

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

**LIFE SCIENCES P2
PREPARATORY EXAMINATION 2008**

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

Read the 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. ALL drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT all drawn to scale.
9. Do NOT use graph paper.
10. Non-programmable calculators, protractors and compasses may be used.
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 – 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 The main cause of the increase in the amount of CO₂ in the earth's atmosphere is ...

- A increased worldwide primary production.
- B increased worldwide standing crop biomass.
- C an increase in the amount of infrared radiation.
- D the burning of large amounts of wood and fossil fuels.

1.1.2 A natural population of plants can be regarded as sustainable if ...

- A the community members can collect enough to feed their families.
- B the community members are able to sell whatever they collect.
- C the plant population recovers so that plants can be harvested in the future again.
- D it does not harm the tourist potential of the area.

1.1.3 The characteristic that humans DO NOT share with other primates is ...

- A opposable thumb.
- B freely rotating arms.
- C bare finger tips.
- D a flat face.

1.1.4 Which of the following is NOT a fossil?

- A *Tyrannosaurus rex* skull, 65 million years old
- B Oil formed from microorganisms, 150 million years old
- C Stone tool made by ancestors of human, 2,6 million years ago
- D 195 million-year-old dinosaur footprint imprinted in rock

1.1.5 The theory of evolution based on the principle of use and disuse was proposed by ...

- A Darwin.
- B Mendel.
- C Lamarck.
- D Wallace.

(5 x 2) (10)

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 – 1.2.5) in the ANSWER BOOK.

1.2.1 A document that lists species that are endangered, under threat or near extinction

1.2.2 Small genetic changes that occur within a single species

1.2.3 The chemical compound that breaks down the ozone layer in the atmosphere

1.2.4 The variety of species in a particular environment, habitat, ecosystem or region

1.2.5 The mating of unrelated individuals from different populations to introduce new dominant genes and increasing the gene pool (5 x 1) (5)

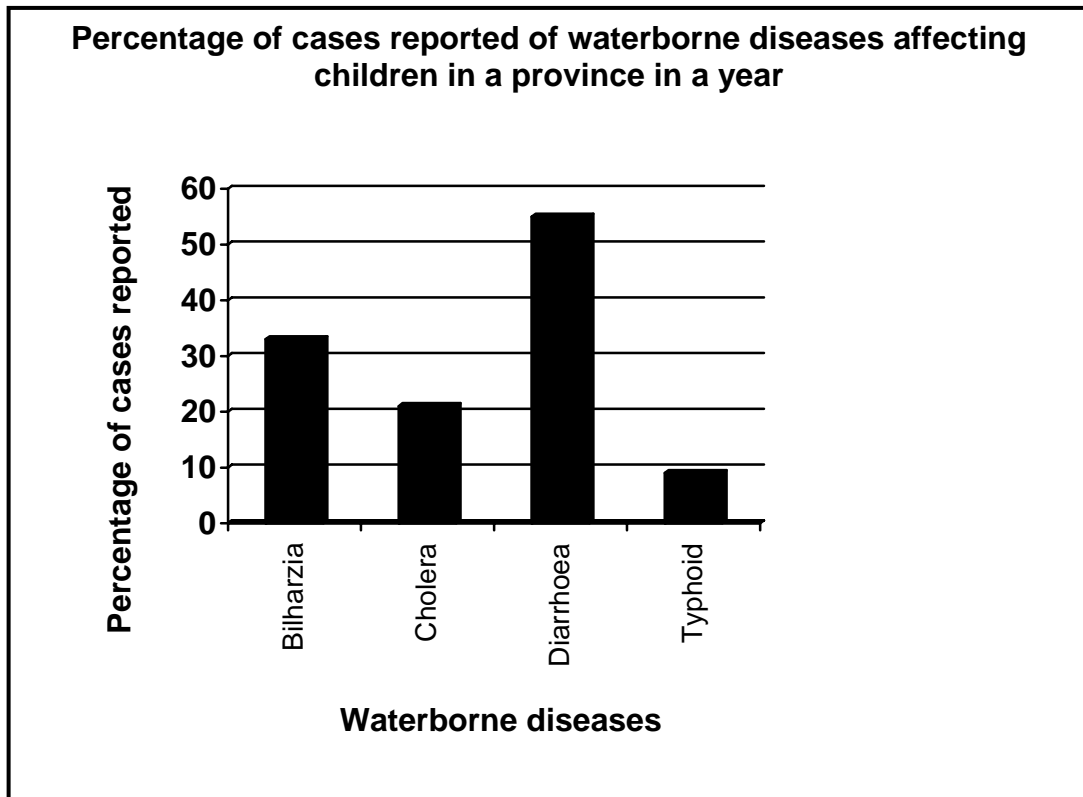
- 1.3 Choose an item from COLUMN II that matches a description in COLUMN I. Write only the letter (A – H) next to the question number (1.3.1 – 1.3.5) in the ANSWER BOOK, for example 1.3.6 J.

