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Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2023

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

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

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.9) in the ANSWER BOOK, for example 1.1.10 D.

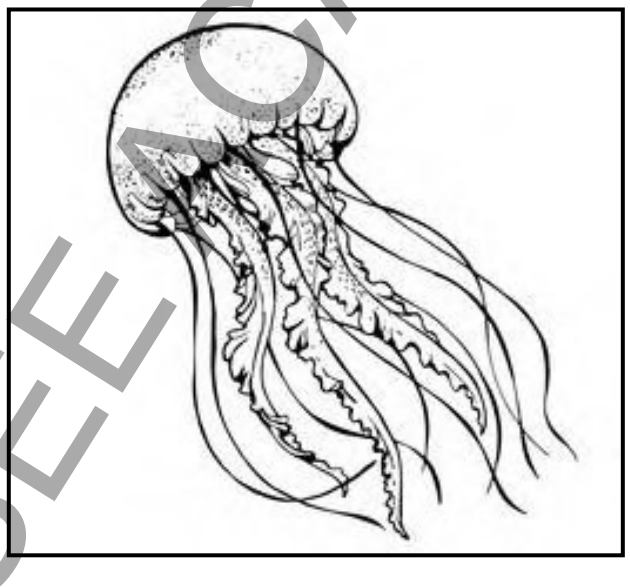
1.1.1 Vaccines work because …

A they contain antibodies that destroy disease causing organisms.
B they destroy disease causing organisms by dissolving their cell membranes.
C they trigger the body to produce antibodies to protect the body against disease causing organisms.
D it contains drugs that destroy disease causing organisms.

1.1.2 Which of the following phyla is diploblastic?

A Porifera
B Chordata
C Annelida
D Cnideria

1.1.3 Which characteristic best describes the organisms in the diagram below?



A Triploblastic
B Radially symmetrical
C Shows cephalization
D Has a notochord

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1.1.4 Advantages of a coelom:

(i) Independent movement and digestive system
(ii) Needs a blood system
(iii) Coelomic fluid acts as a hydrostatic skeleton
(iv) More space for complex organs and organ systems

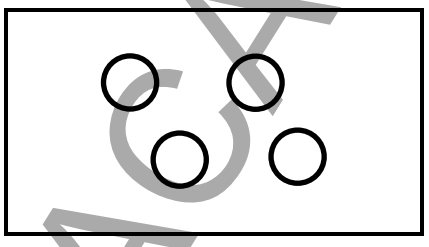
Which of the above statements represent advantages of having a true coelom?

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

1.1.5 Which combination listed below represents wind-pollinated plants?

A Large bright petals and lots of nectar
B Brightly coloured petals and small, light pollen
C Large anthers and lots of nectar
D Small petals and large, feathery stigmas

1.1.6 The shape of the bacteria below can be classified as …



A coccus.
B bacillus.
C vibrio.
D spirillum.

1.1.7 Which statement below best describes emigration?

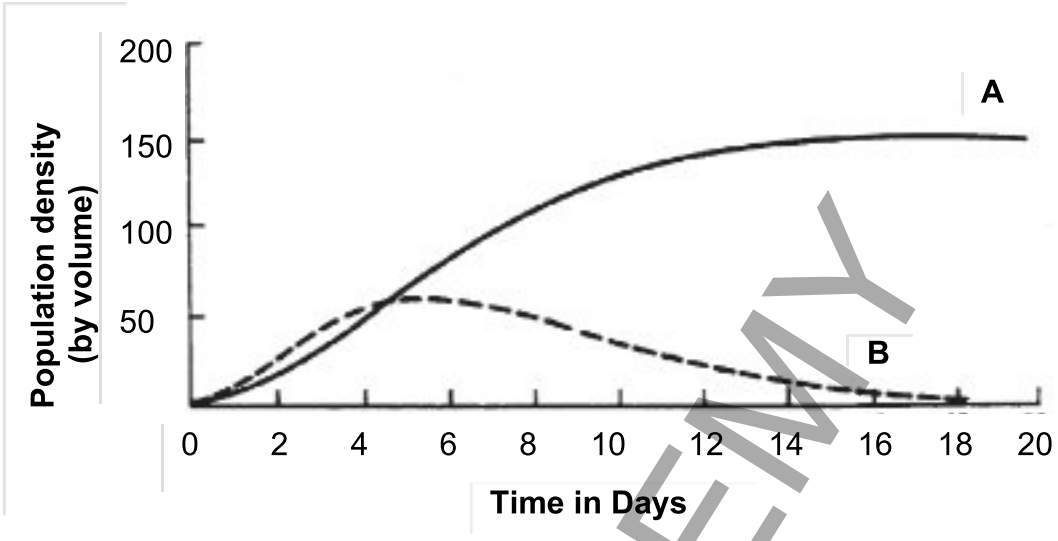
A Increase in population size
B Migration of animals.
C Permanent movement of organisms out of a habitat.
D Movement of people from city to city.

