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GRADE 11

NOVEMBER 2019

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

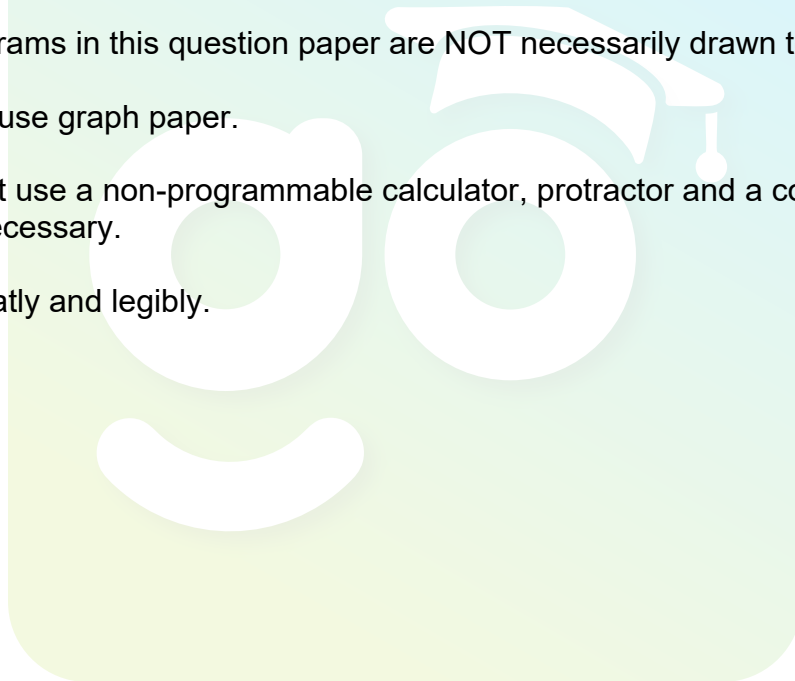


This question paper consists of 17 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Start the answer to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.



SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in you ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which of the following is applicable to viruses?

- A They are mutualistic
- B They are the simplest known living organism
- C They are parasitic
- D They are capable of respiration

1.1.2 The cell walls of fungi are composed of ...

- A chitin.
- B cellulose.
- C pectin.
- D lignin.

1.1.3 Which statement correctly describes fungi and protozoans?

- A Fungi and protozoans are all unicellular
- B Fungi and protozoans all have chloroplasts
- C Fungi and protozoans are eukaryotic
- D Fungi and protozoans all have cell walls

1.1.4 Rabies is a viral disease spread to people by infected animals. A person bitten by an infected animal, should be given an injection containing specific antibodies.

Following the injection, the person should have ...

- A natural, active immunity.
- B artificial, active immunity.
- C natural, passive immunity.
- D artificial, passive immunity.

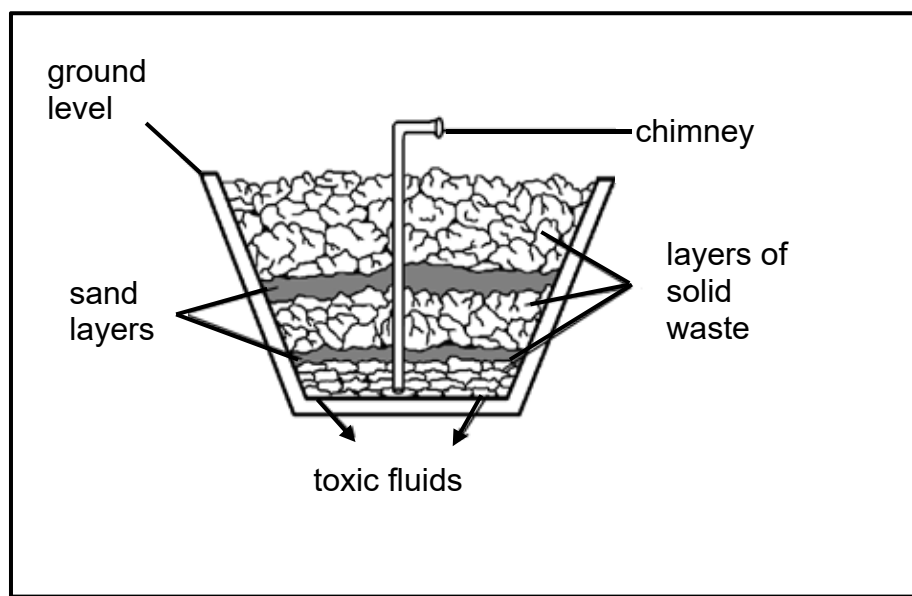
1.1.5 Pterophytes are adapted to living on land because they ...

