



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2020

**LIFE SCIENCES P2
(EXEMPLAR)**

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 the 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 numbers (1.1.1–1.1.9) in your ANSWER BOOK, for example 1.1.10 D.

1.1.1 The regrowth of plants and animals in an area after a fire has destroyed all vegetation:

- A Primary succession
- B Secondary succession
- C Competitive exclusion
- D Symbiosis

1.1.2 Which of the following produce antibodies?

- A Blood plasma
- B Lymphocytes
- C Macrophages
- D Red blood cells

1.1.3 The short-lived type of immunity that mothers pass to their babies is called ...

- A maternal immunity.
- B active immunity.
- C passive immunity.
- D innate immunity.

1.1.4 All of the following increase intraspecific competition except:

- A Too much food
- B Lack of water
- C Too little space
- D Too few mates

1.1.5 A seed and a spore differ in that ...

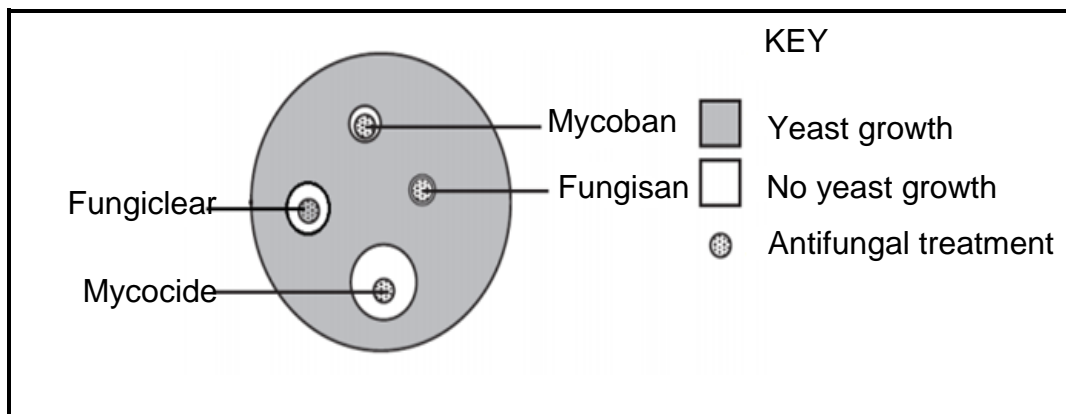
- A spores are diploid while seeds are haploid.
- B spores can withstand dehydration while seeds cannot.
- C spores are gametes while seeds give rise to new plants.
- D spores are usually unicellular while seeds are multicellular.

- 1.1.6 A biologist discovered a new living cell with a distinct cell wall but with no definite nucleus.

The cell is likely to be that of a/an ...

- A animal
- B bacterium
- C virus
- D plant

- 1.1.7 An investigation was carried out to test the effectiveness of four antifungal treatments on preventing the growth of yeast. The results are shown in the diagram below.



Which ONE of the following conclusions can be made from the results?

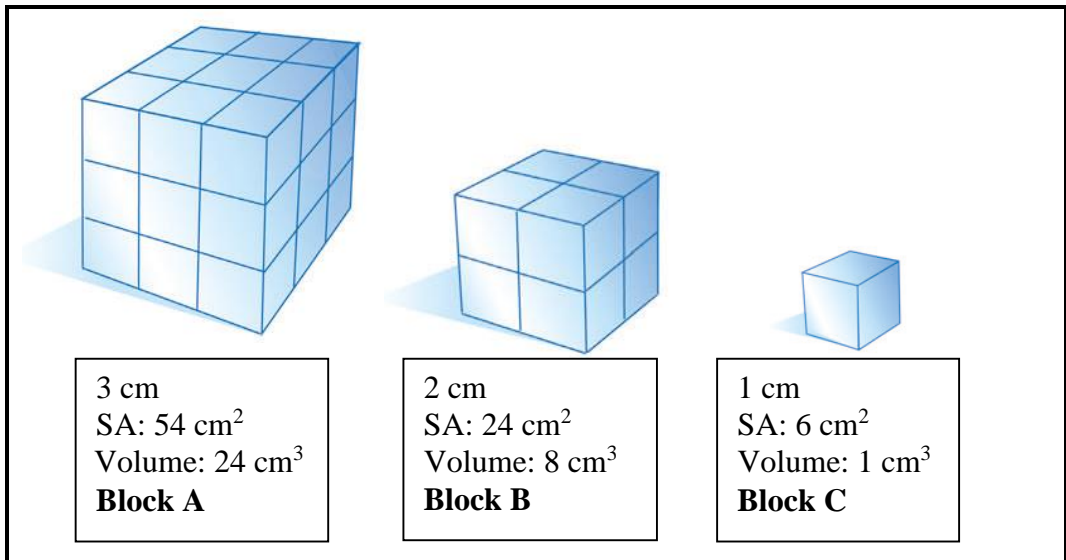
- A All the antifungal treatments are equally effective.
 - B All the antifungal treatments are ineffective.
 - C Mycocide is the most effective and Fungisan is the least effective.
 - D Fungisan is the most effective and Mycocide is the least effective.
- 1.1.8 Consider the following which affect the waterways in South Africa.