COLUMN I		COLUMN II	
1.3.1	Non-living components of the environment	A	analogous
1.3.2	When resources are exploited without any effort to replace or to renew them	B	fossil fuels
1.3.3	Similar body structure with the same function in different species, but evolved independently without common ancestor	C	vestigial
1.3.4	Remainder of a body structure inherited but totally unused and inconspicuous	D	endangered species
1.3.5	Structures in different species inherited from a common ancestor but evolved into slightly different structures and functions	E	sustainable
		F	non-sustainable
		G	homologous
		H	abiotic

(5 x 1)

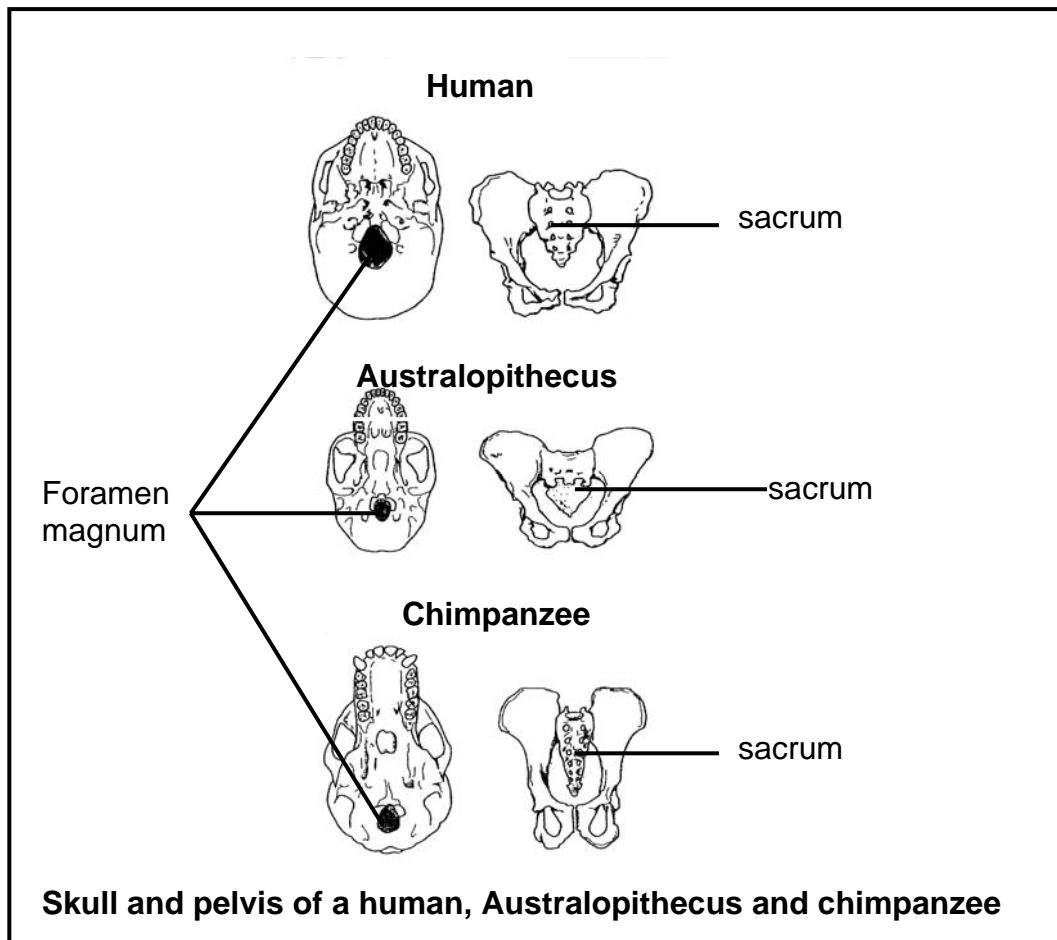
(5)

