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

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SECTION B

Question 2

2.1 Study the diagrams below representing two plant organs.

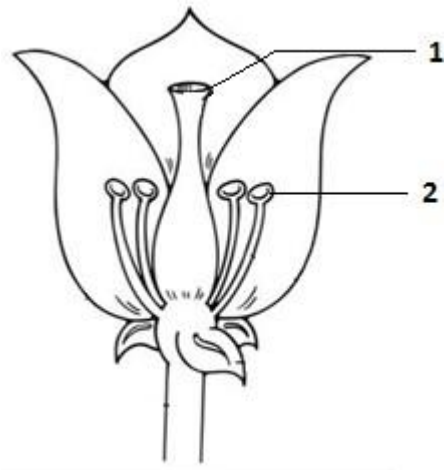


Diagram A

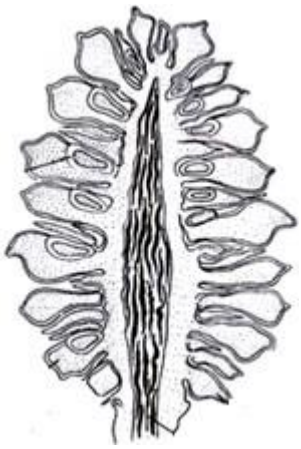


Diagram B

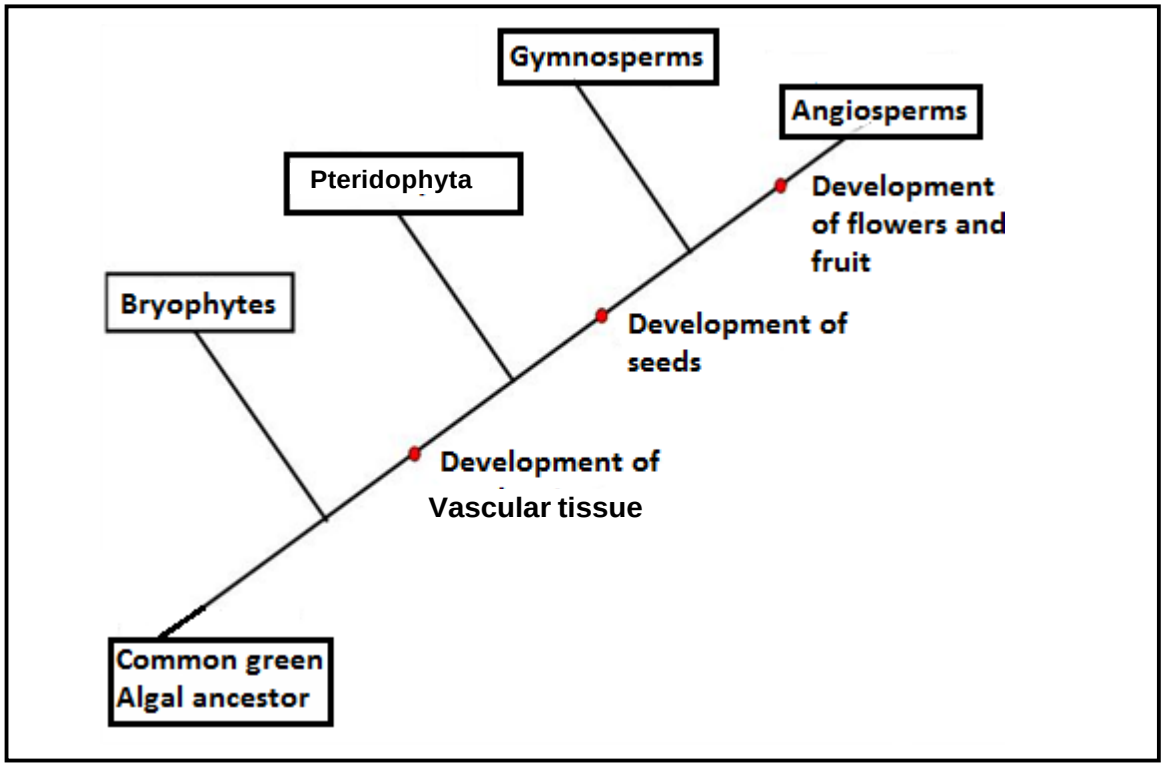
2.1.1 Name the plant division that both the organs belong to. (1)

2.1.22.1.2 Identify the organ in **Diagram B**. (1)

2.1.32.1.3 Identify parts **1** and **2**. (2)

2.1.42.1.4 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
A. formosa	81	2
A. pubescens	5	115

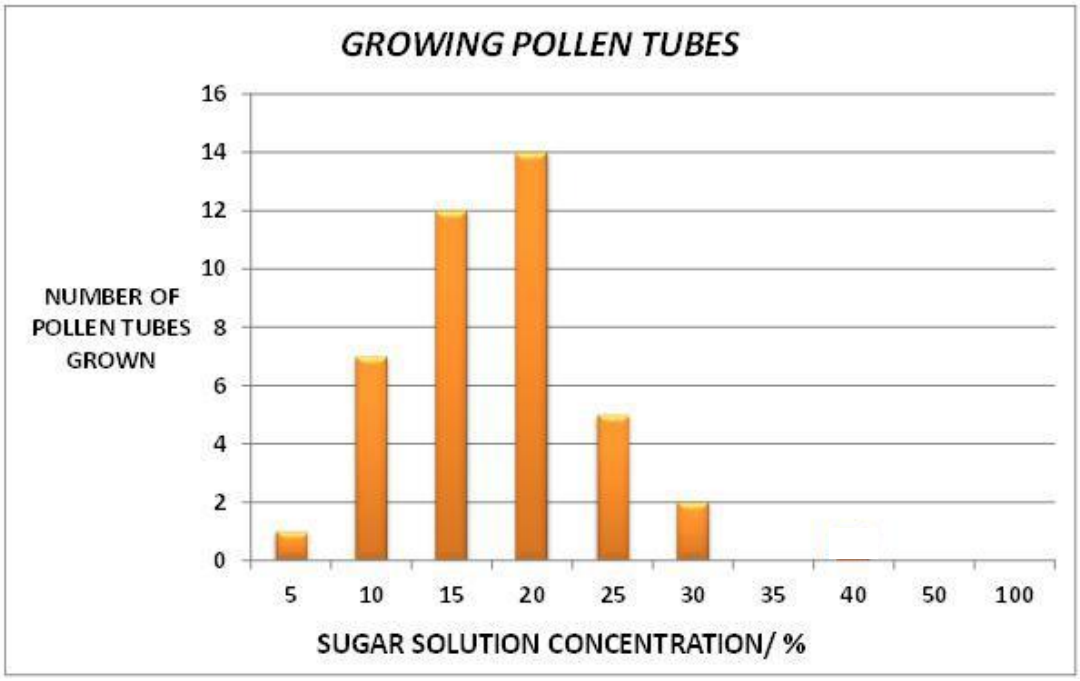
3.1.1 State the dependent variable. (1)

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)
(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]

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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 (**Mark FIRST ONE only)**	(1)
	3.1.3	- Same environmental conditions✓ - Same number of flowers for each plant species✓ - Same number of hummingbirds and hawkmoths✓ (Any 1) (**Mark FIRST ONE only)**	(1)
	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✓ (**Mark FIRST ONE only)**	(1) **(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]