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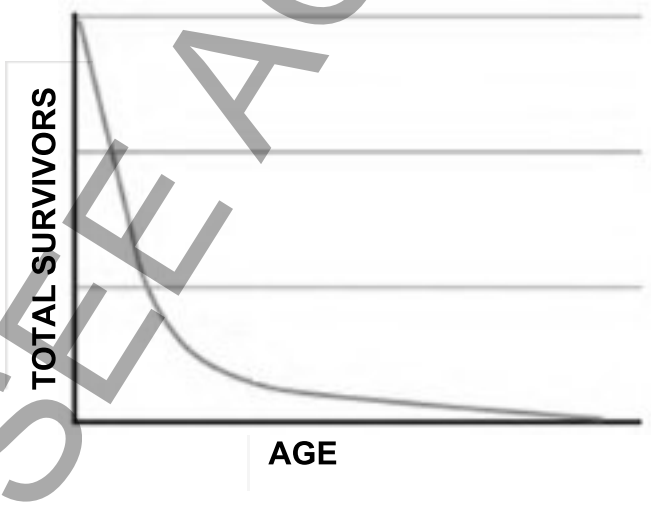
1.1.8 Two species of paramecium were found in a pond. The graph below shows the population growth of the two species (**A** and **B**) that feed on the same bacteria.



The graph above shows an example of …

A parasitism.
B resource partitioning.
C competitive exclusion.
D predator-prey relation.

1.1.9 Study the graph below.



The graph above best represents the survivor curve of …

A humans.
B frogs.
C birds.
D lions.

(9 x 2) (18)

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

1.2.1 An organism that captures and kills another organism for food

1.2.2 A direct method whereby all individuals in a human population are counted

1.2.3 A process in biotechnology that is used to convert sugar into alcohol and carbon dioxide

1.2.4 An organism without a true nucleus

1.2.5 A diagram showing the evolutionary relationship between organisms

1.2.6 A type of gut that is found in Annelids

1.2.7 A disease-causing organism

1.2.8 The access, by all people at all times, to adequate, safe and nutritious food (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 numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Tick on a dog	A: Symbiosis B: Parasitism
1.3.2	Decreases food security	A: Droughts B: GM foods
1.3.3	Characteristic of a population	A: Same species B: Live in the same habitat