- 1.4 The graph below shows reported cases of waterborne diseases affecting children living in the rural areas in a province in a year. Study the graph and answer the questions that follow.



- 1.4.1 Name TWO main sources of water pollution. (2)
- 1.4.2 According to the graph, which disease had the highest percentage of cases reported in the province? (1)
- 1.4.3 Describe FOUR possible ways in which data was collected for this investigation. (4)
- 1.4.4 Explain TWO ways in which rural communities can protect themselves from the disease mentioned in QUESTION 1.4.2. (4)
- 1.4.5 Describe TWO strategies the provincial government can use in the management and control of water pollution. (4)

1.5 The diagram below shows the skull and pelvis of three mammals. Study the diagram and answer the questions that follow.



- 1.5.1 Tabulate FOUR observable differences of the skull and pelvis of a human and a chimpanzee. (9)
- 1.5.2 Which organism(s) is/are bipedal? (2)
- 1.5.3 Give ONE reason, observed from the diagram, for your answer to QUESTION 1.5.2. (2)
- 1.5.4 State ONE visible difference between the skull of Australopithecus and a human. (2)

TOTAL SECTION A: 50

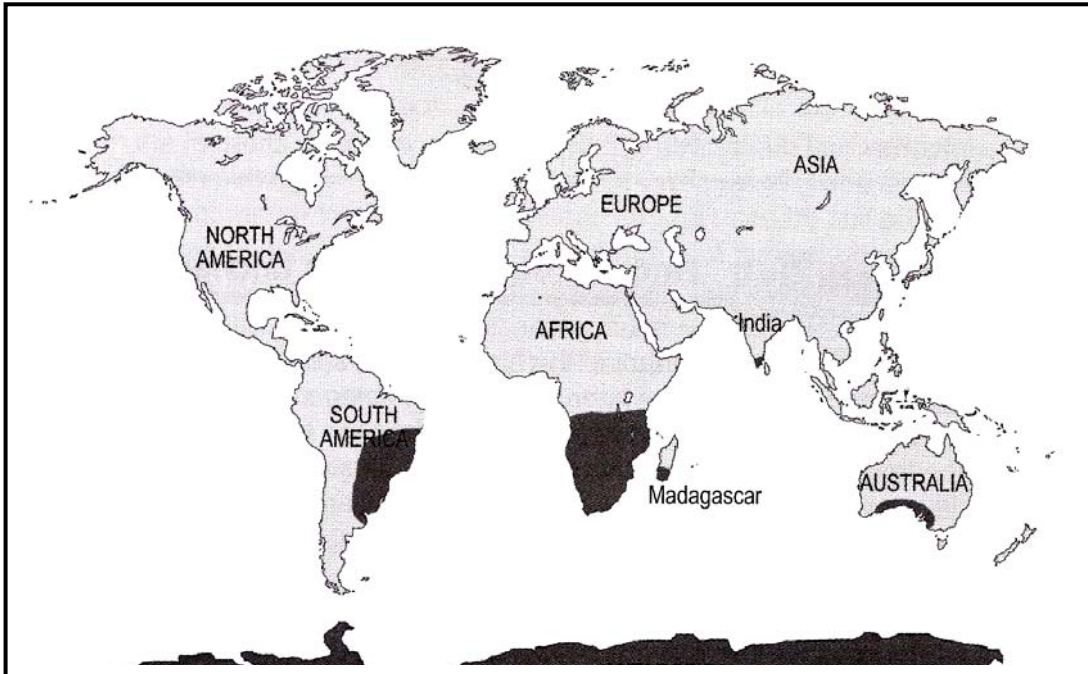
SECTION B**QUESTION 2**

- 2.1 The table below shows the amount of solid waste generated in a town over a period of 6 years. Study the table and answer the questions that follow.

