinking water that is contaminated by the bacterium *Salmonella typhi*, commonly found in human faeces.

An investigation was carried out to determine the number of cases of typhoid in Kwa-Zulu Natal over 1 year.

The average rainfall per month during the year was also recorded. The results of the investigation are shown in the table below.

Month	Average Rainfall (mm)	Number of cases of typhoid
January	170	24
February	185	30
March	41	15
April	35	12
May	12	11
June	4	6
July	7	2
August	18	5
September	26	12
October	52	15
November	117	17
December	120	18

- 2.1 Name the bacterium that causes typhoid. (1)
- 2.2 In which month was typhoid LEAST common in the province? (1)
- 2.3 State TWO reasons why you think typhoid is prevalent in Kwa-Zulu Natal. (2)
- 2.4 What is the relationship between the number of cases of typhoid and the average rainfall in the province during the year? (2)
- 2.5 Draw a bar graph to show the number of cases of typhoid from July to October. (6)
- 2.6 State THREE strategies that can be used to reduce water pollution in our country. (3)
- (15)**

QUESTION 3

- 3.1 Study the following extract based on food security.

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.

- 3.1.1 What is meant by food security? (3)
- 3.1.2 Explain how wastage of food contributes to loss of energy and global warming. (3)
- 3.1.3 State TWO effects of global warming. (2)
- 3.1.4 Use the information in the passage to suggest FOUR ways in which food wastage could be reduced. (4)
- (12)**

- 3.2 Ken conducted an investigation to test the effect of car exhaust fumes on germinating seeds. The investigation was carried out three times under each of the following air compositions:

- A** - Exposed to normal atmospheric air
B - Exposed to exhaust fumes

The percentage of seeds that germinated under each of these conditions after seven days was recorded in the table below:

	% OF SEEDS THAT GERMINATED	
	A	B
	NORMAL ATMOSPHERIC AIR	EXHAUST FUMES
1	80	27
2	74	31
3	91	45
AVERAGE	81	34

- 3.2.1 For this investigation, identify the:

- (a) Independent variable (1)
 (b) Dependent variable (1)

- 3.2.2 Describe ONE way in which Ken ensured reliable results in his investigation. (2)

- 3.2.3 Explain why the percentage of germinating seeds differs under the two air compositions. (2)

- 3.2.4 Explain ONE practical application of the results of this investigation. (2)
(8)

(20)

TOTAL SECTION B: 35

GRAND TOTAL 50



Basic Education

KwaZulu-Natal Department of Basic Education

LIFE SCIENCES

Topic Test Memorandum: Human Impact on the Environment

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- 1.1 1.1.1 Poaching✓
 1.1.2 Alien/Exotic✓
 1.1.3 Ozone layer✓
 1.1.4 Algal bloom✓
 1.1.5 Aquifer✓
 1.1.6 Deforestation✓
 1.1.7 Biological Control✓
 1.1.8 Monoculture✓
 1.1.9 Sustainable✓
- 1.2 1.2.1 B only✓✓
 1.2.2 A only✓✓
 1.2.3 A only✓✓



(9)

(3 x 2) (6)

TOTAL SECTION A [15]

SECTION B

Question 2

2.1 *Salmonella typhi*✓ (1)