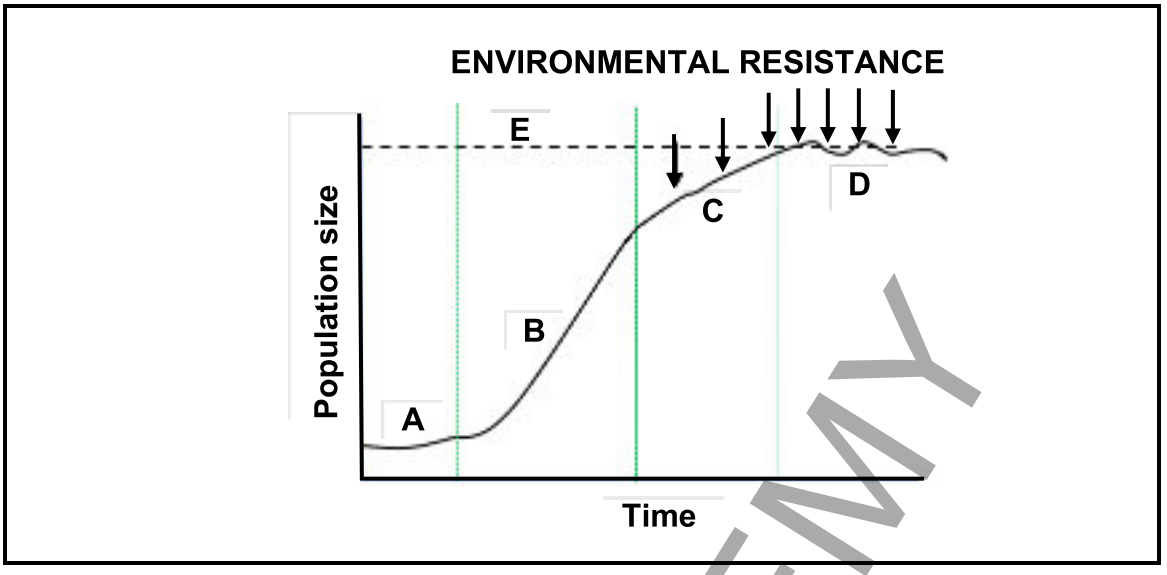
(3 x 2) (6)

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1.4 Study the population growth curve below.



1.4.1 Name the type of growth form shown in the graph above. (1)

1.4.2 Provide the following labels:

(a) Stage **D** (1)

(b) Line **E** (1)

1.4.3 Explain why the growth at stage **A** is slow. (2)

1.4.4 Name TWO factors that could form part of environmental resistance. (2)

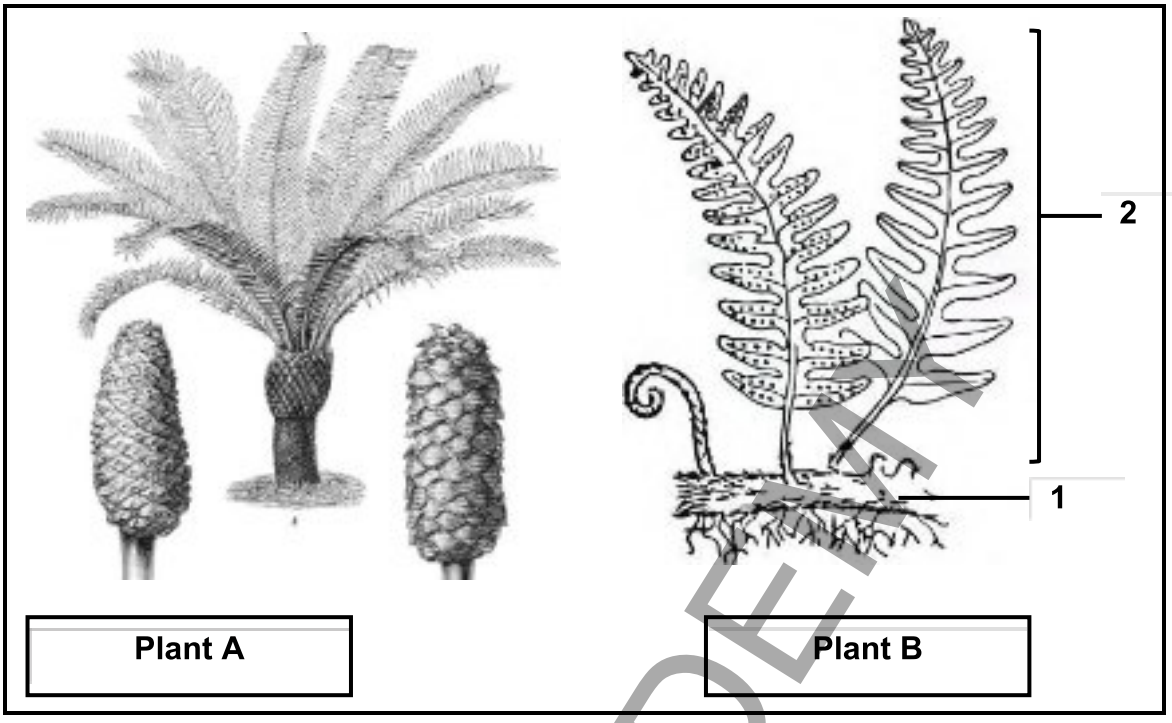
1.4.5 Name TWO inherent factors that would cause an increase in population size. (2)

