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Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2024

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

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ILFSCE2

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.
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. ALL drawings MUST be done in pencil and labelled 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. All calculations to be rounded off 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.

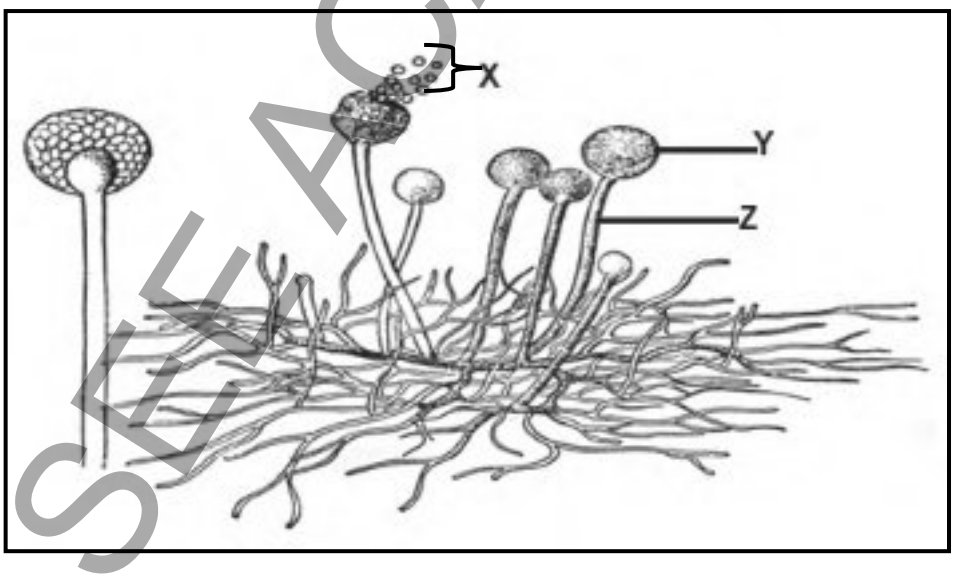
1.1.1 A root system mainly found in monocots formed by many thin, moderately branching roots from the stem.

A Vascular roots
B Aerial roots
C Adventitious roots
D Taproots

1.1.2 A biological preparation made from damaged micro-organisms particles used to stimulate an immune response by the body's immune system.

A Antibiotic
B Vaccine
C Antigen
D Virus

1.1.3 The diagram below shows a bread mould.



The correct labels for the diagram above are:

A X-spores, Y-sporangiophore, Z-sporangium
B X-sporangium, Y-spores, Z-sporangiophore
C Z-sporangiophore, Y-sporangium, X-spores
D Y-sporangium, X-sporangiophore, Z-spores

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1.1.4 A technique used to determine the elephant population from an aerial photograph:

A Quadrat sampling
B Direct counting
C Mark-recapture
D Culling

1.1.5 The table below shows the water dam levels in the Nelson Mandela Bay municipality during certain months of 2024.

Dam	Capacity when full (mℓ)	Current level (%)	Available water (mℓ)
Churchill	32 249 mℓ	100%	32 597 mℓ
Impofu	105 757 mℓ	42.62%	27 642 mℓ
Loerie	3 026 mℓ	98.65%	2 410 mℓ
Kouga	125 910 mℓ	100%	121 755 mℓ
Groendal	11 638 mℓ	100%	11 149 mℓ

Which dam has the least available water?

A Impofu
B Groendal
C Kouga
D Loerie

1.1.6 A narrow shaft drilled in the ground to extract water.

A Aquifer
B Borehole
C Wetland
D Purification

1.1.7 Study the list below.

(i) Stops using medication after feeling better
(ii) Uses incorrect treatment
(iii) The pathogen undergoes mutations
(iv) Uses correct treatment on regular basis
(v) Gets infected with another disease

Which of the following combinations causes humans to develop resistance to a disease?