2.2 July✓ (1)

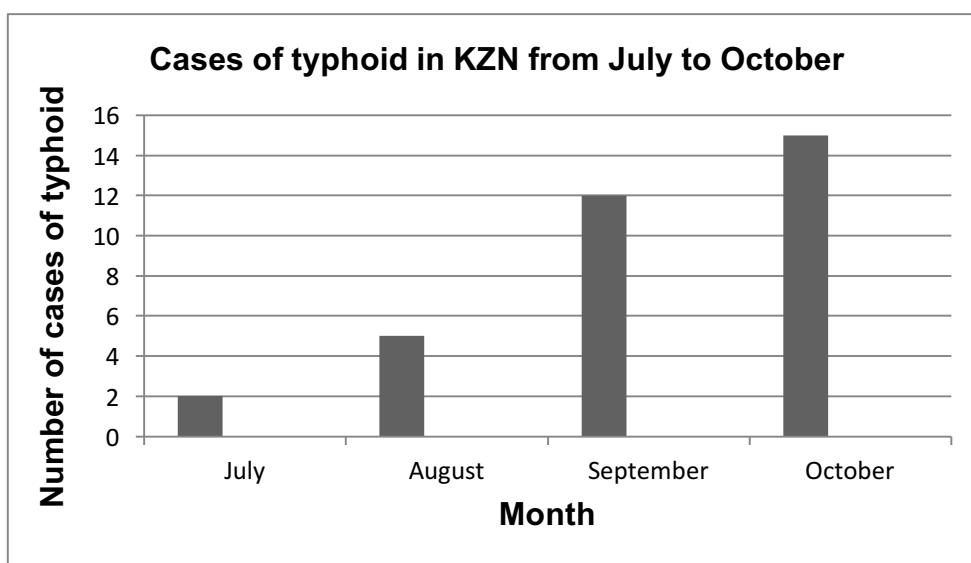
2.3

- Sewage waste disposal systems are inadequate✓
- Many communities do not have piped water / sewer / sanitation systems and drinking water is contaminated / bacteria by human faeces✓
- Lack of education on typhoid and how it is spread✓

(Mark first TWO only) (any 2) (2)

2.4 The higher the rainfall the higher the number of cases of typhoid✓✓
OR
The lower the rainfall the lower the number of cases of typhoid✓✓ (2)

2.5



Marking Guideline	
Criteria	Mark allocation
Type of graph	1
Caption	1
Labelling of x-axis and y-axis with units	1
Scale on x-axis and y-axis	1
Plotting of bars	
1 to 3 bars plotted correctly	1
All 4 bars plotted correctly	2

(6)

- 2.6
- Education / awareness about water pollution✓
 - Clean-up campaign✓
 - Monitoring of water quality✓
 - Sanitary systems need to be upgraded and maintained✓
 - Install taps / introduce piped-water✓
 - Developing and implementation of government policy/legislation✓
 - Penalties for polluting water✓
 - Prevent the release of chemicals and other waste into the environment✓
 - Must treat waste water properly to remove all harmful chemicals before water is released into the environment✓
 - The use of biodegradable chemicals and materials must be enforced/ encouraged✓
 - Report activities that pollute water resources to the relevant government department✓

(Mark first THREE only)

(any 3)

(3)
(15)

Question 3

- 3.1
- 3.1.1
- Food security refers to the availability and access✓
 - to adequate, safe and nutritious food✓
 - to people at all times✓
- 3.1.2
- 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✓
- 3.1.3
- 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)

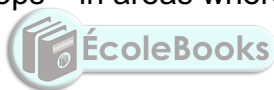
- 3.1.4 - Buy only what is needed in sufficient quantities✓
 - Give to others what is not used instead of throwing away✓
 - Educate about efficient farming methods✓
 - Educate about ways to preserve food✓
 - Improve storage facilities✓ (any 4) (4)
(Mark first FOUR only) (12)

Question 4

- 3.2 3.2.1 (a) Air compositions (1)
 (b) % of seeds that germinated (1)
- 3.2.2 - He carried out the investigation more than once✓
 - and calculated the average✓ (2)
- 3.2.3 - **A** has normal air so many seeds are able to germinate
 - **B** contains a lot of pollution✓ / fumes which kills the seeds /
 - prevents them from germinating✓ as compared to A (2)
- 3.2.4 - To educate people✓ about how toxic exhaust fumes are✓
OR
 - To grow crops✓ in areas where pollution levels are lower✓ (any 1) (2)
(8)
(20)

TOTAL SECTION B: [35]

GRAND TOTAL : 50



Life Sciences Analysis Grid
Grade: 11
Topic Test - Human Impact

	Cognitive Levels					
Question	A	B	C	D		
1.1						
1.1.1 -1.1.9	9					
1.2.						
1.2.1		2				
1.2.2		2				
1.2.3		2				
2						
2.1	1					
2.2		1				
2.3				2		
2.4				2		
2.5	1	3	2			
2.6			3			
3						
3.1	3					
3.2			3			
3.3	2					
3.4		4				
4						
4.1(a)				1		
4.1(b)				1		
4.2				2		
4.3			2			
4.4				2		
Actual Marks	16	14	10	10		50
Norm Marks	20	12,5	10	7,5		50





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN AND ILEMBE DISTRICTS

LIFE SCIENCES

Grade 11

TOPIC TEST: POPULATION ECOLOGY

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK.