YEAR	TOTAL SOLID WASTE (tons)
1999	255
2000	276
2001	300
2002	330
2003	388
2004	428

- 2.1.1 Draw a line graph to represent the data in the table above. (10)
- 2.1.2 What general trend is indicated by the graph you have drawn? (2)
- 2.1.3 In which year was the solid waste generated the highest? (1)
- 2.1.4 What is the difference in the amount of waste generated between 2001 and 2003? Show ALL the calculations. (3)
- 2.1.5 Name TWO main sources of the town's solid waste. (2)
- 2.1.6 What strategies could the municipality employ to manage the increase in municipal solid waste? Name TWO strategies and its impact on the environment. (4)
- 2.2 Distinguish between *biodegradable* and *non-biodegradable* matter AND give an example of each. (4)

- 2.3 The map below shows places where fossils of *Glossopteris* were found. *Glossopteris* is an extinct terrestrial animal without wings. The fossils of *Glossopteris* are only found in the regions coloured in black.



Describe how scientists explain the distribution of this animal over the different continents.

(4)
[30]

QUESTION 3

- 3.1 In an investigation a biotechnologist injected chimpanzee blood into a rabbit. The immune system of the rabbit recognised the chimpanzee blood protein as foreign and produced antibodies. The rabbit's antibodies were then extracted and developed as a serum.

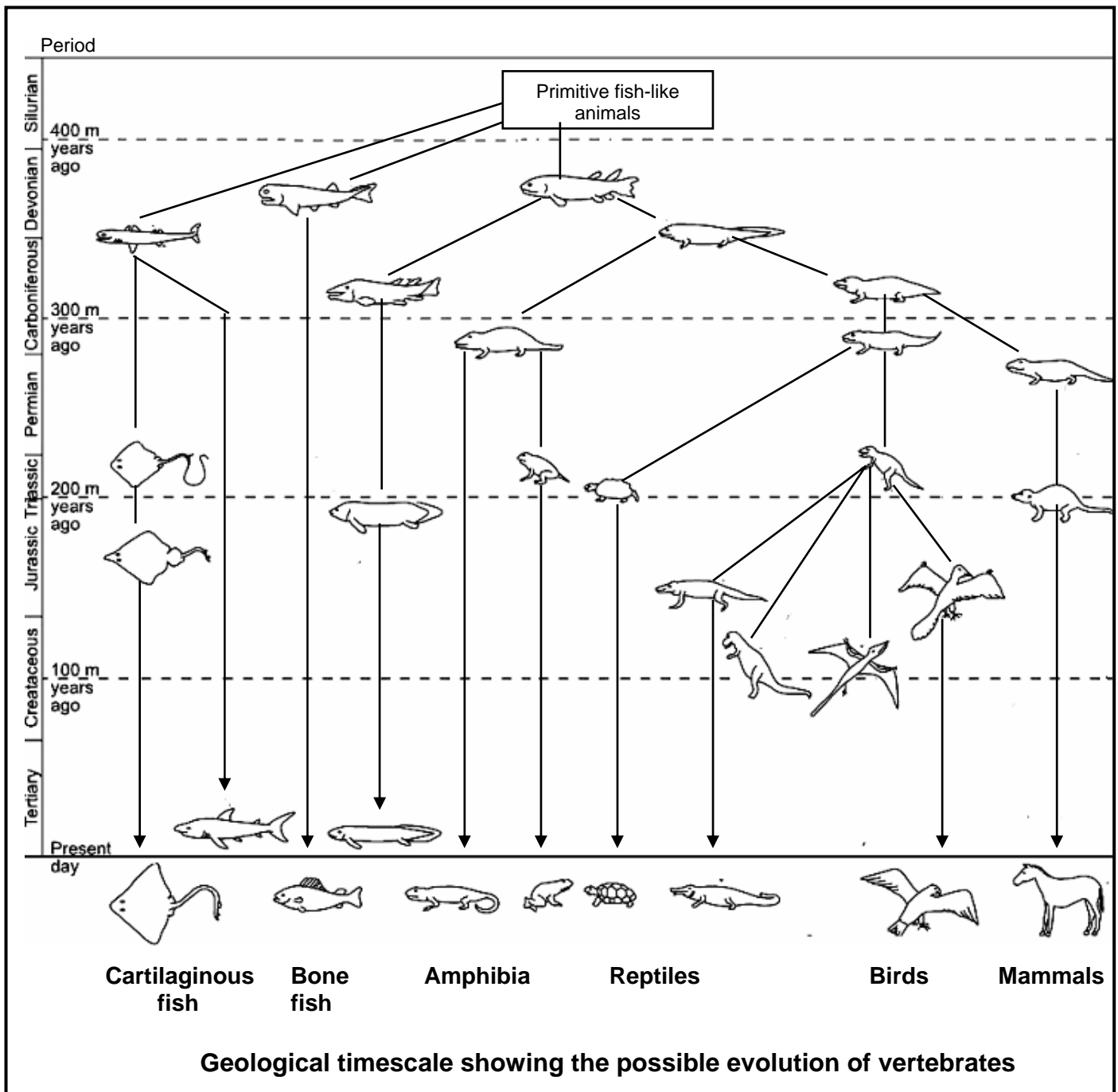
When the serum is added to blood samples in different test tubes removed from of a variety of different animals, a precipitate forms. The more precipitate forms, the more closely related the animal is to the chimpanzee.