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

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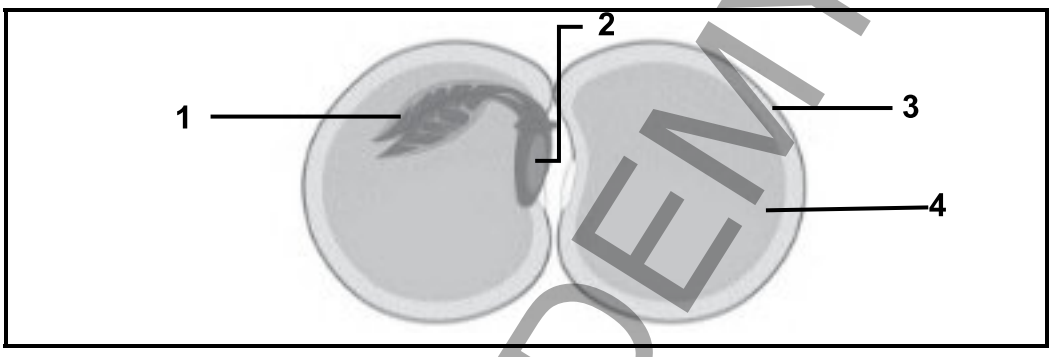
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1.1.8 The net increase in a population can be determined by …

A adding deaths and immigrations and subtracting births and emigrations.
B adding births and immigrations and subtracting deaths and emigrations.
C adding births and emigrations and subtracting deaths and immigrations.
D adding births and deaths and subtracting emigrations and immigrations.

1.1.9 The following diagram shows a seed.



Which labelled part develops into the stem and leaves?

A 1
B 2
C 3
D 4

(9 x 2) (18)

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 1.2.9) in the ANSWER BOOK.

1.2.1 Organisms of the same species that live together in the same environment and can interbreed

1.2.2 A plant body that is not differentiated into stems and leaves and which lacks true roots

1.2.3 Plant and animal species that remain stable in their environment

1.2.4 Organic component of soil, formed by the decomposition of leaves and other plant material by micro-organisms

1.2.5 A stem which grows horizontally

1.2.6 Factors that will exert an influence on a population regardless of its size

1.2.7 A process of initial colonisation of land in a previously disturbed area

1.2.8 Growing of a single species of plant crops in large areas for many consecutive years

1.2.9 Electricity generated by the power of water (9 x 1) (9)

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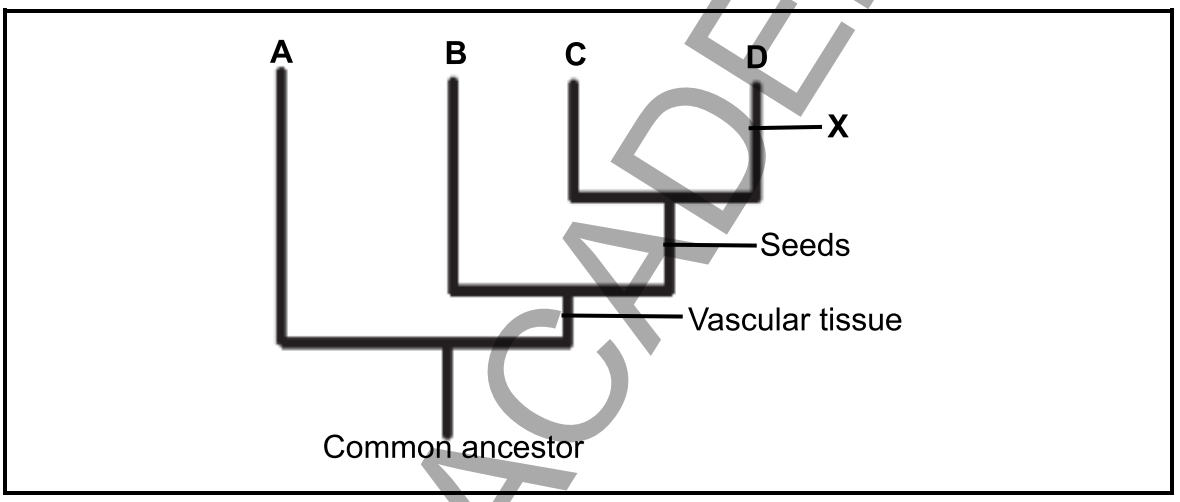
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1.3 Indicate whether each of the descriptions in COLUMN I, applies to **A ONLY**, **B ONLY**, **BOTH A and B**, or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B**, or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Develop a notochord	A: Arthropoda B: Chordata
1.3.2 Hemocoel	A: Open blood system B: Closed blood system
1.3.3 Autotrophic	A: Green algae B: Amoeba

(3 x 2) (6)

1.4 The phylogenetic diagram below shows possible evolutionary relationships in living organisms with four divisions.



1.4.1 Identify the kingdom represented by the phylogenetic diagram above. (1)

1.4.2 Write down the LETTER and NAME of the division that has:

(a) Dominant gametophyte generation (2)