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1.5 Study the diagrams below.



1.5 1.5.1 Name the plant division to which plant **A** belongs. (1)

1.5.2 Give TWO characteristics found in both plant **A** and **B**. (2)

1.5.3 Explain why plant **A** is less reliant on water than plant **B**. (3)

1.5.4 Provide labels for the following:

(a) **1** (1)

(b) **2** (1)

1.5.5 Why is the plant in generation **B** NOT considered a thallus plant? (1)

TOTAL SECTION A: 50

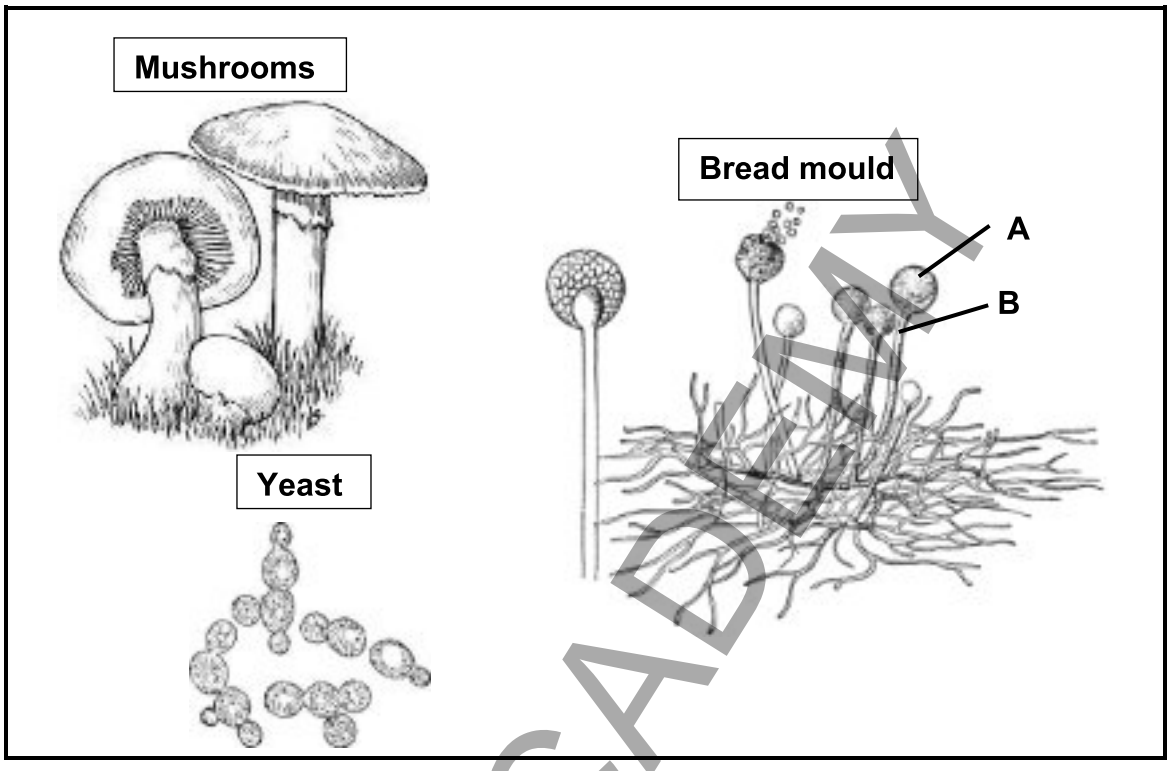
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SECTION B