Study the table below that shows the percentage precipitate formed in this investigation, and answer the questions that follow.

Animal species	Percentage precipitate formed
Gorilla	Very high
Baboon	High
Monkey	Moderate
Pig	Very low

- 3.1.1 What is the composition of the serum? (2)
- 3.1.2 According to the above information, which animal is least closely related to chimpanzees? Give a reason for your answer. (2)
- 3.1.3 Formulate a hypothesis for the investigation above. (2)
- 3.1.4 Name TWO variables that had to be kept constant in this investigation. (2)

3.2 The geological timescale below shows the possible evolution of vertebrates. Study the timescale and answer the questions that follow.

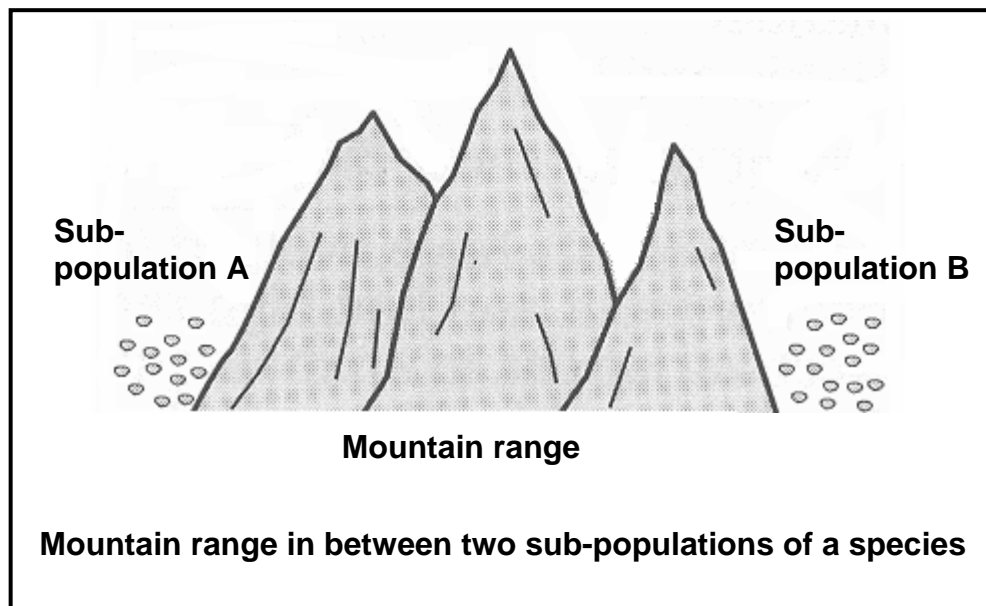


3.2.1 In which period did the first terrestrial (land) vertebrate appear? (2)

3.2.2 According to the time scale, would it be acceptable to say that amphibia are primitive reptiles? Give a reason for your answer. (2)