(b) Fronds as leaves (2)

1.4.3 State the evolutionary adaptation at **X** in division **D** that allowed it to be successful. (1)

1.4.4 Name the vascular tissue that transports manufactured foods. (1)

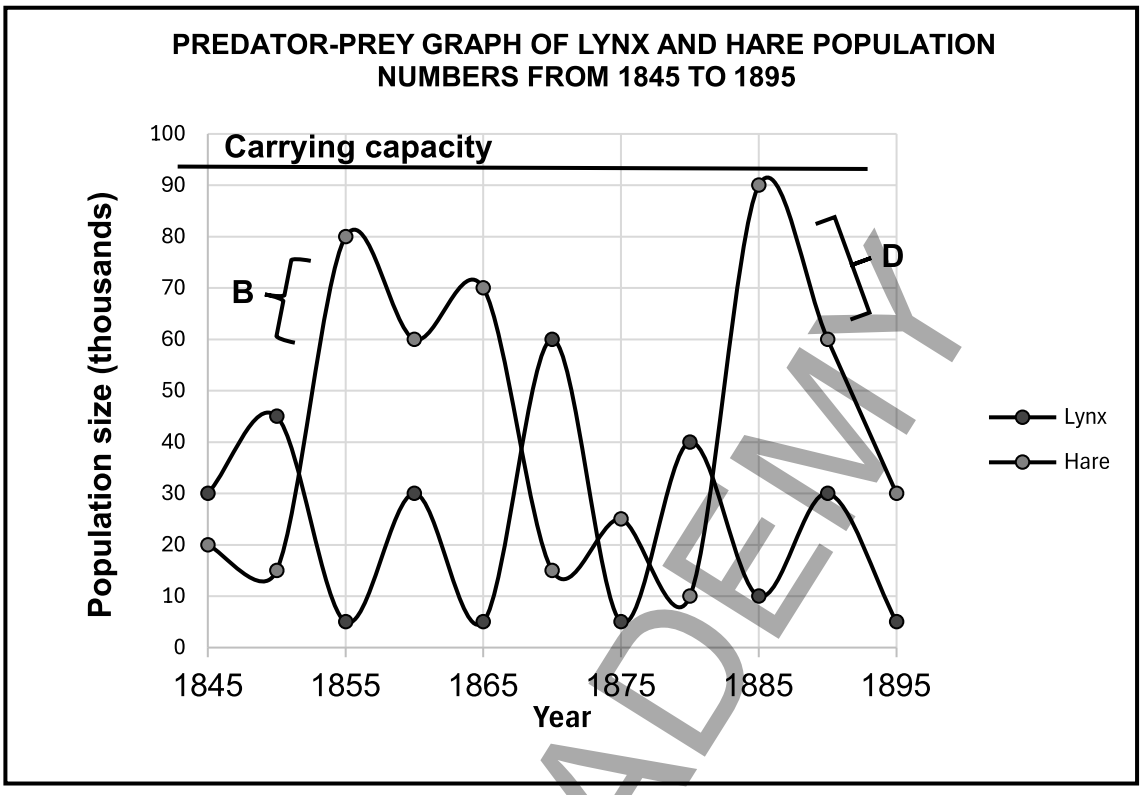
1.4.5 Which kingdom has sessile organisms that differ to the one above in their mode of nutrition? (1)

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1.5 The graph below shows the interaction of between the lynx and hare population over time.



1.5.1 Name the:

(a) Prey species (1)

(b) Predator species (1)

1.5.2 What is the carrying capacity of the hare population in the above predator-prey graph? (1)

1.5.3 In which years is the population size of the hare twice as much as the lynx population? (2)

1.5.4 Identify the phase marked:

(a) **B** (1)

(b) **D** (1)