QUESTION 2

2.1 Study the diagrams below.



2.1.1 To which kingdom do all the above organisms belong? (1)

2.1.2 Provide labels for **A** and **B**. (2)

2.1.3 Name the thread-like filaments that make up the body of a bread mould. (1)

2.1.4 Name TWO conditions needed for bread mould to grow. (2)

2.1.5 Name TWO products that yeast is used for. (2)

2.1.6 Explain ONE way in which organisms in this kingdom play an important role in the environment. (2)

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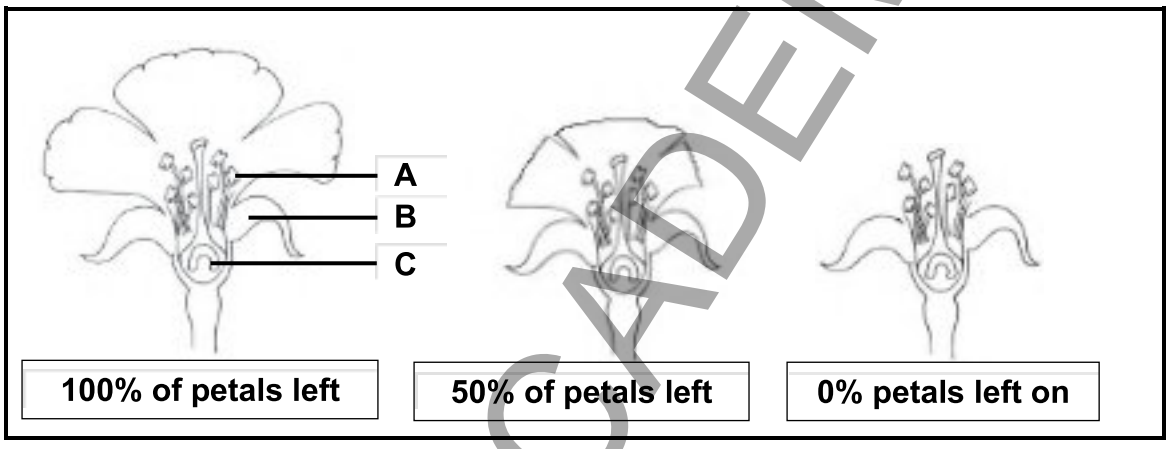
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2.2 An investigation was done to determine if the amount of petals affects the fertilisation of the ovule.
When flowers are self pollinated, the pollen tube grows only a little way into the stigma and style and fertilisation does not occur. When cross pollination occurs by pollinators then the pollen tubes grow all the way down and fertilisation of the ovule can occur.

The investigation was conducted as follows:

- 30 flowers were used. 10 flowers with 100% petals, 10 flowers with 50% of the petals removed and 10 flowers with 0% petals
- flowers were placed in an area with pollinators for 2 days
- after 2 days the flowers were prevented from further pollination
- after 7 days the amount of pollination and fertilisation in each flower was recorded

The diagrams below show the appearance of the flowers used.



The results are shown in the table below.

	NUMBER		
	Flower with 100% of petals	**Flower with 50% of petals**	**Flower with no petals**
Pollen on stigma	158	149	25
Pollen tubes in the style	86	82	8
Ovules fertilised	38	40	4

2.2.1 For this investigation give the:

(a) Independent variable (1)

(b) Dependant variable (1)

2.2.2 Supply labels for:

(a) Structure **A** (1)

(b) Whorl **B** (1)

(c) Structure **C** (1)

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2.2.3 Explain why there was more pollen on the flowers with petals. (2)

2.2.4 Explain why there are more pollen tubes present in the style of all flowers than the number of ovules fertilised. (2)

