



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2012

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours



This question paper consists of 15 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 EACH question on a NEW PAGE.
4. Number the answers correctly according to the numbering system used in this question paper.
5. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
6. All drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams and flow charts ONLY when requested to do so.
8. The diagrams in this question paper may NOT necessarily be drawn to scale.
9. The use of graph paper is NOT permitted.
10. Non-programmable calculators, protractors and compasses may be used.
11. Write neatly and legibly.

SECTION A

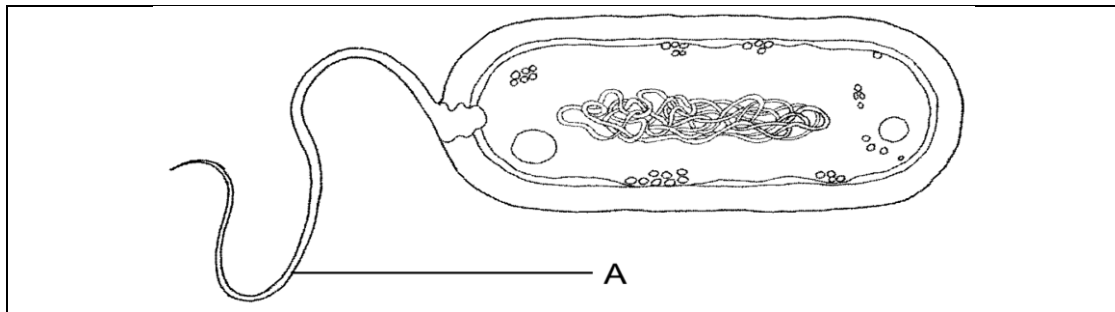
QUESTION 1

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 – 1.1.10), for example 1.1.11 D.

1.1.1 Which of the following is NOT applicable to viruses?

- A They are living cells which are parasites.
- B They cause diseases.
- C They are the simplest known organisms.
- D They have the ability to reproduce.

QUESTION 1.1.2 and 1.1.3 are based on the diagram below.



1.1.2 The function of the part labelled A is ...

- A movement.
- B feeding.
- C reproduction.
- D food storage.

1.1.3 The visible feature that enables us to classify the bacterium as a prokaryote is the ...

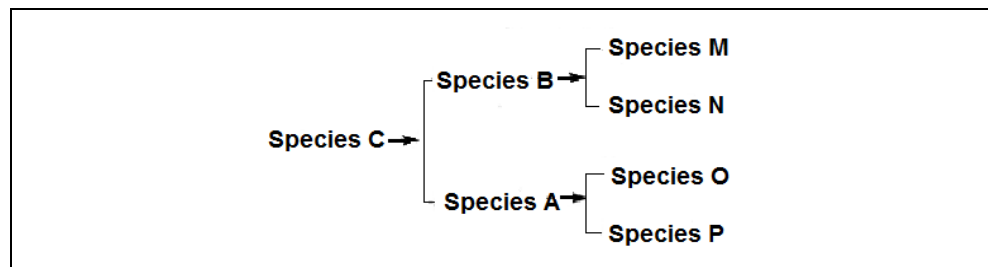
- A cell wall.
- B absence of a true nucleus.
- C storage granule.
- D flagellum.

1.1.4 Bacteria are pathogens because they ...

- A are prokaryotic organisms.
- B live symbiotically in the intestine of mammals.
- C cause diseases.
- D feed on dead organisms.

- 1.1.5 The cell walls of most fungi are mainly composed of ...
- A chitin.
 - B cellulose.
 - C pectin.
 - D lignin.
- 1.1.6 Which of the following flightless birds evolved from a common ancestor on Gondwanaland?
- A Ostrich and Rhea
 - B Emu and Moa
 - C Ostrich and Emu
 - D Rhea and Moa
- 1.1.7 A jellyfish belongs to the phylum Cnidaria because it has ...
- A an exoskeleton made of chitin.
 - B a fluid-filled coelom that forms a hydrostatic skeleton.
 - C a fluid-filled gut and mesoglea that form a hydrostatic skeleton.
 - D no skeleton.