1.5.5 State TWO other density-dependent factors that may have a negative effect on a population. (2)

TOTAL SECTION A: 50

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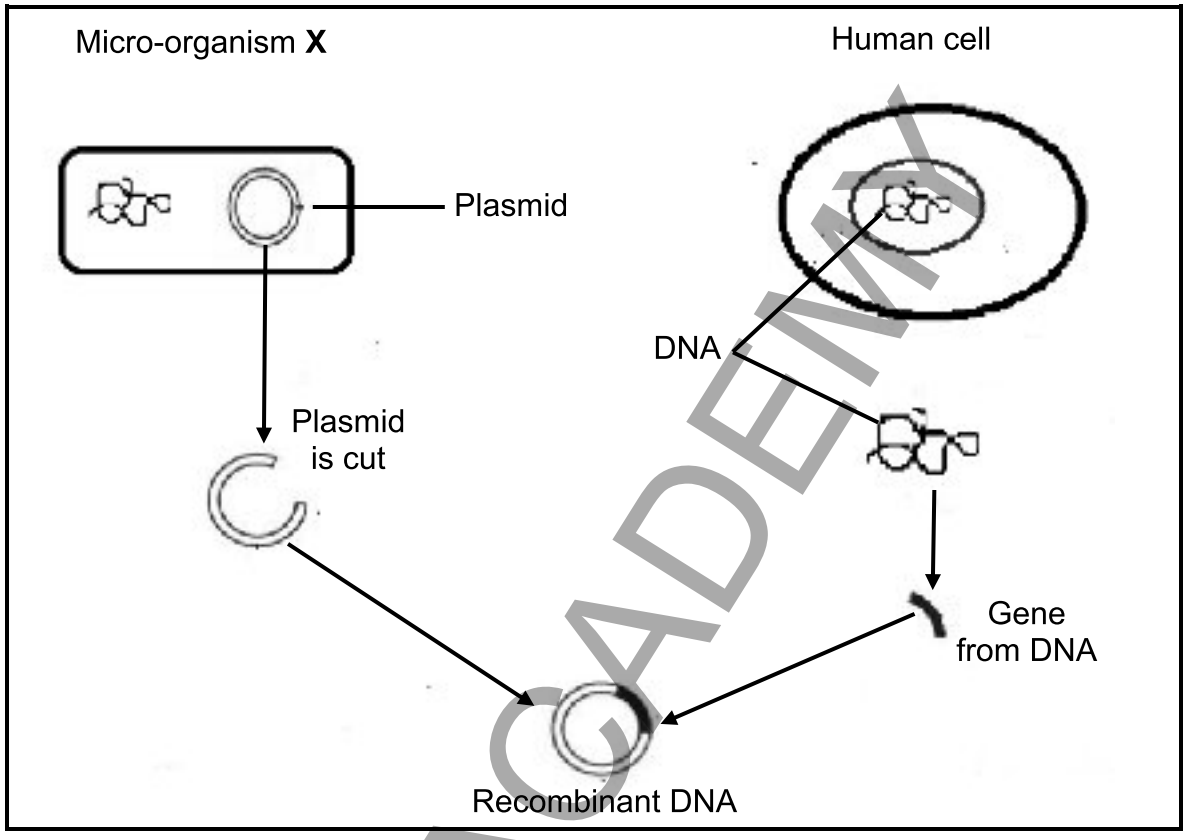
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SECTION B

QUESTION 2

2.1 The diagram below shows a process in biotechnology on how insulin is produced for humans with diabetes mellitus.



2.1.1 Name the:

(a) Biotechnological process above (1)

(b) Micro-organism **X** used in this process (1)

2.1.2 Explain how micro-organism **X** named in QUESTION 2.1.1 (b) reproduces to make it suitable for the above process. (2)

2.1.3 Describe the steps involved in producing insulin. (4)

2.1.4 Draw a neatly labelled diagram of micro-organism **X** to show its structure. (5)

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2.2 Read the information below.

HIV/Aids has been a global health pandemic for many years, with more than 35 million lives lost globally through this disease. Although no cure for this virus has been developed, scientists have developed prevention therapy to stop and reduce the spread of HIV in humans.