2.2.5 Give TWO ways the validity of this experiment could be improved. (2)

2.2.6 Write a conclusion for this experiment. (2)

2.2.7 State TWO ways in which angiosperms are better adapted to terrestrial life than bryophytes. (2)

2.2.8 Name the plant division to which angiosperms belong. (1)

2.2.9 Give TWO advantages of sexual reproduction. (2)

2.3 Read the extract below.

Malaria is a deadly disease caused by *Plasmodium sp*. and transmitted through the female Anopheles mosquito. In 2020, 627 000 people around the world died from malaria.

DDT is a pesticide used to control mosquito populations in malaria areas. In the early 1990s there was a worldwide ban on the use of DDT. DDT is non-biodegradable. It affects animals at the top of the food chain. It caused the decline of many birds of prey as it made the shells of their eggs very thin.

The number of deaths due to malaria rose from 19 in 1991 to 450 in 2000. The South African government decided to lift the ban and started using DDT again. By 2020 there were only 38 deaths due to malaria.

2.3.1 Name the kingdom to which the malaria parasite belongs. (1)

2.3.2 Give evidence from the passage that the use of DDT has a negative effect on the environment. (1)

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

2.3.4 Explain how the Anopheles mosquito transmits malaria. (2)

2.3.5 Give TWO precautions besides killing mosquitoes that people can take to prevent getting malaria. (2)

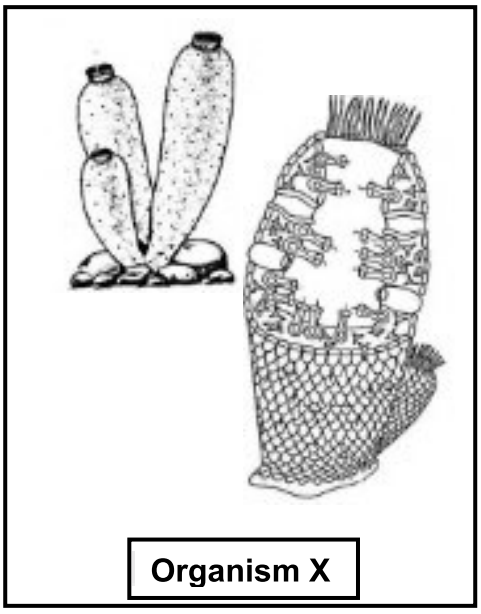
2.3.6 Name the TWO different human body cells that the plasmodium parasite attacks. (2)

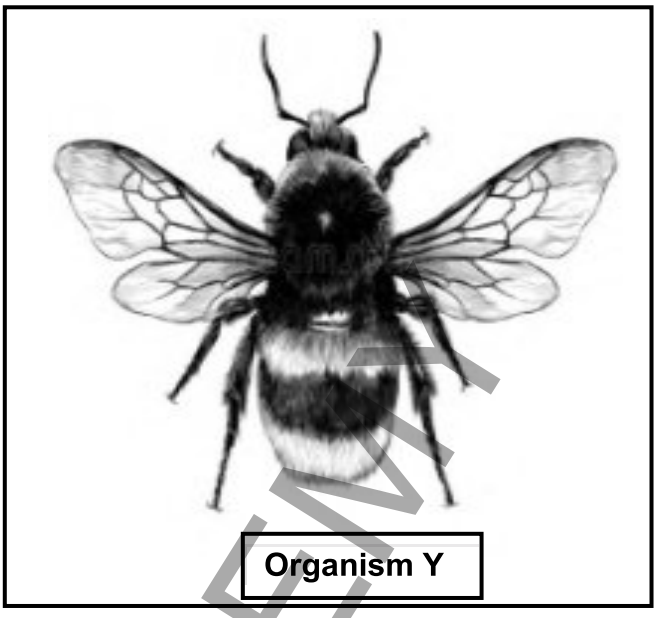
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2.4 The diagrams below show animals that belong to two different phyla.