- (i) Thermal pollution
- (ii) Sewerage spills
- (iii) Acid mine drainage
- (iv) Over use of inorganic fertilisers

Which of the above reduce the oxygen content of a river?

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

1.1.9 Consider the blocks below.



According to the above diagrams, the block(s) with the highest surface area to volume ratio is/are:

- A Block A
- B Block B
- C Block C
- D All are the same

(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 (1.2.1–1.2.8) in the ANSWER BOOK.

1.2.1 Symbiotic relationship between humans and *E. coli* bacteria living in the gut of humans

1.2.2 The micro-organism used in the manufacturing of beer and bread

1.2.3 A diagram which shows the evolutionary relationships between different organisms

1.2.4 Reproductive structure in which the gametes are found in gymnosperms

1.2.5 A process caused by excessive nutrients in water which leads to algal bloom and reduces water quality

1.2.6 The variety plant and animal life in a particular habitat

1.2.7 The elimination of one species from a habitat as a result of being out competed by a similar species occupying the same ecological niche

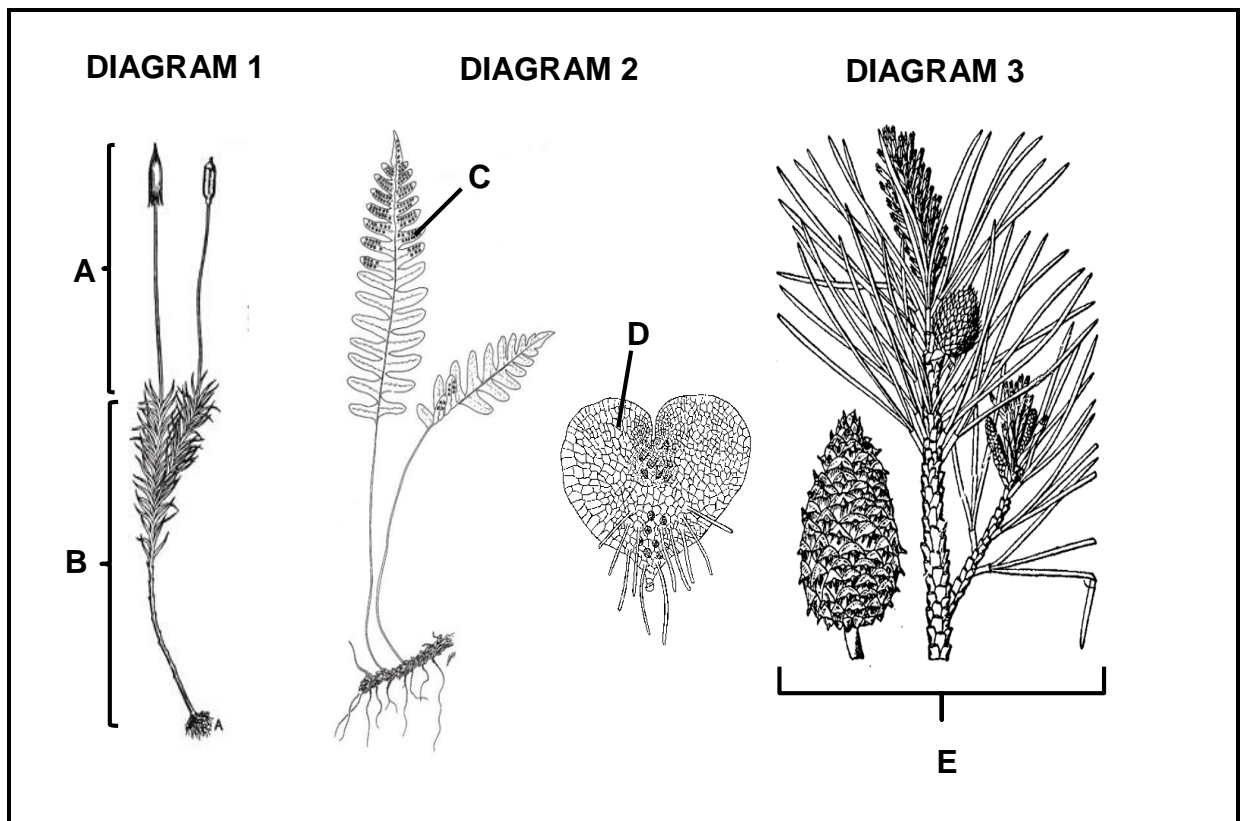
1.2.8 Gas produced in landfill sites that has the potential to be used as a biofuel (8 x 1) (8)

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 (1.3.1–1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	Flower of a Monocotyledon	A:	Calyx
		B:	Corolla
1.3.2	Fungi	A:	Saprophytic
		B:	Prokaryotic
1.3.3	Reduced water availability	A:	Genetically modified crops
		B:	Destruction of wetlands