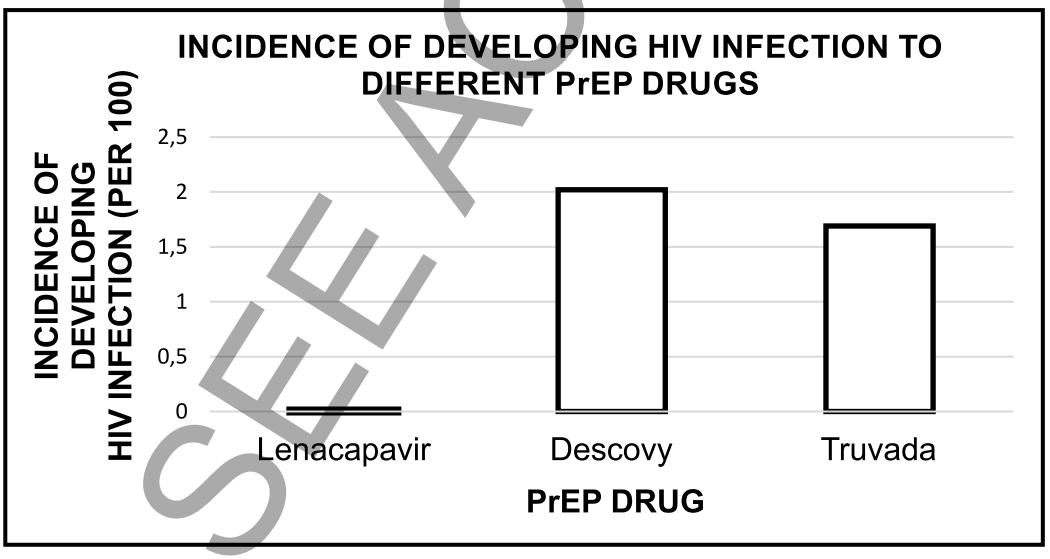
One such prevention therapy for HIV/Aids is Pre-Exposure Prophylaxis (PrEP). PrEP works by stimulating the immune system into blocking an enzyme HIV needs to reproduce in the body. These drugs are usually taken daily at the same time interval by HIV negative people.

Scientists carried out an investigation to determine the effectiveness of PrEP drugs on preventing HIV infection in women.

The procedure was as follows:

- 5 338 women aged 16–25 years old participated in the investigation and were divided into three groups (**A**, **B** and **C**).
- Group **A** which consisted of 2 134 women, were given the Lenacapavir drug twice a year (once every 6 months).
- Group **B** had 2 136 women participants who took the Descovy drug daily for a year.
- Group **C** had 1 068 women participants who took the Truvada drug daily for a year.

The results of the investigation are shown graphically below.



2.2.1 Identify the type of immunity the PrEP drugs offer to people. (1)

2.2.2 For this investigation, identify the:

(a) Dependent variable (1)

(b) Independent variable (1)

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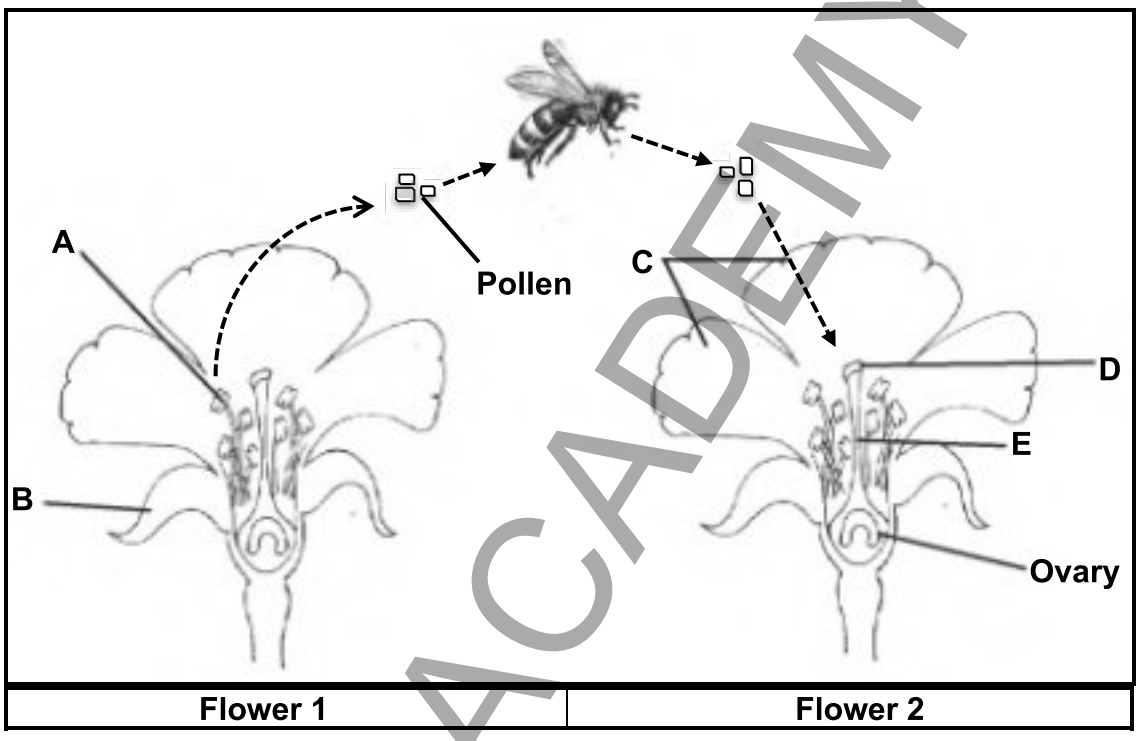
2.2.3 Give ONE reason why this investigation could be considered reliable. (1)