- A reproduce sexually.
- B have vascular tissue.
- C have rhizoids.
- D depend on water for reproduction.

1.1.6 Which of the following will have a negative impact on food security?

- A Fertilisers
- B Crop rotation
- C Climate change
- D Genetic Modified Organisms (GMO)

1.1.7 The diagram below shows the structure of a landfill site.



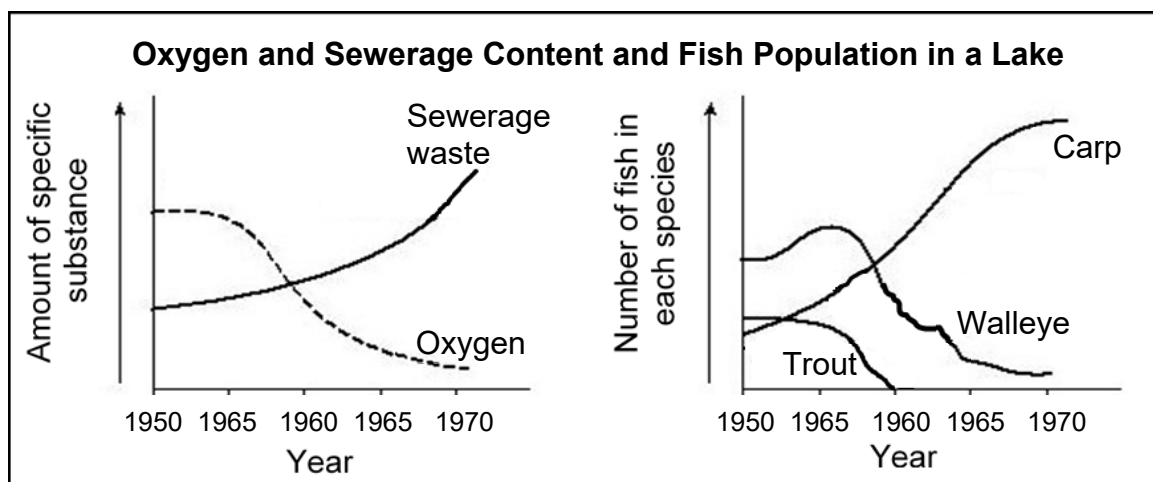
The gas which would escape from the chimney will most likely be ...

- A carbon dioxide.
- B oxygen.
- C methane.
- D ethanol.

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

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

1.1.9 Study the graphs below.



Which relationship is best inferred from the graph data?

- A As sewage waste increases, oxygen content increases
- B As the carp population increases, the walleye fish population increases
- C As the oxygen content decreases, the carp population decreases
- D As oxygen content decreases, the trout population decreases

1.1.10 Desertification reduces the capacity of the environment to maintain the balance of nature, because it ...

- A has a negative impact on biodiversity.
 - B increases the number of pest species and spreads diseases.
 - C pollutes groundwater resources.
 - D causes seasonal flooding of rivers.
- (10 x 2) (20)

- 1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1–1.2.8) in the ANSWER PAGE.