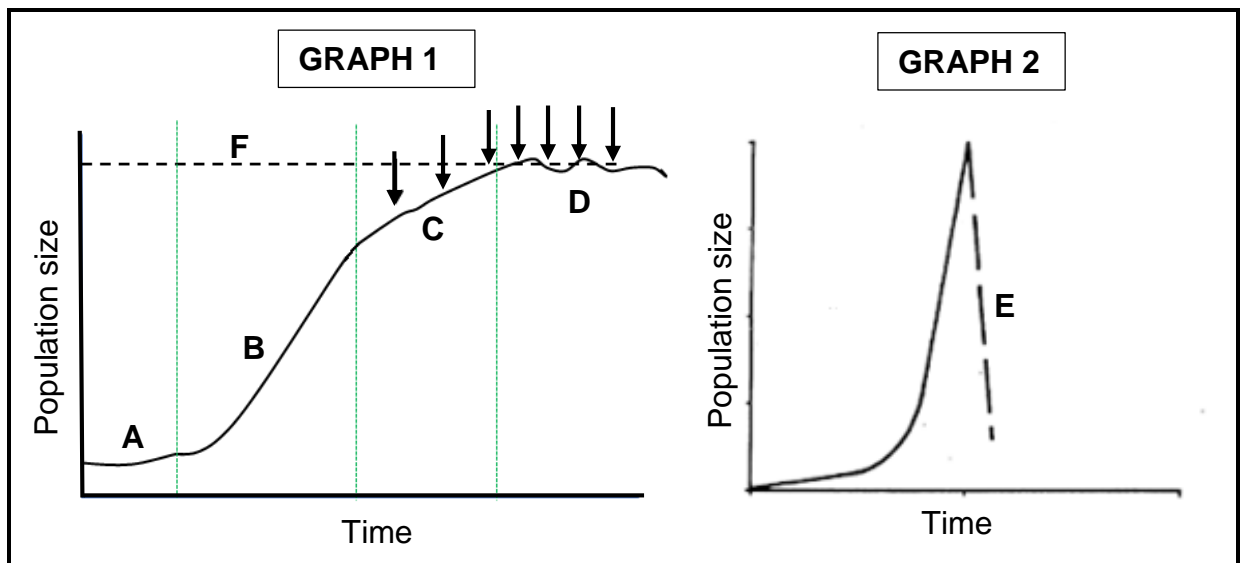
(3 x 2) (6)

1.4 Study the diagrams below.



- 1.4.1 Name the kingdom to which the above organisms belong. (1)
- 1.4.2 Name the Division/Phylum to which the organism in DIAGRAM 1 belongs. (1)
- 1.4.3 Give the LETTERS that represent the gametophyte generation. (2)
- 1.4.4 Give the DIAGRAM NUMBER of the group that DOES NOT rely on water for reproduction. (2)
- 1.4.5 Give the DIAGRAM NUMBER of the group that produces seed. (2)

1.5 Study the two population growth curves below.



1.5 1.5.1 Provide labels for phases:

- (a) B (1)
- (b) C (1)
- (c) E (1)

1.5.2 Name the type of growth form represented by GRAPH 1. (1)

1.5.3 Which growth curve would represent the growth of a bacterial colony? (1)

1.5.4 Give the LETTER of the phase where:

- (a) Birth rate equals death rate (1)
- (b) Natality exceeds mortality by far (1)

1.5.5 What do the arrows in GRAPH 1 represent? (1)

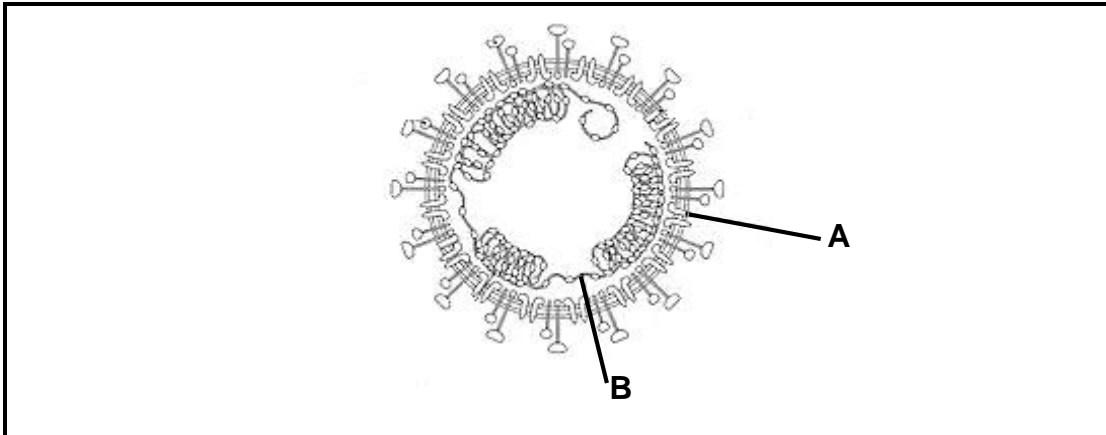
1.5.6 Give TWO reasons why the initial phase A starts slowly. (2)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 The novel corona virus, named COVID-19, escalated to a pandemic level during 2020. Scientists around the world raced to produce a vaccine to help fight the virus. However, it would take months before a vaccine could be released, once it had been discovered.