1.1.8



The diagram above indicates that ...

- A species A is a common ancestor to species M, N, O and P.
 - B species N and O are most closely related species shown.
 - C species C is the most recent common ancestor of species O and P.
 - D species B is the most common ancestor of species M and N.
- 1.1.9 A characteristic of the Chordata is that they ...
- A have no coelom.
 - B have mammary glands.
 - C are diploblastic.
 - D have bilateral symmetry.

1.1.10 The flightless bird, the rhea, can be found in ...

- A Africa.
- B South America.
- C Australia.
- D New Zealand.

(10x2) (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 – 1.2.9) in the answer book.

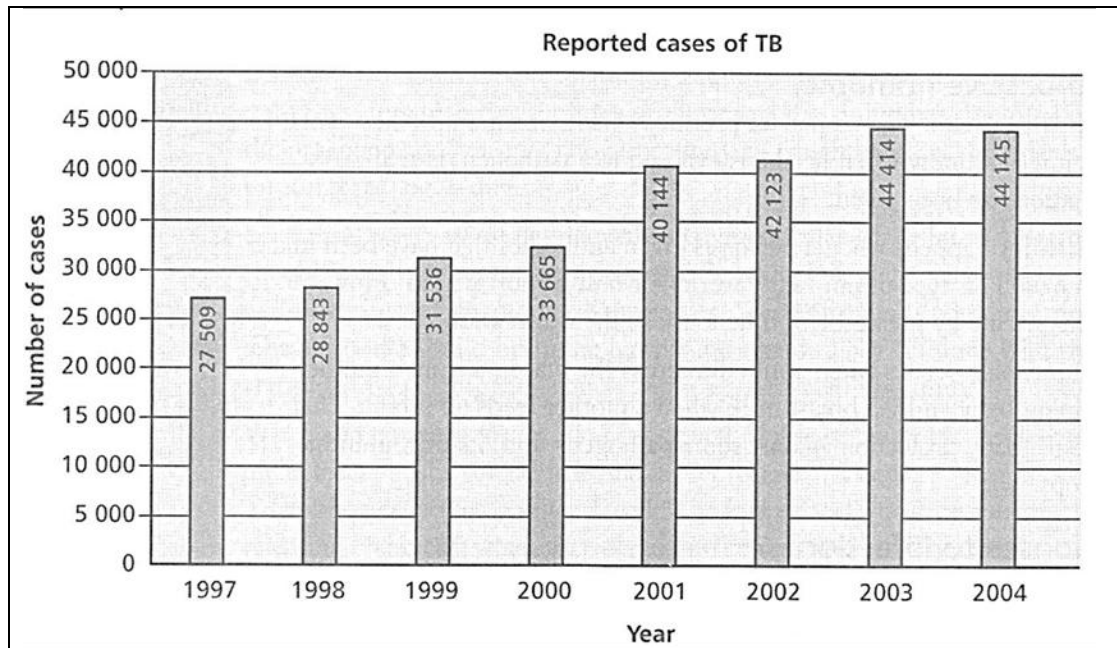
- 1.2.1 The ability to produce antibodies to fight diseases.
- 1.2.2 A plant body that has no differentiation into roots, stems and leaves.
- 1.2.3 Organisms that have a definite nucleus.
- 1.2.4 The vegetative part of a fungus.
- 1.2.5 Unicellular organisms that can exist in *coccus*, *spirillum* or *bacillus* form.
- 1.2.6 The degree of variety of organisms in a particular area.
- 1.2.7 An organism that carries a disease without being affected by it.
- 1.2.8 The parasitic protozoan that causes malaria.
- 1.2.9 The structure with a nucleic acid core and a protein coat. (9x1) (9)

- 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 in the ANSWER BOOK.