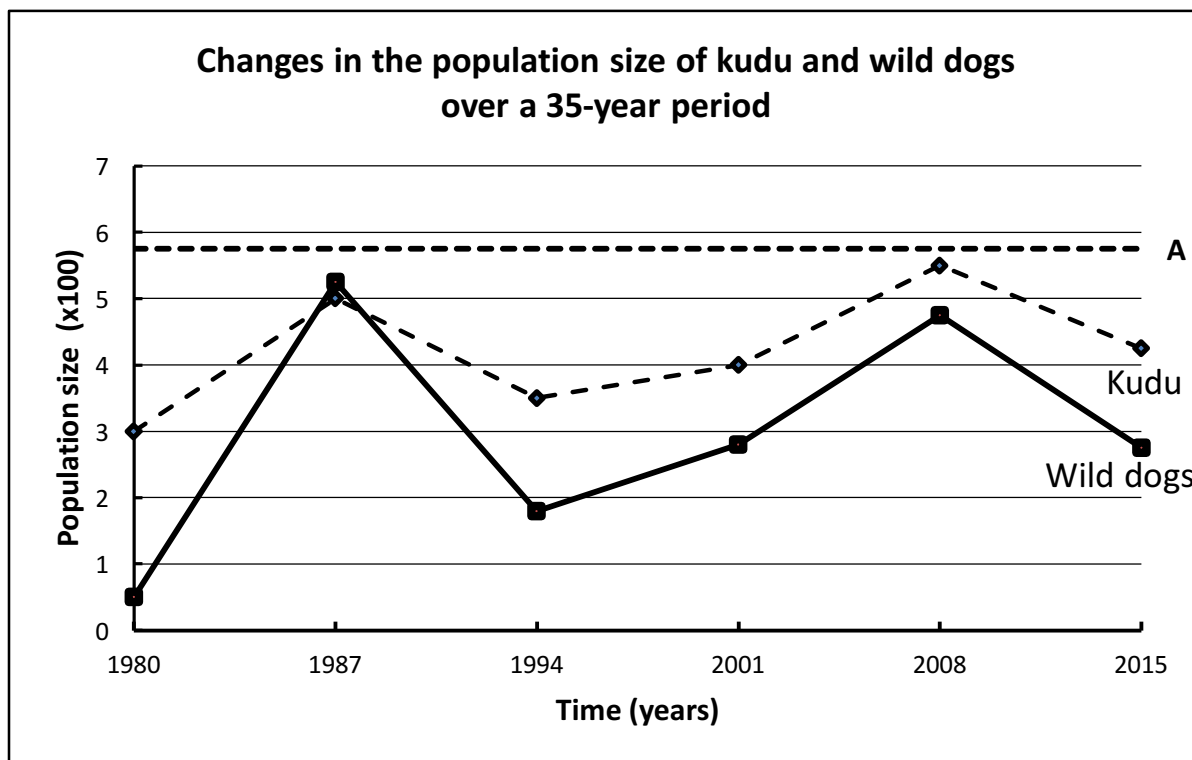
- 1.1.1 A pattern of relationships among individuals that benefits the society
- 1.1.2 Method of determination of population size by counting the individuals in a representative sample area
- 1.1.3 Competition for resources between individuals of the same species
- 1.1.4 Co-existence of different species living in the same habitat by using resources differently
- 1.1.5 A symbiotic relationship in which one organism benefits and the other one is unaffected
- 1.1.6 The death of individuals in a population
- 1.1.7 Countries with a characteristic high birth rate and decreased life expectancy
- 1.1.8 A group of organisms of the same species, occupying a particular habitat and having the ability to interbreed randomly
- 1.1.9 The inherent ability of a population to increase by birth
- 1.1.10 The tendency of certain species to defend an area within a habitat that they occupy against intruders

(10)