2.2.4 State TWO factors that were considered in the selection of women participants in this investigation. (2)

2.2.5 Explain which PrEP drug would be highly recommended for sexually active people. (3)

2.2.6 State ONE other HIV/Aids preventative measure sexually active people must practice during sexual intercourse. (1)

2.3 The diagram below shows pollination in flowering plants.



2.3.1 Identify the:

(a) Pollinating agent in the above process (1)

(b) Type of pollination represented (1)

2.3.2 Write down the LETTER and NAME of the structure that:

(a) Attracts the pollinating agent (2)

(b) Has a protective function (2)

2.3.3 Describe the events that occur when pollen lands on part **D**. (4)

2.3.4 Give ONE characteristic in the offspring produced by these plants, that would enable them to survive in harsh changing environments. (1)

2.3.5 Research shows a decline in the population size of the pollinating agent above.

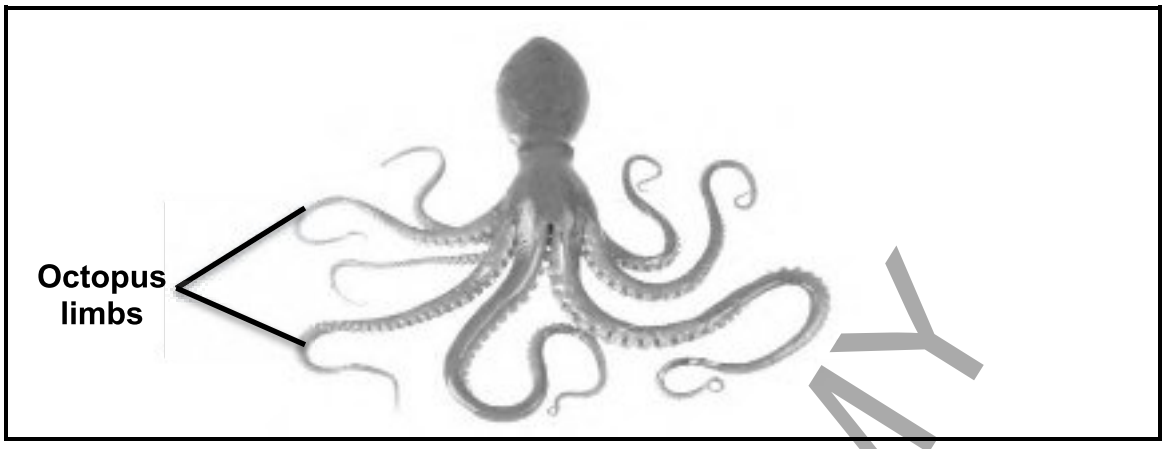
Explain how this could affect the cost of seed-based foods. (2)

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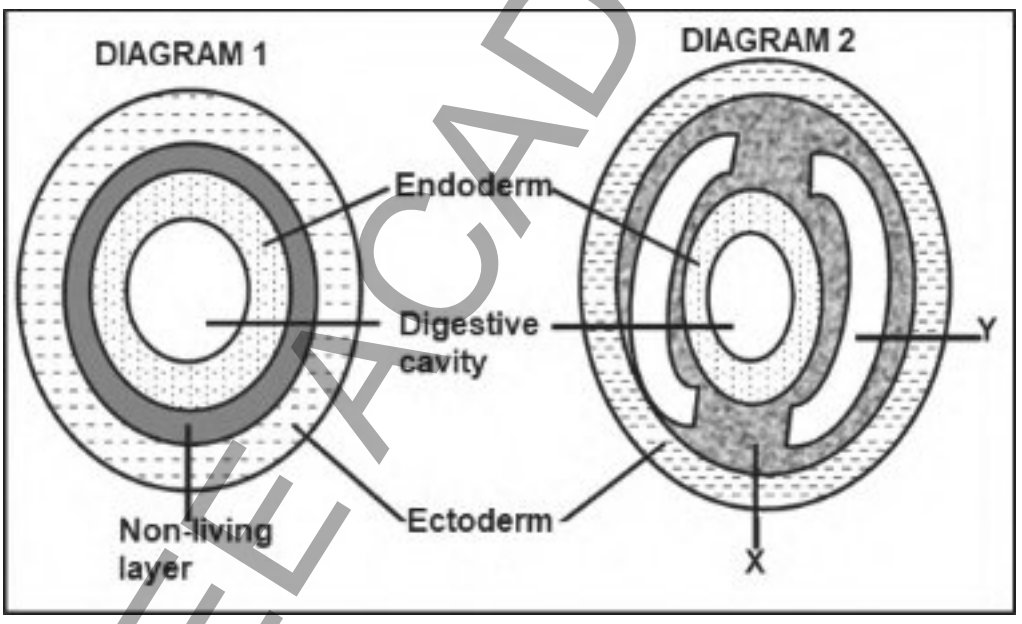
2.4 The diagram below shows an octopus, a triploblastic marine organism with eight limbs.