1.2.1 Blood cells responsible for immunity in humans

1.2.2 Organisms that cause disease

1.2.3 Phylum to which sponges belong

1.2.4 Chemical substance used to kill bacteria

1.2.5 The plant- and animal-like Protista floating in the open oceans

1.2.6 Micro-organism used in the production of traditional beer

1.2.7 Chemicals used in agriculture to kill weeds in order to increase crop yield

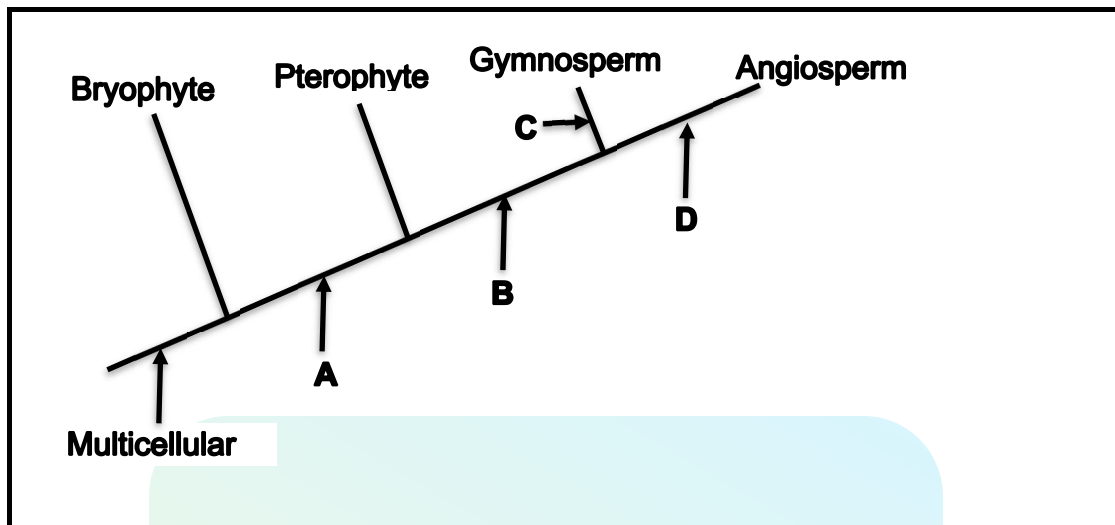
1.2.8 A natural process that traps heat within the Earth's atmosphere creating conditions suitable for life (8 x 1) (8)

- 1.3 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 (1.3.1–1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	Use of bacteria	A:	Making antibiotics
		B:	Nitrogen cycling
1.3.2	Loss of biodiversity	A:	Golf estates
		B:	Mining
1.3.3	Ozone depletion	A:	Cholorofluorocarbons
		B:	Hydrofluorocarbons

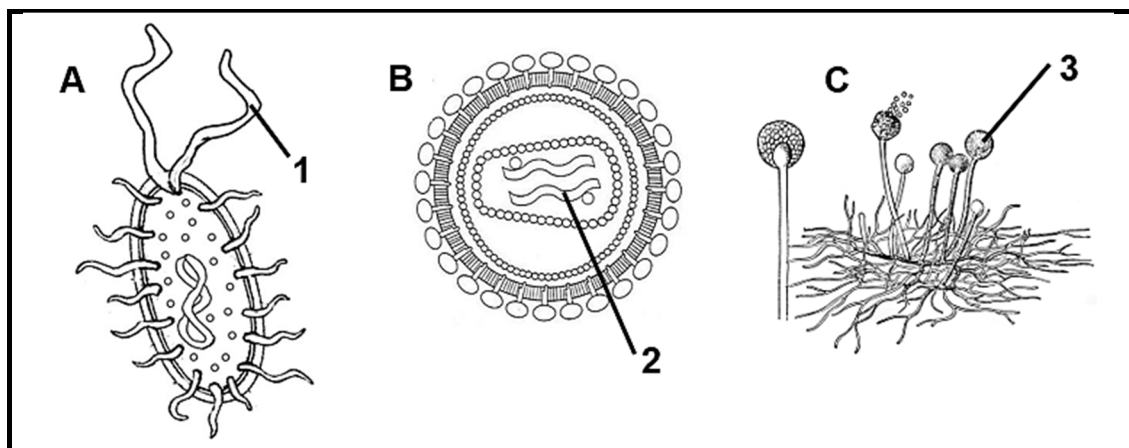
(3 x 2) (6)

- 1.4 The diagram below represents a cladogram showing relationships between plant divisions / groups. The letters **A** to **D** indicate the characteristics which have evolved over time.



- 1.4.1 Which characteristic is shared by all organisms in the plant kingdom according to the cladogram? (1)
- 1.4.2 Which LETTER represents each of the following characteristics on the above cladogram? (1)
- (a) Cones (1)
 - (b) Dominant sporophyte generation (1)
 - (c) Seeds (1)
 - (d) Flowers (1)
 - (e) Vascular tissue (1)
- 1.4.3 Write down the names of the groups that are collectively known as spermatophytes. (2)

- 1.5 Study the diagrams below of micro-organisms and answer the questions that follow.