Below is the virus that caused our world to change.

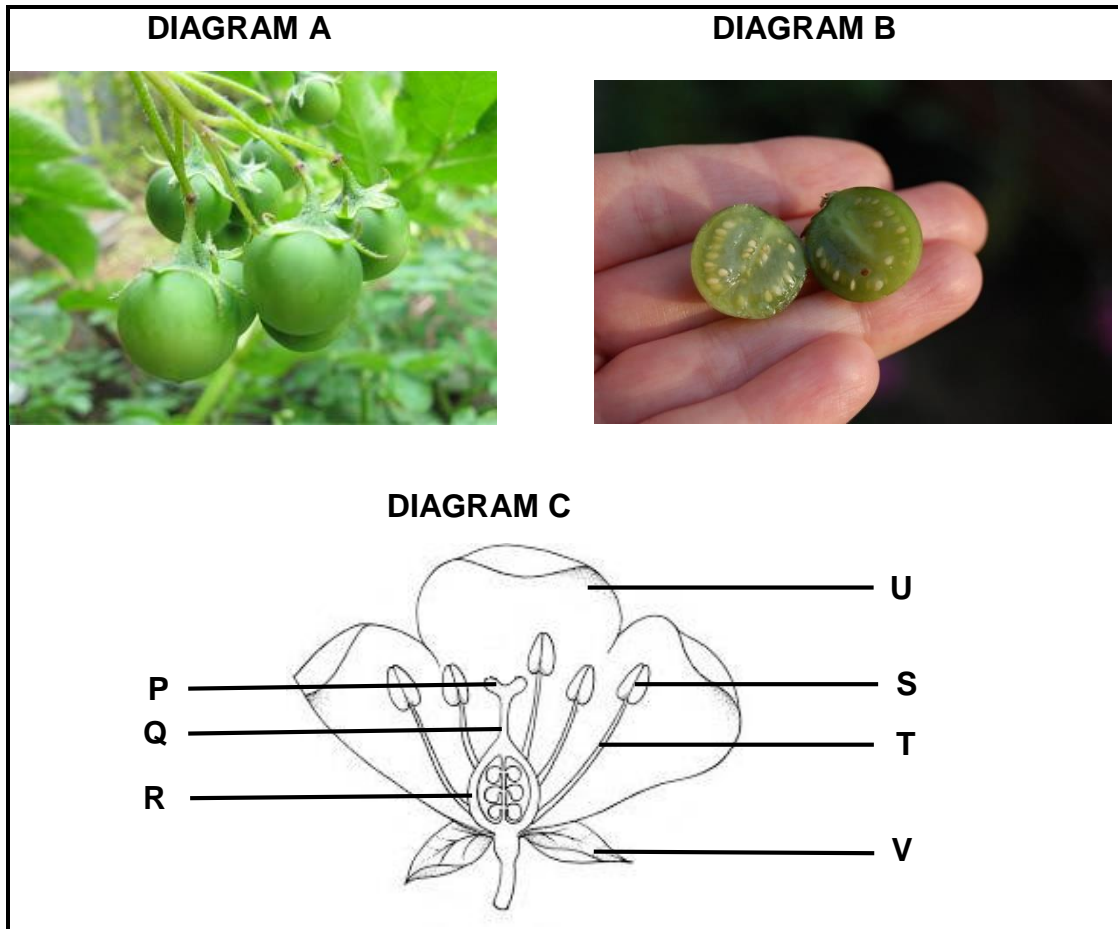


- 2.1.1 Provide labels for viral parts **A** and **B** respectively. (2)
- 2.1.2 Why were antibiotics not prescribed to fight against the virus? (2)
- 2.1.3 Explain how a vaccine works to protect us from a disease. (3)
- 2.1.4 Why would it take so long for a vaccine to be released? (2)
- 2.2 Malaria causes over 400 000 deaths each year globally.
- 2.2.1 Name the protozoan that causes malaria. (1)
- 2.2.2 What is the vector that spreads malaria? (1)
- 2.2.3 Give TWO common symptoms in malaria patients. (2)
- 2.2.4 How can malaria be prevented if there is no medication or vaccine available? (2)

2.3 Potatoes are a staple food in many countries including Peru. The International Potato Centre in Lima, Peru is a seedbank that stores 4 500 different varieties of potato seeds. Many of these varieties are not used as farmers prefer to use only a few varieties which grow well. Most farmers practise monoculture and grow only one variety of potato.

To collect the potato seed, the fruit or potato berry is picked and ripened. The seeds can remain viable for many years.

The diagrams below show the potato berry (**Diagram A**) the potato seeds inside the berry (**Diagram B**) and the potato flower (**Diagram C**).