- 3.2.3 According to the timescale, which group of animals went extinct in the Cretaceous period? (1)
- 3.2.4 Explain how scientists can determine that these animals mentioned in QUESTION 3.2.3 became extinct 100 millions years ago. (4)
- 3.2.5 Discuss any TWO theories on how these animals in QUESTION 3.2.3 became extinct. (4)

3.3 Study the diagram below and answer the questions that follow.

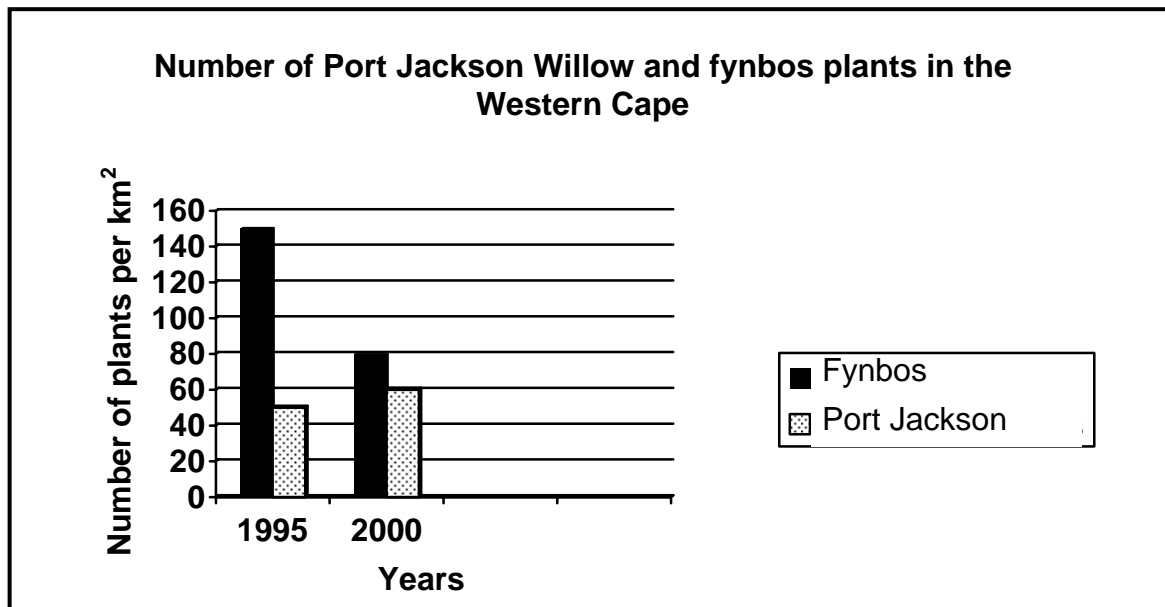


- 3.3.1 Define a *species*. (3)
- 3.3.2 Describe how sub-population B could form a new species. (6)
[30]