1.5.1 Name the group of organisms to which **B** and **C** belong respectively. (2)

1.5.2 Provide labels for:

- (a) **1**
- (b) **2**
- (c) **3** (3)

1.5.3 Give the LETTER of the organism that:

- (a) Is not considered to be living (1)
- (b) Is eukaryotic (1)

1.5.4 Name the shape of the bacterium in DIAGRAM A. (1)

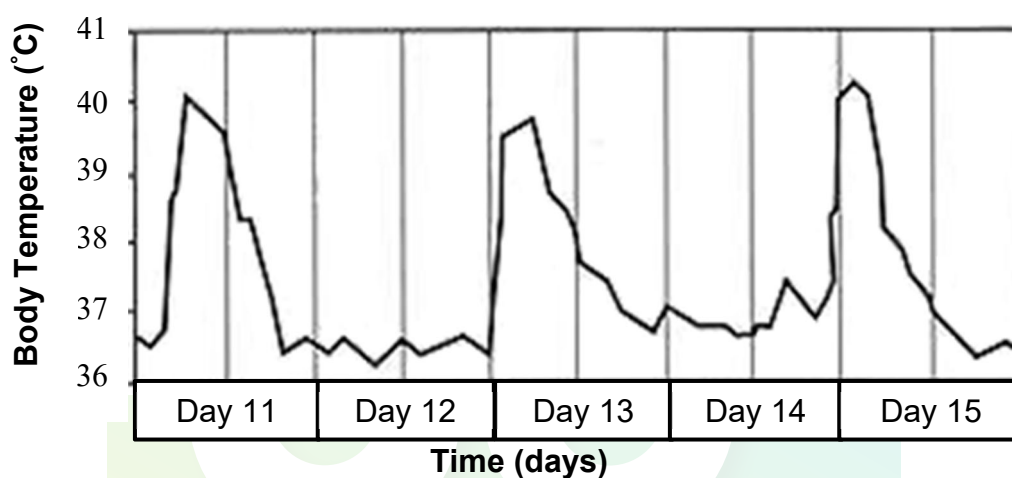
TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 Read the extract below and study the temperature chart of a patient suffering from malaria.

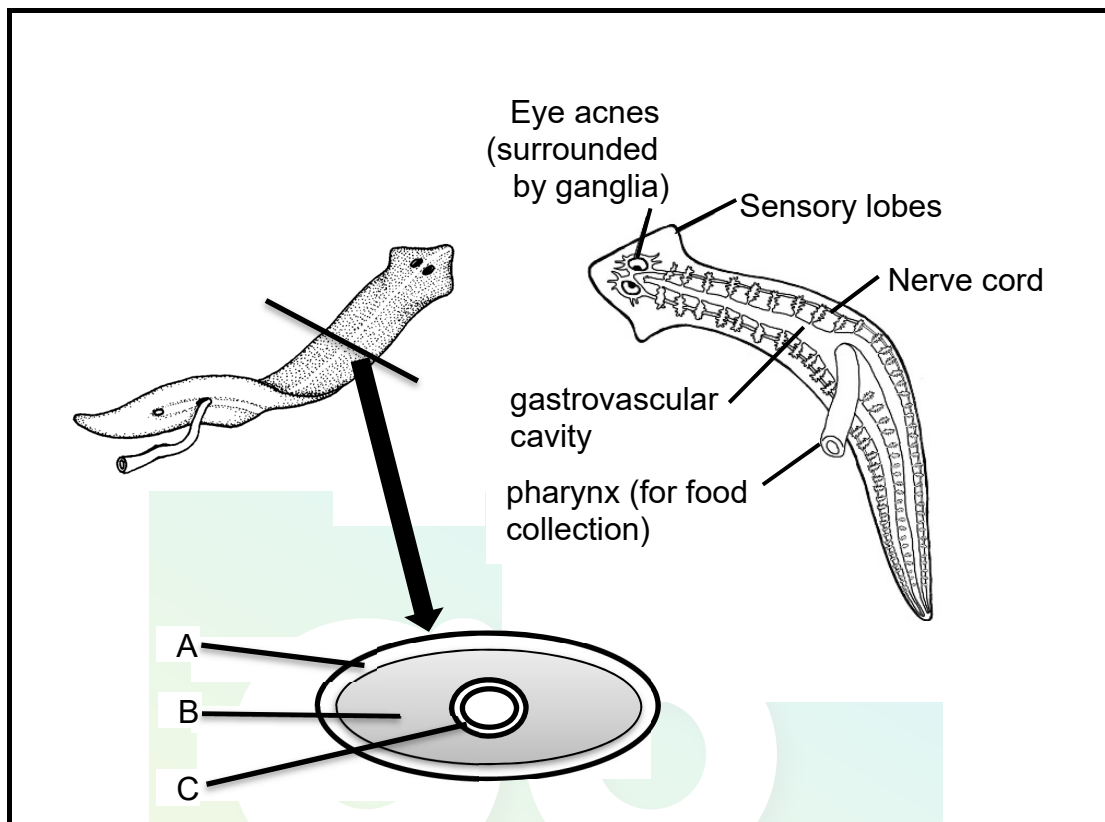
The malaria parasite is caused by a unicellular organism called Plasmodium. The parasite is transferred to humans by the Anopheles mosquito. Malaria symptoms only appear after 10 days when the first fever attack occurs.