- 2.3.1 Name the plant division to which potatoes belong. (1)
- 2.3.2 Provide labels for the whorl labels **U** and **V** in Diagram **C**. (2)
- 2.3.3 Give the LETTER and NAME of the part in Diagram **C**:
 - (a) That will develop into the potato berry after fertilisation (2)
 - (b) Where the male gametes are produced (2)

2.3.4 The potato flowers are bright purple with a small amount of nectar. Suggest how these flowers can be pollinated. (1)

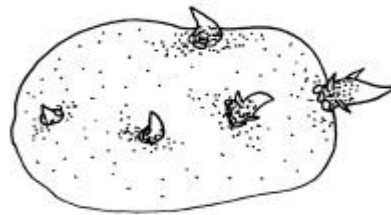
2.3.5 Give ONE:

(a) Advantage of monoculture (1)

(b) Disadvantage of monoculture (1)

2.3.6 Explain TWO reasons why seedbanks are important. (4)

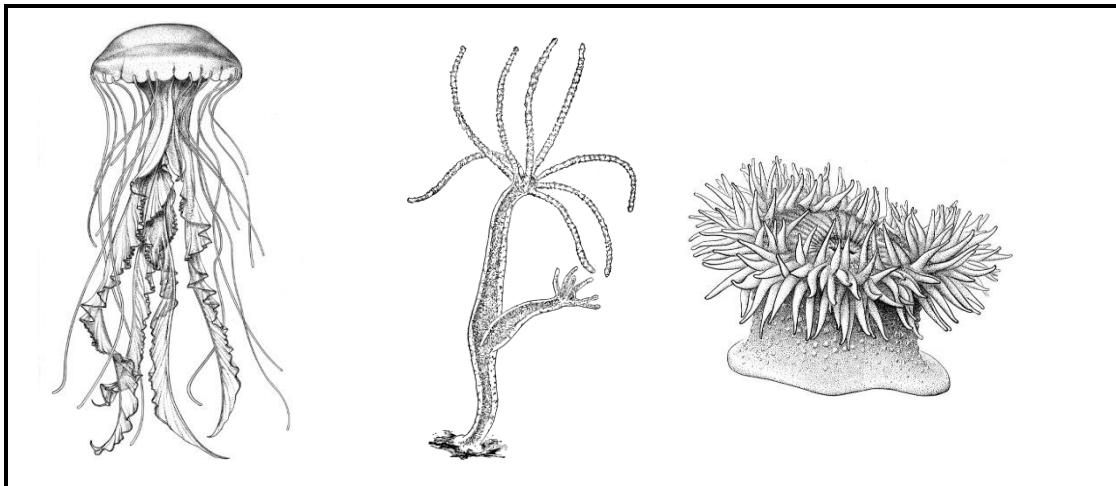
Farmers, however, do not use seeds to grow their potato plants but rather they plant the potato tuber that has started to grow roots as shown in the picture below.



2.3.7 Is this method of growing potatoes an example of asexual or sexual reproduction? (1)

2.3.8 Explain ONE advantage of growing potatoes in this way. (2)

2.4 The diagrams below show animals that belong to the same phylum.



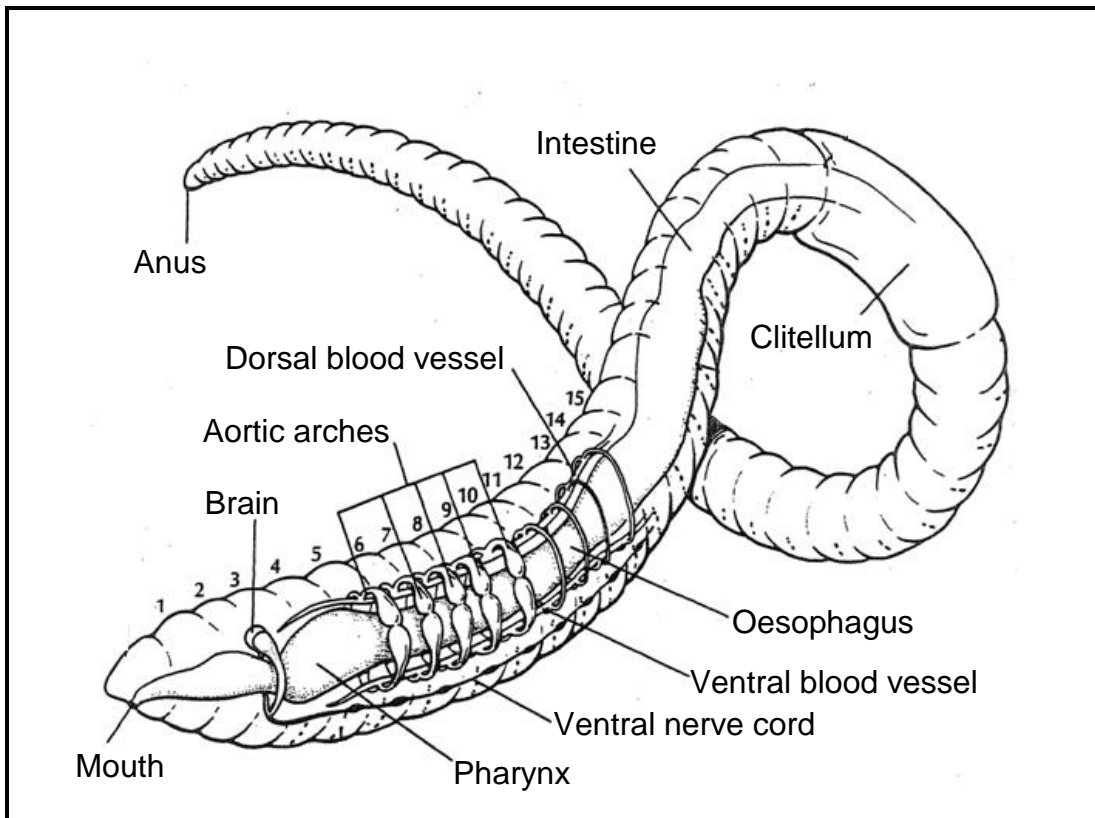
2.4.1 Name the phylum to which the above organisms belong. (1)