TOTAL SECTION A: 10

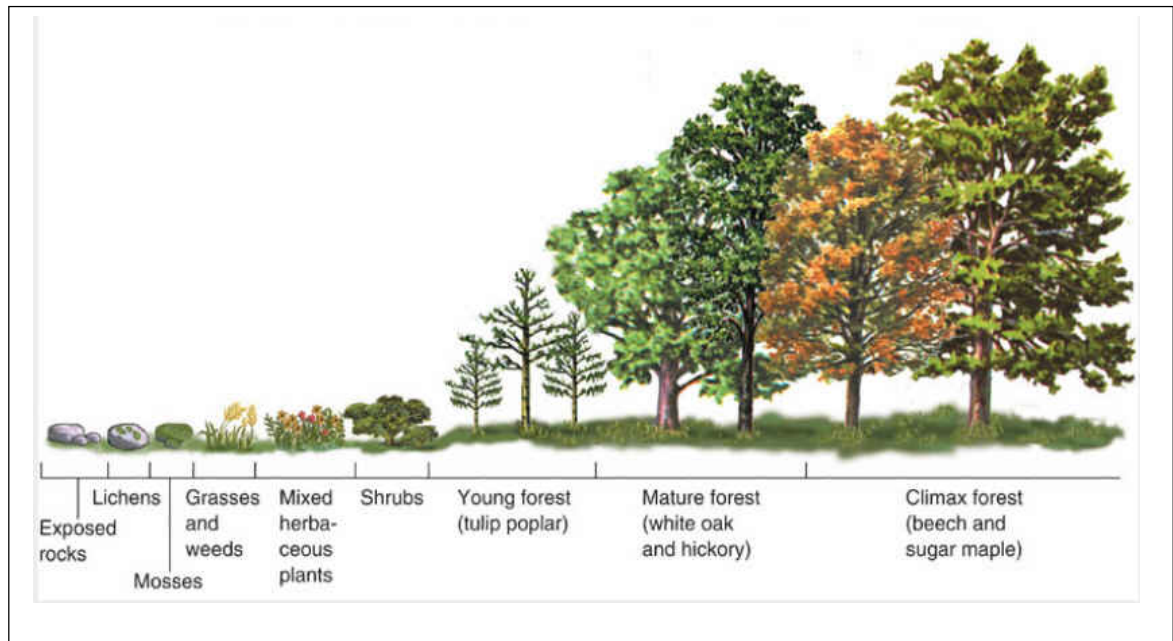
SECTION B**Question 2**

- 2.1 The graph below represents changes in the population size of kudu and wild dogs in a specific closed habitat over a 35-year period.



- 2.1.1 Identify the relationship shown in the graph. (1)
- 2.1.2 What does line **A** represent? (1)
- 2.1.3 Explain the possible consequence for the wild dogs in this habitat if the number of kudu exceeded 700. (3)
- 2.1.4 Calculate the percentage increase in the wild dog population from 1980 to 2001. Show ALL working. (3)
- 2.1.5 Describe the trend for the kudu population from 1987 to 2015. (3)
- (11)**

- 2.2 The diagram below represents ecological succession in a forest over 500 years.



- 2.2.1 What is ecological succession? (2)
- 2.2.2 Name the type of ecological succession shown in the diagram. (1)
- 2.2.3 Explain your answer in QUESTION 2.2.2. (2)
- 2.2.4 Identify TWO examples from the diagram that may be regarded as part of the pioneer community in this habitat. (2)
- 2.2.5 Explain the importance of the pioneer species in the type of ecological succession you identified in QUESTION 2.2.4. (2)
- (9)**
- [20]**

QUESTION 3

- 3.1 The table below shows the changes in the population size of impala (a type of fast moving buck) in a game reserve over a 10-year period.

Year	Number of impala
1995	18
1996	20
1997	23
1998	48
1999	82
2000	145
2001	150
2002	151
2003	147
2004	135

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

- 3.1.2 Name one direct method that may have been used to calculate the size of the impala population over this time period? (1)

- 3.1.3 In 2007, a fire broke out in a part of the game reserve reducing the carrying capacity for impala in the reserve to 140.

To compare the population size to the carrying capacity, 15 impala were captured, marked and released.

One month later 40 impala were recaptured and of these 5 were found to be marked.

- (a) Calculate the size of the impala population, using the Lincoln-Petersen index ($N = C \times M \div R$. Show all working) (3)
- (b) Is the impala population size above or below the carrying capacity of the reserve? (1)
- 3.1.4 List TWO precautions that must be followed when using the method described in QUESTION 3.1.3 to estimate population size. (2)

(13)

- 3.2 Read the extract on South Africa's human population growth and answer the questions that follow.