The graph below shows the body temperature of a malaria patient over five (5) days.



- 2.1.1 What group of micro-organisms does Plasmodium belong to? (1)
- 2.1.2 Name ONE tissue in the body that the malaria parasite attacks. (1)
- 2.1.3 From the chart determine:
- The highest temperature this patient experienced during the time period (1)
 - The number of fever attacks the patient experienced during the five days (1)
- 2.1.4 Calculate on which day the patient could expect the start of the next fever attack. (1)
- 2.1.5 Suggest THREE ways of preventing malaria. (3)

- 2.2 Describe TWO ways that invertebrates can be beneficial in an ecosystem. (4)
- 2.3 The diagram below shows various views for the body plan of an animal belonging to the phylum Platyhelminthes.



- 2.3.1 Provide labels for the germ layers **A**, **B** and **C**. (3)
- 2.3.2 Explain TWO ways this animals body plan is suited for its mode of life. (4)
- 2.3.3 Why is a blood system not necessary in the animal shown above? (2)
- 2.3.4 Tabulate TWO differences between the phylum Platyhelminthes and the phylum Cnidaria. (5)

2.4 Read the article below and answer the questions that follow.

THE "DOOMSDAY VAULT" IS IN DANGER

Svalbard Global Seed Vault (SGSV) is a seed bank located in Arctic Norway. The seeds are kept at -18°C with minimum access to oxygen in order to delay aging as much as possible. The vault is also surrounded by frozen soil called permafrost. However, global warming is causing the permafrost to melt and the vault is in danger of flooding.

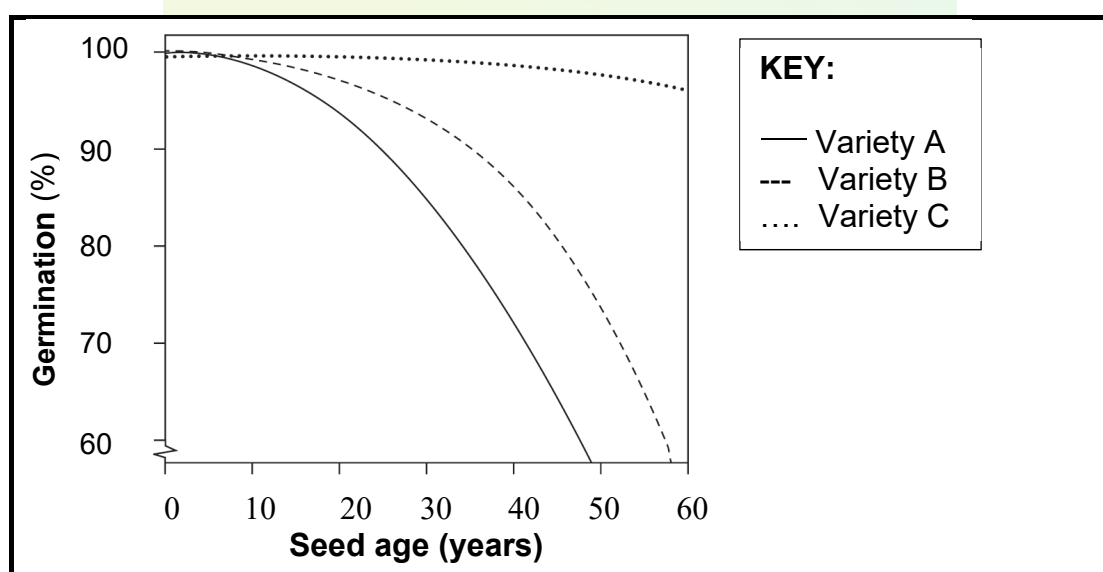
SGSV keeps seeds from almost 4 000 species of plants, focusing on food crops such as wheat, rice and maize. SGSV keeps seeds from more than 865 000 varieties of plants, including 200 000 varieties of wheat and rice. Some of these varieties are rare or extinct in the wild.

[Adapted from *"The Doomsday Vault Is In Serious Danger"* by Alfredo Carpineti, 07 Feb. 2019.]