2.4.2 What type of symmetry is shown by members of the phylum above? (1)

2.4.3 Draw a simple labelled diagram of a cross section through the body wall of tissue layers found in this phylum. (4)

2.4.4 Explain how the body plan of this phylum of animals is suited to their sedentary mode of living. (2)

- 2.5 Study the diagram of the earthworm below. Earthworms belong to the phylum *Annelida*, which are coelomate organisms.



- 2.5.1 Does this organism show cephalisation? (1)
- 2.5.2 Give a reason for your answer visible in the diagram above. (1)
- 2.5.3 How has a coelom been an advantage to the earthworm? (2)
- 2.5.4 Why is a blood system necessary in Annelids? (2)
- 2.5.5 Describe how earthworms are economically important to farmers. (4)

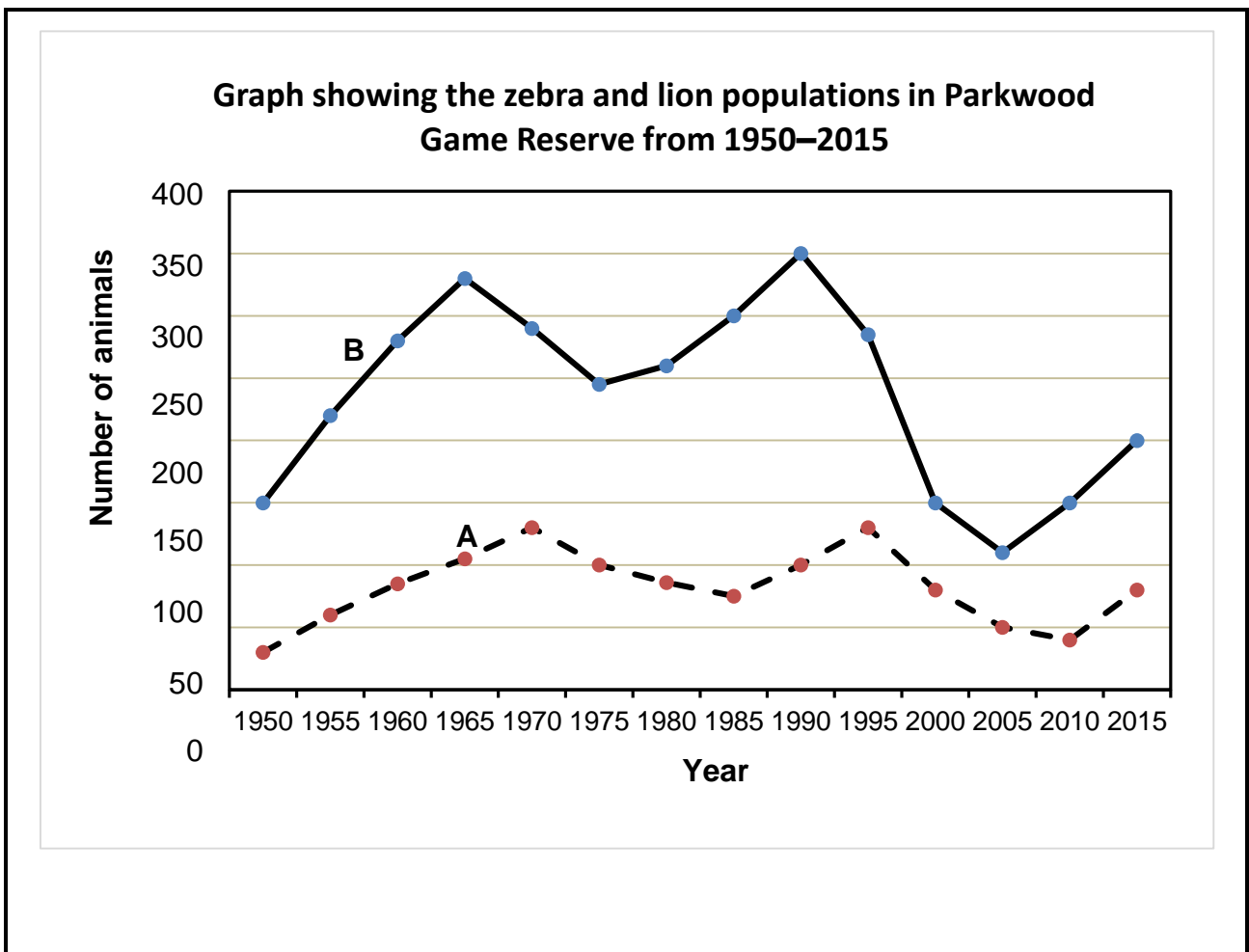
[50]

QUESTION 3

3.1 Read the extract below and study the graph showing the zebra and lion population in Parkwood Game Reserve over a period of 65 years.