| | COLUMN I | COLUMN II | |
|-------|--|-----------|----------------------|
| 1.3.1 | Presence of a protein capsule and a well-defined nucleus | A | Viruses |
| | | B | Bacteria |
| 1.3.2 | A disease caused by bacteria | A | Cholera |
| | | B | Malaria |
| 1.3.3 | The earthworm's body consist of ... | A | Three body layers |
| | | B | Segments |
| 1.3.4 | Plants that have naked seeds | A | Pteridophytes |
| | | B | Bryophytes |
| 1.3.5 | A fluid-filled body cavity found in some animals | A | Gut |
| | | B | Coelom |
| 1.3.6 | The kind of skeleton that results from muscles working against fluids in the body cavities | A | Endoskeleton |
| | | B | Hydrostatic skeleton |
| 1.3.7 | Structure produced when the spore of a moss germinates | A | Prothallus |
| | | B | Sporangium |
| 1.3.8 | A type of asexual reproduction where a single cell split into two | A | Binary fission |
| | | B | Meiosis |

(8x2) (16)

1.4 Study the graph below and answer the questions that follow.



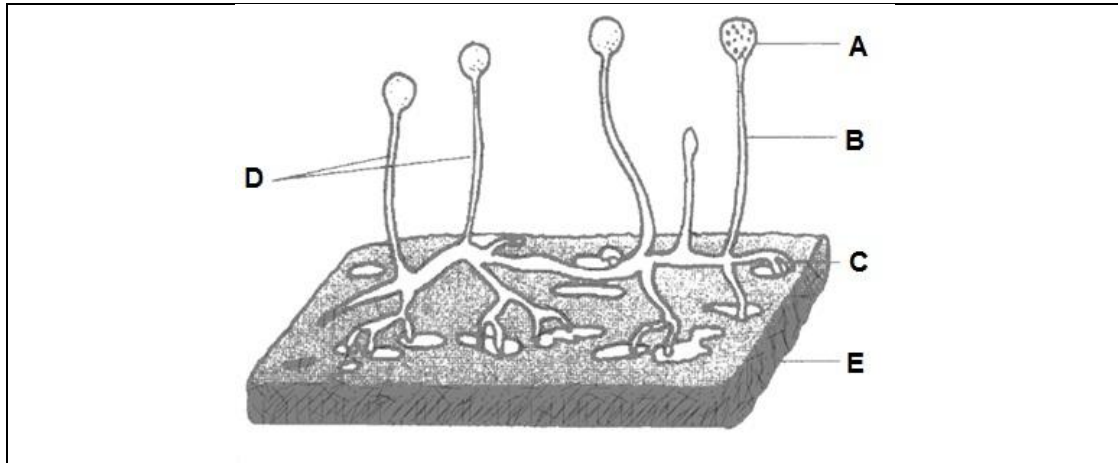
- 1.4.1 In which year was the highest number of TB cases reported? (1)
- 1.4.2 Calculate the total number of TB cases in 2003 and 2004. (1)
- 1.4.3 What trend is shown by the data on the graph? (2)
- 1.4.4 Suggest ONE reason why this trend is taking place. (1)