- 2.4.1 What are suitable conditions for keeping seeds in a seed bank, according to the article? (1)
- 2.4.2 What environmental event is threatening the safety of the seeds at the Global Seed Vault? (1)
- 2.4.3 Give THREE different ways in which seeds provide a source of food for humans. (3)
- 2.4.4 Why are seed banks important for the future? (2)

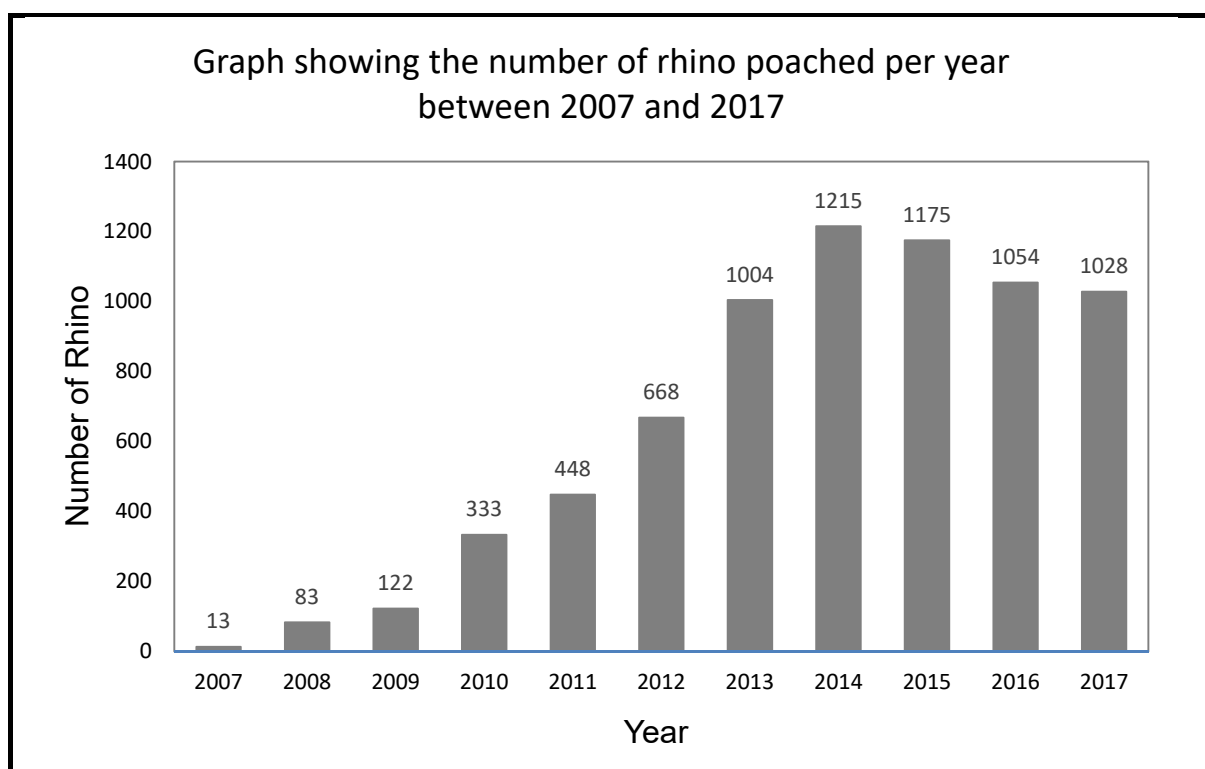
The purpose of SGSV is to store seeds for use 50 or more years from now. Seeds from three varieties of maize were tested to see the effects of long periods of storage.

The results of these tests are shown in the graph.



- 2.4.5 Explain how SGSV could make use of these results. (2)