The most important reason that lions are able to find enough food is that they usually do their hunting cooperatively. Normally, several lions circle around the herd they are attacking, slowly driving their victims towards the lionesses hiding in the tall grass. These lionesses then attack their prey from the sides or the rear. Lions are not fast predators. By working in groups they are able to tackle prey that would otherwise prove to be too fast for them. Lions also gain another advantage through group hunting when they kill an animal too large for one lion to tackle on its own. Zebras are one of the major prey of lions.

The graph below shows the number of zebras and lions in Parkwood Game Reserve over a period of 65 years.



3.1.1 Give TWO reasons mentioned in the extract why the social structure (hunting together) of lion prides makes them successful hunters. (2)

3.1.2 What type of relationship is shown between lions and zebras in the graph above? (1)

- 3.1.3 Which line (**A** or **B**) represents the lion population? (1)
- 3.1.4 Give TWO reasons for your answer to QUESTION 3.1.3. (2)
- 3.1.5 In 1995 there was a large decrease in the number of zebras in the reserve. Give ONE environmental factor that could have caused this decrease. (1)
- 3.1.6 Zebra live in herds. Explain ONE reason why living in herds is an advantage. (2)
- 3.1.7 Explain why the chances of the zebra and lion population reaching carrying capacity is limited. (3)
- 3.2 3.2.1 Define the following:
- (a) *Global warming* (1)
- (b) *Food Security* (3)
- 3.2.2 Name the main gas produced by humans that is responsible for global warming. (1)
- 3.2.3 Explain how global warming has a negative effect on food security. (5)
- 3.3 The spread of Invasive Alien Plants (IAP) in the water catchment areas of South Africa is concerning. In a country that is already water scarce this means less water available for agricultural and domestic use. A recent study of the Olifants River catchment area looked at the water consumption of some of the most invasive species (measured in m³ per hectare) and the area that they invade (measured in hectares).