Organism X


Organism Y

2.4.1 Name the phyla to which Organism **X** belongs. (1)

2.4.2 For each of the statements below, write only **X** or **Y**.

(a) Organism that has a through gut (1)

(b) Organism that has no organs (1)

(c) Organism that is sedentary (1)

2.4.3 What type of symmetry is shown by Organism **Y**? (1)

2.4.4 Describe how the body plan of Organism **Y** is suited to an organism that actively moves from one environment to another. (3)

2.4.5 Draw a simple labelled diagram of a cross section through the body wall to show the tissue layers found in Organism **Y**. (4)

[50]

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QUESTION 3

3.1 The table below shows the average atmospheric carbon dioxide level over 60 years.

The table showing the contribution of different sources of electricity in 2021 and the planned contribution of different sources to electricity in South Africa in 2030.

Source	Contribution to electricity consumption in 2021 (%)	Planned contribution to electricity consumption in 2030 (%)
Coal	84,4	46
Gas	0,8	16
Wind	3,4	15
Solar	2	11
Hydro	2,8	10
Nuclear	5,3	2
Other	1,4	0

3.1.1 Which source provided the most electricity in South Africa in 2021? (1)

3.1.2 Explain how coal generated electricity increases global warming. (4)

3.1.3 Explain why Eskom wants to increase the amount of wind and solar generated electricity. (2)

3.1.4 Draw a pie chart showing the planned sources of electricity for 2030. (7)

3.1.5 What is the difference between the percentage of gas generated electricity used in 2021 and 2030? (2)

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3.2 Dandelions are weeds that often grow on schools sports fields. The groundsman at a school is responsible for making sure that the soccer field is well maintained and has no weeds.

He wanted to calculate the number of dandelion weeds on their soccer field.

- The size of the soccer field is 2 500 m^2.
- He used 1 m x 1 m (1 m^2) quadrats and took 15 samples across the field.
- The number of dandelions in each sample were recorded in the table below.

Sample number	Number of dandelion plants
1	22
2	3
3	7
4	4
5	15
6	0
7	3
8	0
9	12
10	3
11	0
12	14
13	4
14	7
15	2



Dandelion plant

3.2.1 What is this method of estimating population size called? (1)

3.2.2 The grounds man did not know where to place the quadrats on the field. Explain how he should go about determining where to place them. (2)

3.2.3 Calculate the total number of dandelions on the field. (5)

3.2.4 Why were fifteen samples taken instead of five? (1)

3.2.5 Give ONE reason why the groundsman would want to know the total number of weeds on the field. (1)

3.3 Tabulate TWO differences between *a developed country* and *a developing country* that affects their population growth curves. (5)

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3.4 Read the extract below.

> Acid mine drainage has a negative effect on the environment. Mines often use lime to neutralise the acidic water before it is pumped into rivers and streams. But lime needs to be mined especially for this purpose.
>
> It contaminates soil so that the plants do not get enough of the required nutrients to grow, it contaminates drinking water, disrupts the growth and reproduction of aquatic animals and corrodes buildings and structures like bridges.
>
> New research shows that slag, a very alkaline waste product made from mining, is effective in neutralising the acidic water.

3.4.1 Describe how acid mine drainage forms. (3)

3.4.2 Give TWO negative effects of acid mine drainage on the environment mentioned in the extract. (2)

3.4.3 Explain why it is economically better to use slag to neutralise the acidic water than lime. (4)

3.4.4 Give ONE other way mining affects the quality of water. (1)

3.5 Alien plants such the water hyacinth (*Eichhomia sp.)* have become invasive in South Africa, blocking water ways and reducing water quality.

3.5.1 Differentiate between *alien plants* and *indigenous plants*. (2)

3.5.2 Why do alien plants become invasive in an ecosystem? (1)

3.5.3 State TWO ways that the government could use to control alien plants. (2)

3.5.4 Describe how alien plants may affect aquatic animals by reducing water quality. (4)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150

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