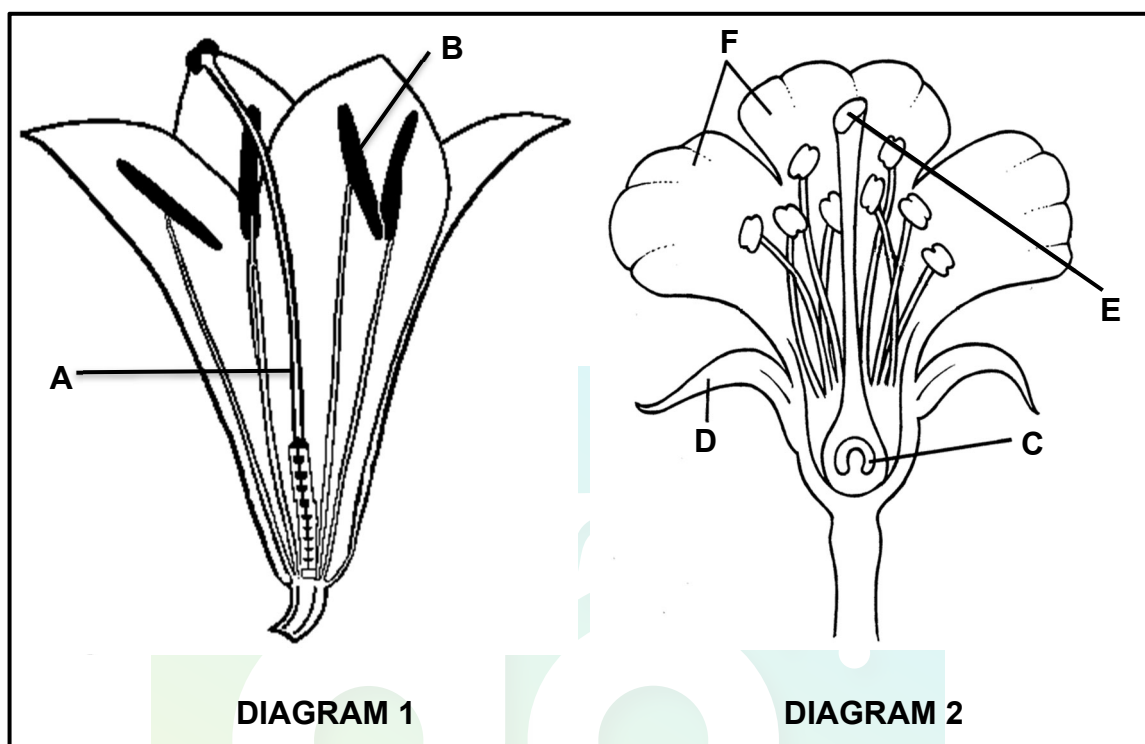
- 2.5 The graph below shows the number of rhino poached annually. Use the graph to answer the questions which follow.



- 2.5.1 Calculate the percentage change in the poaching of rhino in South Africa from 2014 till 2017. Show all calculations. (3)
- 2.5.2 Describe the trend in rhino poaching from 2007 until 2017. (2)
- [40]**

QUESTION 3

- 3.1 Study DIAGRAMS 1 and 2 of angiosperm flowers below and answer the questions that follow.



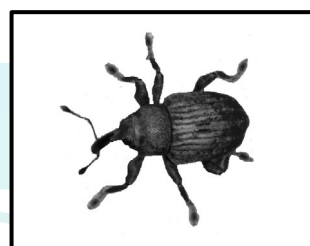
- 3.1.1 Provide labels for structures **A** to **D**. (4)
- 3.1.2 Give the letter of the structure where the seed is formed. (1)
- 3.1.3 Neither of these flowers is wind pollinated. Give **TWO** ways that you would identify a wind pollinated flower. (2)
- 3.1.4 Give **TWO** advantages of sexual reproduction. (2)
- 3.1.5 State **TWO** ways in which the Angiosperms are better adapted to a terrestrial life than the Bryophytes. (2)

3.2 Read the extract below.



The **Water Hyacinth** is an invasive alien plant that has taken over South African rivers, dams and lakes. If left uncontrolled, Water Hyacinth grows and forms a thick layer that covers the surface of the water.

The **weevil**, *Neochetina eichhorniae*, has been very effective in controlling the Water Hyacinth. The weevil feeds on the soft parts of the plant, preventing the plant from reproducing and causing it to break up.



Researchers wanted to determine the optimum number of weevils to release per plant.

- They grew Water Hyacinth in six large water tanks.
- They placed a different number of weevils in each tank.
- They then recorded the number of days it took the weevils to control the Water Hyacinth.

The results are recorded in the table below.

Number of weevils per plants placed in tank	Days taken to control water hyacinth
4	50
8	40
12	30
16	20
20	20
Control (no weevils)	No change in Water Hyacinth

- 3.2.1 Name the method used when a natural pest is released to control an alien invasive species. (1)
- 3.2.2 Give TWO other ways, besides the method mentioned in QUESTION 3.2.1 to control alien invasive plants. (2)

- 3.2.3 What would the optimum number of weevils be to introduce per plant? (1)
- 3.2.4 Explain ONE reason for your answer in QUESTION 3.2.3. (2)
- 3.2.5 Give ONE way how you would improve the reliability of this investigation. (1)
- 3.2.6 For the above investigation, give the:
- (a) Dependent variable (1)
 - (b) Independent variable (1)
- 3.2.7 Give TWO factors that will need to be controlled to ensure that the investigation is valid. (2)
- 3.2.8 Explain the negative impact that Water Hyacinth will have for:
- (a) A farmer (2)
 - (b) A sportsman who enjoys swimming and canoeing (2)

3.3 Read the passage below and answer the questions that follow.

SA WONDER PLANT REMOVES MORE CO₂ THAN AMAZON

Spekboom is our own indigenous wonder plant found in the Eastern Cape and an important 'weapon' in the fight against climate change.