TOTAL SECTION A: 50

SECTION B

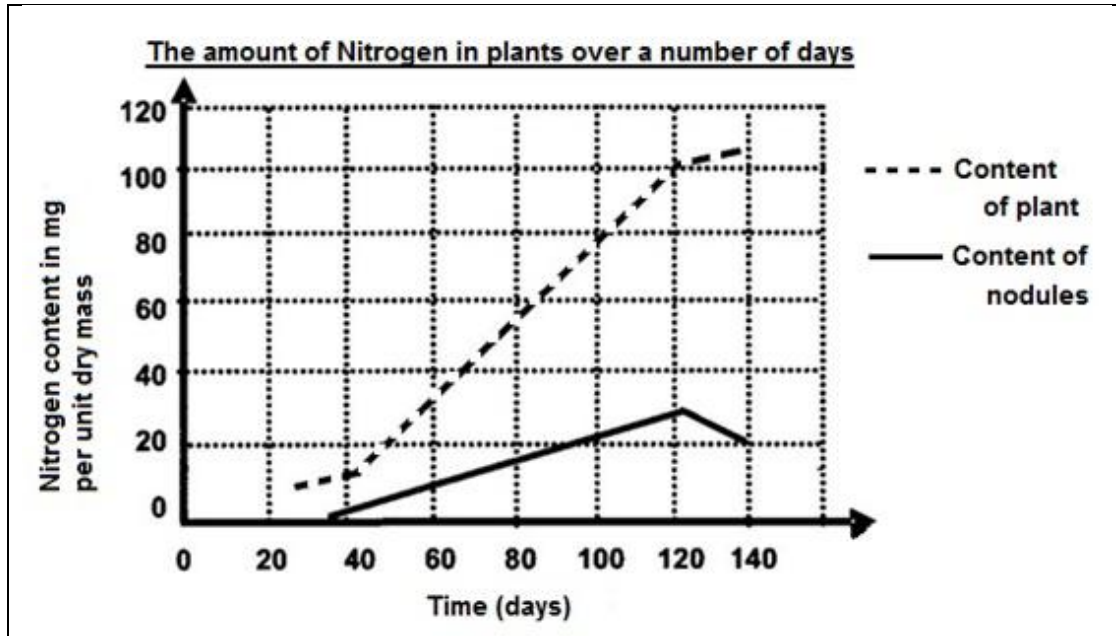
QUESTION 2

2.1 The diagram shows a part of the fungi's life cycle. Study the diagram and answer the questions that follow.



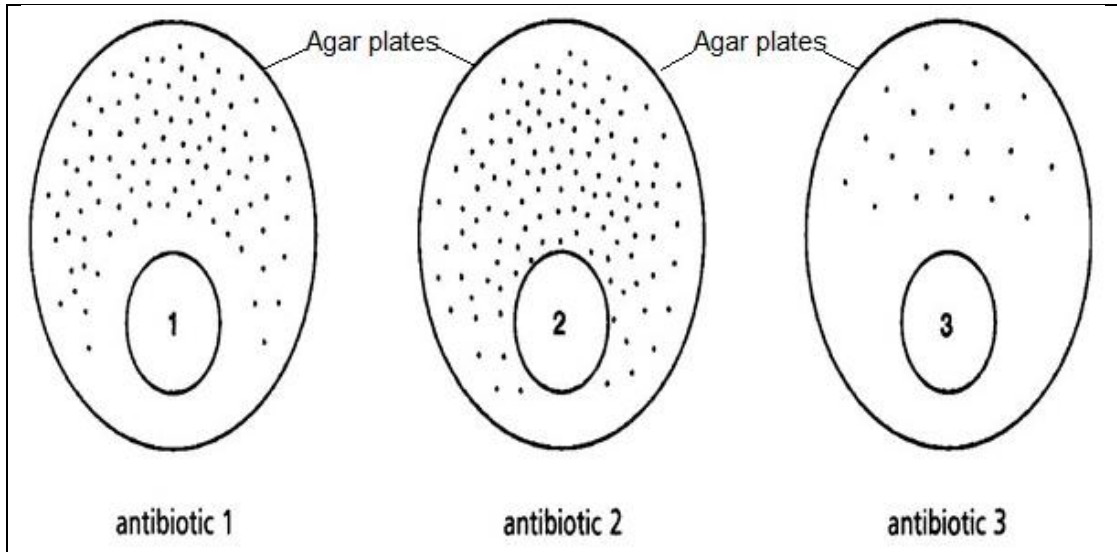
- 2.1.1 Name the parts labelled A, B and C. (3)
- 2.1.2 Give TWO ways in which fungi can reproduce. (2)
- 2.1.3 Give THREE reasons why fungi are biologically important. (3)
- 2.1.4 Give TWO examples of fungal diseases in plants. (2)

- 2.2 A large number of soya bean seeds (a leguminous plant) were dipped in a suspension of nitrogen-fixing bacteria and then grown in sand lacking nitrogen-containing compounds. Batches of plants were removed at intervals and the nitrogen content of the nodules and the rest of the plant were determined separately. The results are shown in the graph below.