2.4.1 How many tissue layers does an octopus have? (1)

2.4.2 Give ONE possible function of the eight limbs on the octopus body. (1)

2.4.3 Diagram **1** and **2** below shows a possible body plan for an octopus.



(a) Identify tissue layer **Y.** (1)

(b) Which DIAGRAM (**1** or **2**) is found in an octopus? (1)

2.4.4 More evolved animal phyla developed fluid **X** in tissue layer **Y.**

Name fluid **X** and explain TWO advantages of fluid **X** in more evolved phyla. (5)

2.4.5 Name the animal phylum that has the symmetry in DIAGRAM **1.** (1)

2.5 Describe TWO ways invertebrates can be useful in agriculture. (4)
[50]

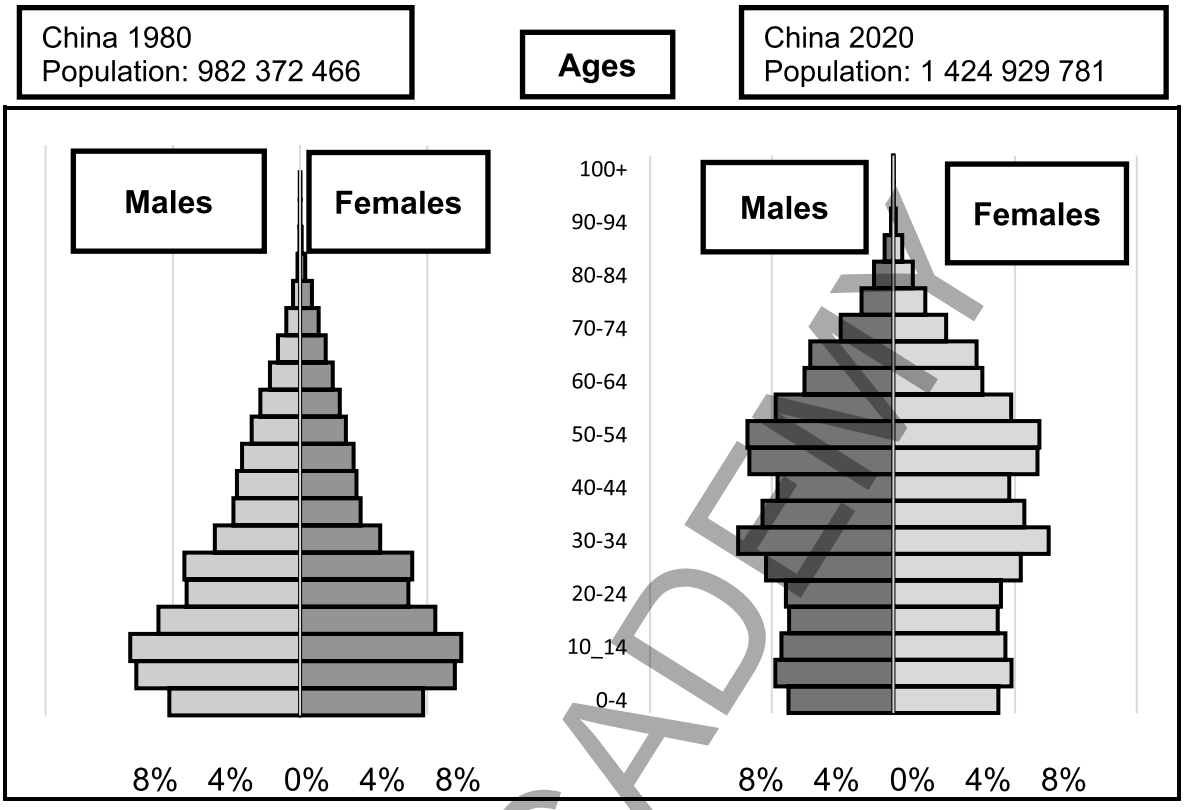
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QUESTION 3