The Spekboom is ten times more effective than the Amazon rainforest at sucking carbon dioxide out of the atmosphere. It is especially good at photosynthesis, which produces a by-product we desperately need.

Kuzuko Lodge, a private game reserve next to Addo Elephant National Park, is able to sell carbon credits due to this miracle bush which occurs naturally there.

Governments in Europe want to reduce industrial pollution and tax companies heavily for excess carbon emissions. Therefore, businesses that produce high levels of greenhouse gas emissions, like transport companies, can buy carbon credits to offset their carbon footprint.

[Adapted from <https://www.getaway.co.za/travel/nature-and-conservation/sa-wonder-plant-removes-more-carbon-dioxide-than-amazon/>]

- 3.3.1 What does the term *carbon footprint* mean? (2)
- 3.3.2 What is the by-product we so desperately need as mentioned in paragraph 2? (1)

- 3.3.3 Why do companies in Europe want to reduce their carbon footprint? (1)
- 3.3.4 How can you, as an individual, reduce your carbon footprint? (3)
- 3.3.5 How would selling carbon credits to European companies benefit the environment at Kuzuko Lodge? (2)
- 3.3.6 Explain how increased carbon dioxide emissions can have a negative effect on the environment. (5)
- [40]**

TOTAL SECTION B: 80



SECTION C

QUESTION 4

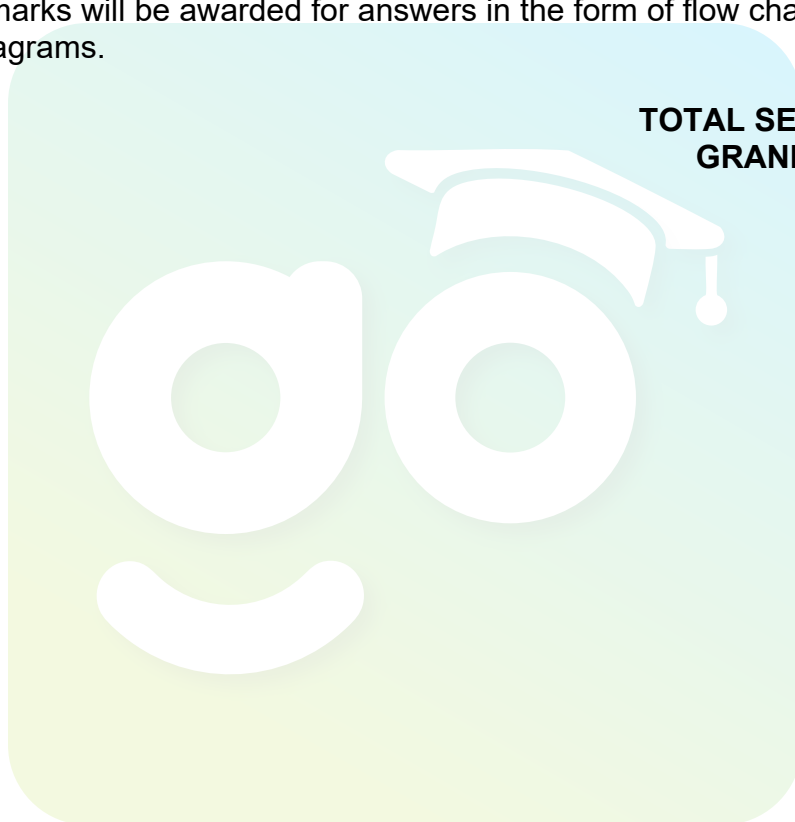
South Africa's economy has traditionally relied on mining and agriculture – the result of a wealth of mineral resources and favourable agricultural conditions. However, nowadays they make a very small contribution to South Africa's gross domestic profit. Unfortunately, they do have a big impact on the environment.

Explain the impact of agriculture and mining on the quality and availability of water in South Africa.

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: 150



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