TOTAL SECTION B: 60

SECTION C**QUESTION 4**

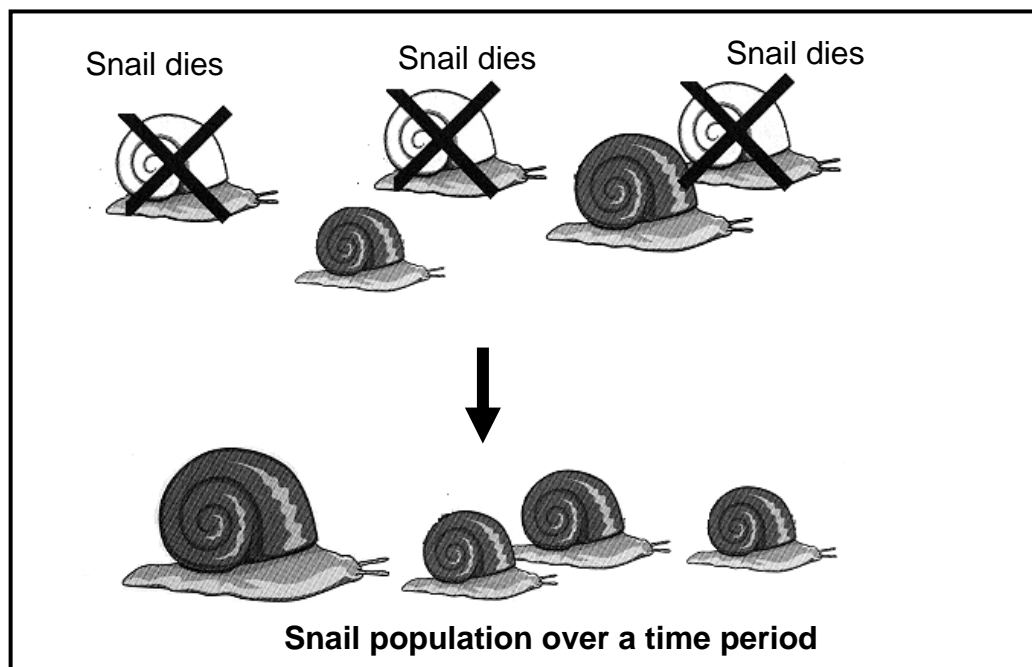
- 4.1 Fynbos is a major vegetation type in the Western Cape. This vegetation is unique and indigenous to the region. In the year 2000, legislation and projects were announced to combat the spread of an invasive alien species, called the Port Jackson Willow, into the fynbos. Data available is shown in the graph below.



In 2005, a group of Grade 12 learners conducted an investigation to evaluate the success of these projects launched in 2000. A 1 km² area was selected in the same area used in 1995 and 2000 and divided into six sample areas (quadrants). The data below was recorded by the learners. Study the table and answer the questions that follow.

Number of plants per km² in the Western Cape in 2005		
Quadrant number	Number of fynbos plants	Number of Port Jackson Willow plants
1	30	0
2	36	2
3	40	5
4	35	11
5	20	8
6	10	12

- 4.1.1 Define the term *indigenous species*. (2)
- 4.1.2 Why did the learners choose a study area of 1 km²? (1)
- 4.1.3 From the table calculate the total number of:
- (a) Fynbos plants
- (b) Port Jackson Willow plants (2)
- 4.1.4 Compare the number of plants in 1995, 2000 and 2005 and write down your observations. (4)
- 4.1.5 What can be concluded from the results of the latest investigation? (2)
- 4.2 Study the diagram below and answer the questions that follow.



- 4.2.1 Explain the phenomenon illustrated in the diagram. (2)
- 4.2.2 Describe the observations on which Darwin based his theory of evolution. (6)
- 4.2.3 Describe how the following aspects provide evidence for evolution:
- (a) Comparative embryology (3)
- (b) Comparative anatomy (3)

4.3 Read the extract below and answer the question that follows.

African potato (*Hypoxis hemerocaluidea*) is widely used for traditional medicine in South Africa and regarded as a natural resource. It is commercially used to cure human ailments such as testicular tumors, enlargement of the prostate gland, urinary infections and stomach aches. It is also used as a laxative.

Research has shown that 73 tons or 428 000 bulbs are widely harvested by sangomas and collectors in KwaZulu-Natal every year. Claims that the extract of African potato can be used to treat diseases like HIV/Aids and cancer has put this traditional medicine under the spotlight.

[Source: www.kznwildlife.com]

Describe the over-exploitation of the African potato by referring to the consequences and at least THREE strategies to ensure its sustainability. Also state your opinion on what needs to be done to clear up the misconception that African potato cures HIV/Aids.

NOTE:

No marks will be awarded for answers in the form of flow charts or diagrams.

Content: (12)
Synthesis: (3)

TOTAL SECTION C: 40

GRAND TOTAL: 150