- 2.2.1 What is the amount of nitrogen in *mg per unit dry mass* in the bean plant, including the nodules on day 120? (2)
- 2.2.2 Suggest an explanation for the increase in the nitrogen content of the soya bean plants. (3)
- 2.2.3 What type of relationship occurs between the bacteria and the soya bean plants? Why is this not an example of commensalism? (3)
- 2.2.4 Explain how the nitrogen content of the plant can add to the nitrogen content of the air. (3)

2.3 Learners wanted to investigate the effect of different antibiotics on the growth of a certain bacterial species. They set up nutrient agar plates and placed sterile discs containing three different antibiotics on each of the plates. Study the diagram and answer the following questions.

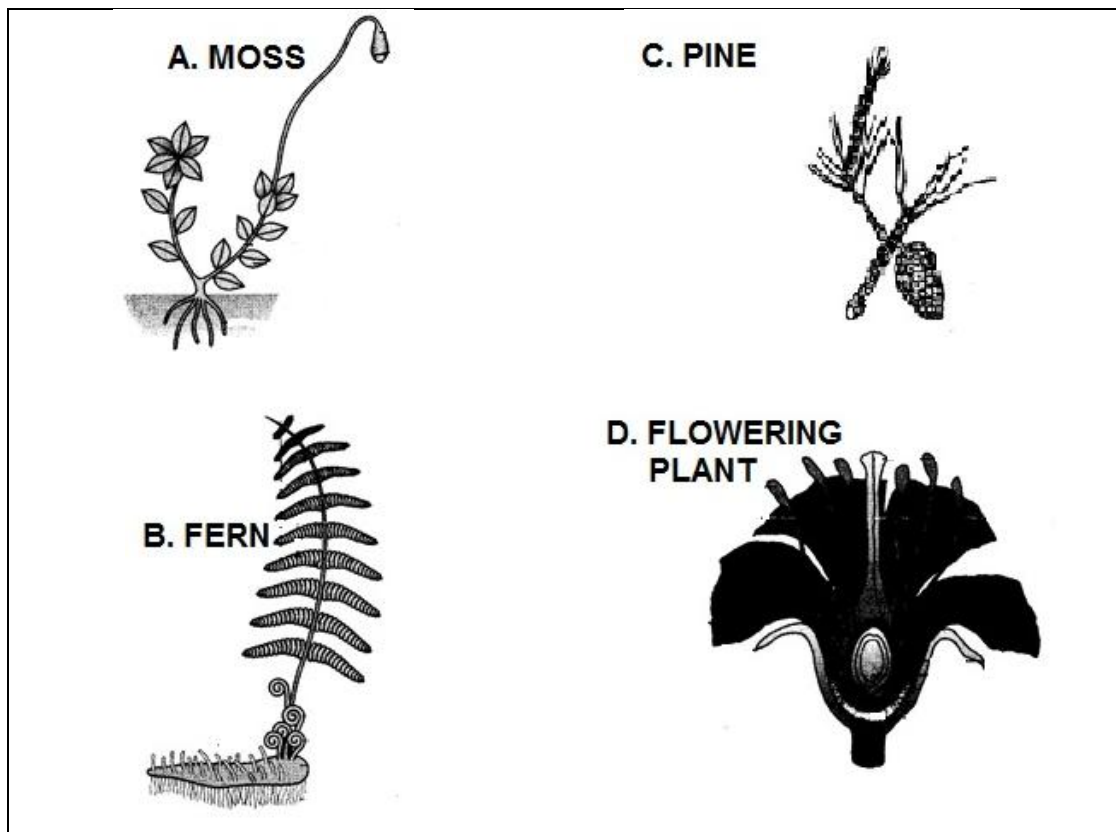


- 2.3.1 What is an antibiotic? (2)
- 2.3.2 What is the function of the agar plates? (1)
- 2.3.3 Mention ONE precaution that the learners would have taken to ensure that their results were valid. (1)
- 2.3.4 Which factors would the learners have kept constant during the investigation? (2)
- 2.3.5 Use the information in the diagram to describe the results of the investigation. (3)