In 2010, South Africa's population was 49,1 million. By 2011, the population had increased to 50,5 million. Around 33 % of the current population is younger than 15 years and 40% of the population is between 15-35 years.

Statistics predicts that the proportion of young people (15-35 years) will increase in the future. There is growing demand by the young for free tertiary education. Due to a decrease in income tax revenue and increased unemployment this demand will be difficult to meet.

Every South African needs to contribute towards the economy and concentrate on ways of using our resources in a more sustainable manner.

- 3.2.1 What percentage of the current population is 35 years and younger? (1)
- 3.2.2 State TWO reasons why for planning purposes it is important for the government to look at projected growth in the population. (2)
- 3.2.3 State TWO reasons, according to the extract, why providing free tertiary education is problematic for the government. (2)
- 3.2.4 Explain ONE possible consequence for the economy if we do not use 'our resources in a more sustainable manner'. (2)
- (7)
- [20]

TOTAL SECTION B: [40]

GRAND TOTAL: [50]





Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

Topic Test Memorandum: Population Ecology

MARKS: 50

TIME: 60 minutes

SECTION A

Question 1

- | | | | |
|-----|--------|------------------------|------|
| 1.1 | 1.1.1 | Social organisation✓ | |
| | 1.1.2 | Simple sampling✓ | |
| | 1.1.3 | Intra-specific✓ | |
| | 1.1.4 | Resource partitioning✓ | |
| | 1.1.5 | Commensalism✓ | |
| | 1.1.6 | Mortality✓ | |
| | 1.1.7 | Developing✓ | |
| | 1.1.8 | Population✓ | |
| | 1.1.9 | Natality✓ | |
| | 1.1.10 | Territoriality✓ | (10) |



TOTAL SECTION A [10]