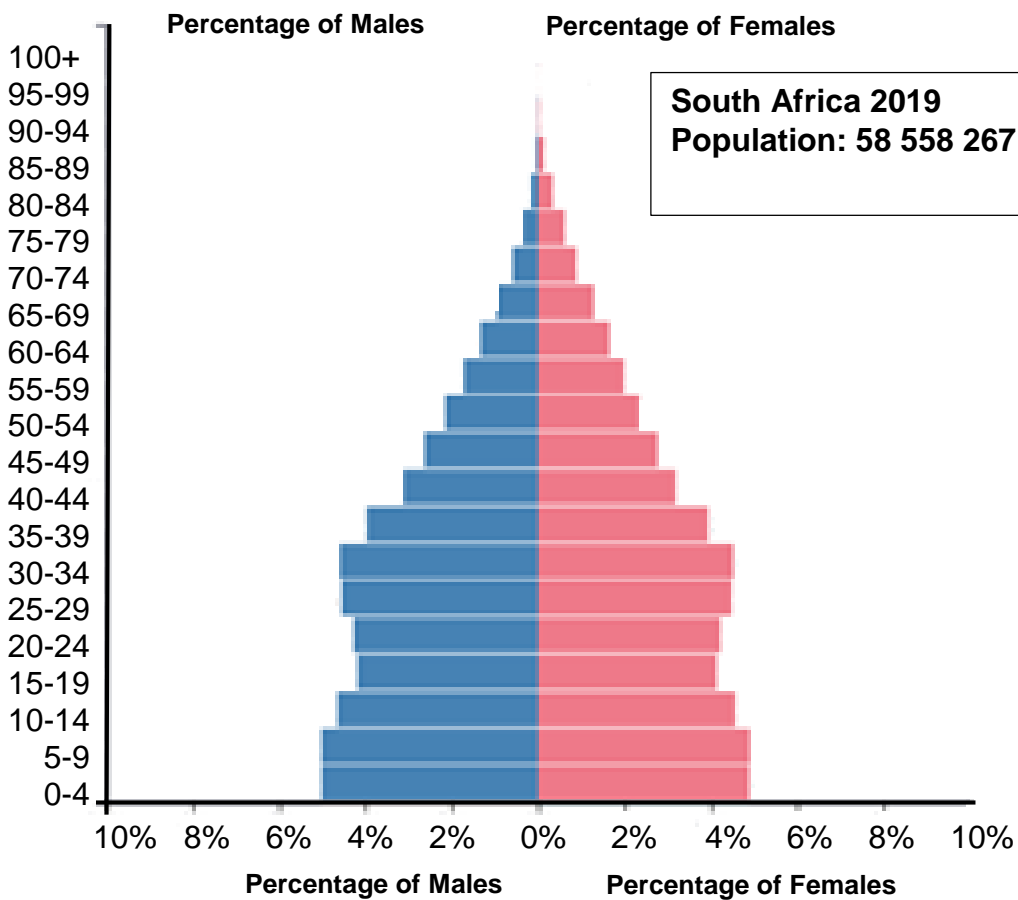
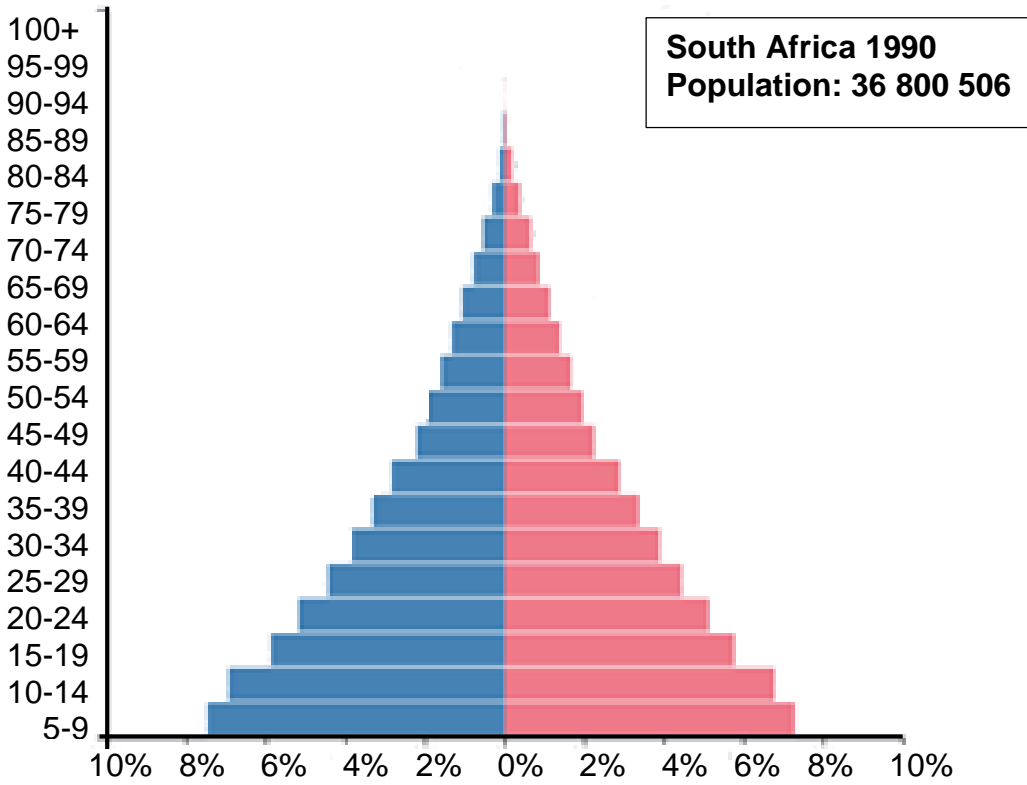
The results are shown in the table below.

Invasive Alien Species	Water consumption (m³ / hectare)	Area invaded by plants (hectares)
<i>Arundo donax</i>	1 155	5 406
<i>Eucalyptus sp.</i>	1 250	116
<i>Pinus sp.</i>	2 550	752
<i>Populus sp.</i>	645	358
<i>Salix babylonica</i>	830	358

- 3.3.1 State the:
- (a) Independent variable (1)
- (b) Dependant variables (2)

- 3.3.2 What method could have been used to calculate the area invaded by the alien plants? (1)
- 3.3.3 How much water did *Pinus sp.* consume in the Olifant's River catchment area? Show ALL your calculations. (3)
- 3.3.4 Draw a suitable graph to show the water consumption of the various invasive alien species in the Olifant's River catchment area. (6)
- 3.3.5 Give THREE ways that can be used to get rid of invasive alien plants. (3)
- 3.3.6 Give ONE way you as an individual can reduce the number of invasive alien species in South Africa. (1)

3.4 The population pyramids below show the change in the South African population from 1990 to 2019. We can see that South Africa is moving from a developing country in 1990 to a more developed country in 2019. The data was collected by means of a census.



- 3.4.1 Define the concept *census*. (1)
- 3.4.2 Which group, males or females, have a higher life expectancy? (1)
- 3.4.3 Which pyramid (1990 or 2019) shows:
- (a) A rapidly increasing population (1)
 - (b) Low life expectancy (1)
- 3.4.4 Explain TWO reasons for the change in the shape of the pyramid from 1990 to 2019. (4)
- 3.4.5 Why is it important for governments to have the information shown in a population pyramid? (3)

TOTAL SECTION B 100
GRAND TOTAL: 150