[30]

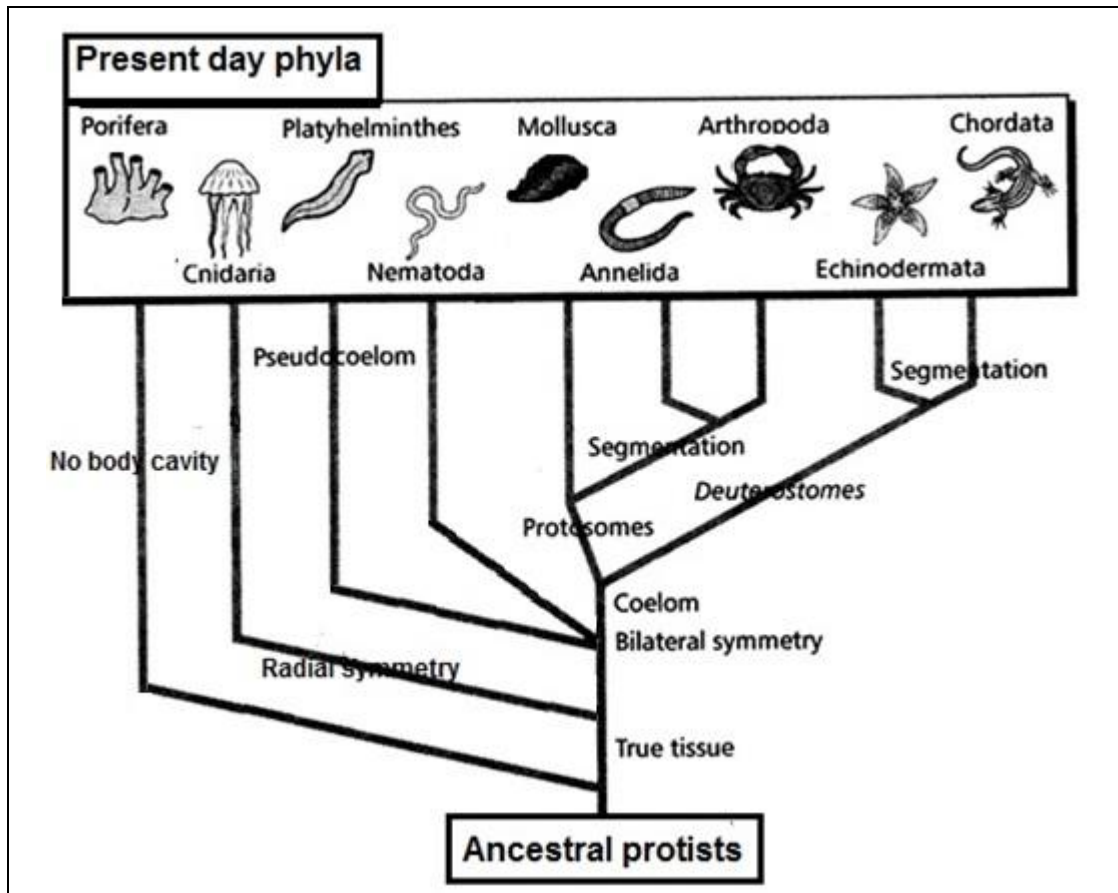
QUESTION 3

3.1 Study the diagrams that illustrate different plants and answer the questions that follow.



- 3.1.1 Identify the groups to which each of the above plants belongs. (4)
- 3.1.2 Which of the four groups identified in QUESTION 3.1.1 ...
- are dependent on water for fertilisation? (2)
 - produce seeds for reproduction? (2)
- 3.1.3 Mention THREE similar structural adaptations of the prothallus in ferns and the gametophyte in mosses, which make them to be poorly adapted to a terrestrial life. (3)

3.2 The diagram below shows a phylogenetic tree of different animals. Study the diagram and answer the questions that follow.