3.1 The graphs below show the population pyramids of China in the years 1980 and 2020.



3.1.1 What is the name of the graph shown above, used to illustrate the distribution of a population in a country? (1)

3.1.2 In which year did China:

(a) Lack basic resources for its growing population? (1)

(b) Improve life expectancy of its population? (1)

3.1.3 Explain your answer to QUESTION 3.1.2 (b) by referring to the graph. (2)

3.1.4 Determine the total number of males in the 2020 Chinese population if the percentage of males is 51,2%. Show ALL workings. (2)

3.1.5 The Chinese government introduced the One Child Policy in 1980 and other economic reform policies in the following years. These policies were designed to slow down the rapid population growth and increase the number of people of working-age. Under the One Child Policy married couples were allowed to have one child.

(a) Explain how these policies affected the pre-reproductive age and the working-age population percentages from the year 1980 to the year 2020. (4)

(b) Give TWO other strategies governments can implement to reduce population growth in a country. (2)

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3.2 Read the information below.

Plastic pollution is linked to climate change, especially plastics that are only used once which are often disposed-off and in some cases burned in landfill sites in informal dwellings. The burning of plastic contributes negatively to people's health. Many attempts have been made by some municipalities and other organisations to recycle plastic with little success achieved.

The table below shows the amount of plastic wasted in millions of tons (Mt) in 2019 by different types of plastic waste.

Type of plastic waste	Amount of plastic (millions of tons)	Amount of plastic (Percentage %)
Landfill sites	174	49,3
Incinerated (burned)	67	19
Released into the environment	79	22,4
Recycled	33	9,3

3.2.1 Name the type of plastic waste that has contributed the most to climate change. (1)

3.2.2 Explain how communities can use the type of plastic waste in QUESTION 3.2.1 to their advantage. (2)

3.2.3 Describe how incineration (burning of plastic) can have a negative effect on people's health. (3)

3.2.4 Suggest TWO possible reasons for the low percentage in recycled plastic waste. (2)

3.2.5 Draw a pie chart to represent the amount of plastic, measured in percentage, of the different types of plastic waste in 2019. (7)

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3.3 Read the extract below on an alien invasive plant.

THE BRAZILIAN PEPPERTREE THREATENS BIODIVERSITY



Brazilian peppertree

The Brazilian peppertree (*Schinus terebinthifolius*) is an *invasive alien* plant in parts of South Africa that is indigenous to Brazil in South America. This plant which was initially introduced for ornamental and street tree purposes usually invades previously disturbed land areas and river margins.

The Brazilian peppertree has a rapid growth rate that enables it to outcompete indigenous vegetation by forming a dense canopy layer over other plants. This plant has poisonous berries that are harmful to wildlife such as birds and other animals that eat them, thus causing them to die. The growth of this invasive plant can reach up to 10 metres in height and it absorbs a lot of carbon dioxide from the atmosphere.

3.3.1 What is meant by *alien invasive*? (2)

3.3.2 Why was the Brazilian peppertree introduced in South Africa? (1)

3.3.3 Give evidence from the extract that states the Brazilian peppertree:

(a) Is a pioneer species (1)

(b) Is toxic to animal life (1)

(c) Can reduce global warming (1)

3.3.4 Explain how the rapid growth rate of the Brazilian peppertree can affect plant biodiversity. (3)

3.3.5 Describe how biological control could work in helping to reduce the population of the Brazilian peppertree. (2)

3.4 Coastal provinces in South Africa have experienced adverse weather patterns, causing severe damage to communities.

Explain the impact of global warming on the weather patterns. (5)

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3.5 Competition and symbiosis exist in ecosystems to allow organisms to compete and interact with each other and share limited environmental resources. Competition often causes some organisms to die out if they are outcompeted while others survive.

The diagrams below show organisms competing.



DIAGRAM 1



DIAGRAM 2

3.5.1 Name the type of competition that occurs in:

(a) DIAGRAM **1** (1)

(b) DIAGRAM **2** (1)

3.5.2 Name and describe TWO symbiotic relationships that can benefit one organism in an ecosystem. (4)

[50]

SECTION B: 100
GRAND TOTAL: 150

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