SECTION B

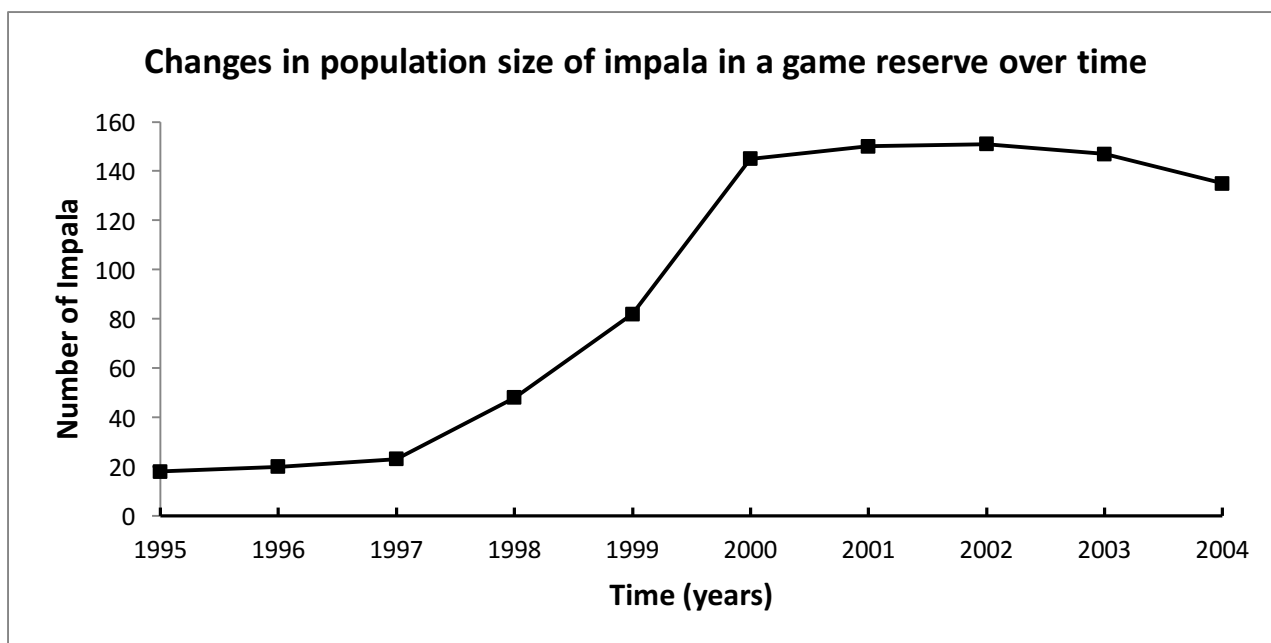
Question 2

- | | | | |
|-----|-------|---|-------------|
| 2.1 | 2.1.1 | Prey-predator/ predation✓ | (1) |
| | 2.1.2 | Carrying capacity✓ | (1) |
| | 2.1.3 | <ul style="list-style-type: none"> - The number of wild dogs will increase✓ - due to there being more food/kudu available✓ - Thereafter the number of wild dogs will decrease✓ - as the number of kudu would have decreased due to limited resources✓ | (Any 3) (3) |
| | 2.1.4 | $\frac{275 - 50/225}{50} \times 100$ $=450\%$ | (3) |
| | 2.1.5 | <ul style="list-style-type: none"> - The population decreased from 1987-1994✓ - then increased from 1994-2008✓ - and finally decreased after 2008✓ | (3) |
| | | | (11) |

- | | | | |
|-----|-------|--|----------------------------------|
| 2.2 | 2.2.1 | - A series of progressive changes✓
- In the composition of an ecological community✓over time | (2) |
| | 2.2.2 | Primary ✓ | (1) |
| | 2.2.3 | - There's no soil/only exposed rock found✓
- The habitat is colonized by living organisms for the first time✓ | (2) |
| | 2.2.4 | - Lichen✓
- Mosses✓
(Mark first TWO only) | (2) |
| | 2.2.5 | - They break down rock into soil/ they help to form soil✓
- thereby making it possible for other species to grow✓ | (2)
(9)
[20] |

Question 3

3.1 3.1.1



Criterion	Mark
Correct type of graph	1
Caption-includes both variables	1
Correct label and unit for X-axis and Y-axis	1
Correct scale for X-axis and Y-axis	1
Plotting of points	1:1-9 points plotted correctly 2: All 10 points plotted correctly

3.1.2	Census✓	(1)
3.1.3	(a) $(15 \times 40) \div 5 = 120$ ✓	(3)
	(b) Below the carrying capacity✓	(1)
3.1.4	<ul style="list-style-type: none"> - The mark must not harm/affect the organism in any way✓ - The mark must last for the duration of the investigation✓ - Investigation must be carried out on a closed population✓ - Enough time must be given for the marked organisms to mix with the rest of the population✓ - Several samples can be taken and then an average taken✓ - The animals must be randomly captured 	(2)
	(Mark first two only)	(13)
3.2		(1)
3.2.1	73%✓	
3.2.2	<ul style="list-style-type: none"> - Planning for education✓ - Planning for health-care✓ - Planning for housing✓ 	(2)
	(Mark first TWO only)	(Any 2) (2)
3.2.3	<ul style="list-style-type: none"> - There's been a decrease in income tax revenue✓ - Unemployment has increased✓ 	
	(Mark first TWO only)	
3.2.4	<ul style="list-style-type: none"> - Since we would run out of resources✓ - future generations may have to pay more✓ - as we would be more dependent on imported products✓ 	(2)
	(Mark first ONE only)	(7)
		(Any 2)
		[20]
	TOTAL SECTION B	[40]
	GRAND TOTAL	[50]

Life Sciences Analysis Grid

Grade: 11

Topic Test - Population Ecology

	Cognitive Levels					
Question	A	B	C	D		
1.1						
1.1.1-1.1.10	10					10
2.1						
2.1.1			1			
2.1.2	1					
2.1.3				3		
2.1.4		3				
2.1.5		3				11
2.2						
2.2.1	2					
2.2.2		1				
2.2.3			2			
2.2.4		2				
2.2.5		2				9
3.1						
3.1.1	1	3	2			
3.1.2	1					
3.1.3[a]		3				
3.1.3[b]			1			
3.1.4	2					13
3.2						
3.2.1		1				
3.2.2				2		
3.2.3			2			
3.2.4				2		7
Actual Marks	17	16	10	7		50
Norm Marks	20	12.5	10	7.5		50