- 3.2.1 According to this phylogenetic tree, which group was the ancestors of the animal kingdom? (1)
- 3.2.2 How many animal phyla are shown on this tree? (1)
- 3.2.3 The first major split in the animal kingdom was into radial- and bilateral symmetry:
 - (a) Which phylum does not form part of this split? (1)
 - (b) Which phylum has radial symmetry? (1)
- 3.2.4 The second split is animals which have a coelom and animals which lack a body cavity:
 - (a) Which phylum has no body cavity? (1)
 - (b) Which phylum has a pseudocoelom? This means it does not have a true body cavity. (1)
- 3.2.5 From the diagram identify THREE phyla which have a true body cavity as well as bilateral symmetry. (3)

- 3.3 Read the following passage on shad fishing and answer the questions that follow.

Decline of South African Shad (Elf) fish:

Conservationists point out that the sizes of shad shoals have become smaller which indicates that their population sizes have declined. They also say that whereas shad of 120 cm were regularly caught in the past, shad specimens of such sizes are now rarely found. They claim that the decline in numbers and sizes of individual specimens are due to over-fishing. The size and bag limits, sale regulations and closed season are all meant to prevent this over-exploitation. In addition, the closed season (which coincides with the shad's breeding season) allows the fish time to breed.

Shore anglers agree that the sizes and number of shad have decreased, but they say that the damage is caused by commercial fishermen who, with their large fishing trawlers, catch shad in large numbers. They say that even though most of the fish (about 70%) caught by shore anglers are shad, this is "nothing" compared to the commercial fisherman's catches. They feel that the regulations are unfair as their quota of not more than four fish per day will affect their livelihood.

Adapted from : *africanconservation.org*

- 3.3.1 Why does a fisherman need to have a fishing licence? (2)
- 3.3.2 What is the shad-fishing limit per fisherman? (1)
- 3.3.3 Explain why such limits should be imposed. (3)
- 3.3.4 What fines are imposed on fishermen that do not abide by their limits? (1)
- 3.3.5 Why are fishermen not allowed to catch fish that are under a certain size? (3)

[30]

TOTAL SECTION B: 60

SECTION C**QUESTION 4**

- 4.1 Study the table of species diversity found in the different provinces in South Africa and answer the questions that follow.

| Province | Plant Species | Mammal Species | Bird Species | Reptile Species | Amphibian Species |
|----------------------|----------------------|-----------------------|---------------------|------------------------|--------------------------|
| Eastern Cape | 6 383 | 156 | 384 | 57 | 51 |
| Free State | 3 001 | 93 | 334 | 47 | 29 |
| Gauteng | 2 826 | 125 | 326 | 53 | 25 |
| KwaZulu-Natal | 5 515 | 177 | 462 | 86 | 68 |
| Limpopo | 4 239 | 239 | 479 | 89 | 44 |
| Mpumalanga | 4 593 | 160 | 464 | 82 | 48 |
| Northern Cape | 4 916 | 139 | 302 | 53 | 29 |
| North West | 2 483 | 138 | 384 | 59 | 27 |
| Western Cape | 9 489 | 153 | 305 | 52 | 39 |

- 4.1.1 Which province has the highest number of mammal species? (1)
- 4.1.2 Which province has the lowest number of species diversity? (1)
- 4.1.3 What THREE conclusions can you deduce from this data? (3)
- 4.1.4 Plot a bar graph of only the plant species for each province. (9)

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

New technology to the rescue of ancient cycads.

by Stephen Bevan adapted from *Cape Argus* 19 March 2008

Nature conservation officials are using microchip and DNA technology to safeguard the ancient cycads, South Africa's rare "living fossils", in the face of a spate of thefts by plant traffickers that is threatening to cause extinctions.

With their tall stems and palm-like leaves, which first evolved more than 300 million years ago, cycads are the oldest seed plants on Earth.

Collectors in the US and East Asia are prepared to pay up to R90 000 for a large specimen of a rare species, encouraging a flourishing but illegal trade in these plants - either plucked from the wild, or taken from nature reserves and botanical gardens.

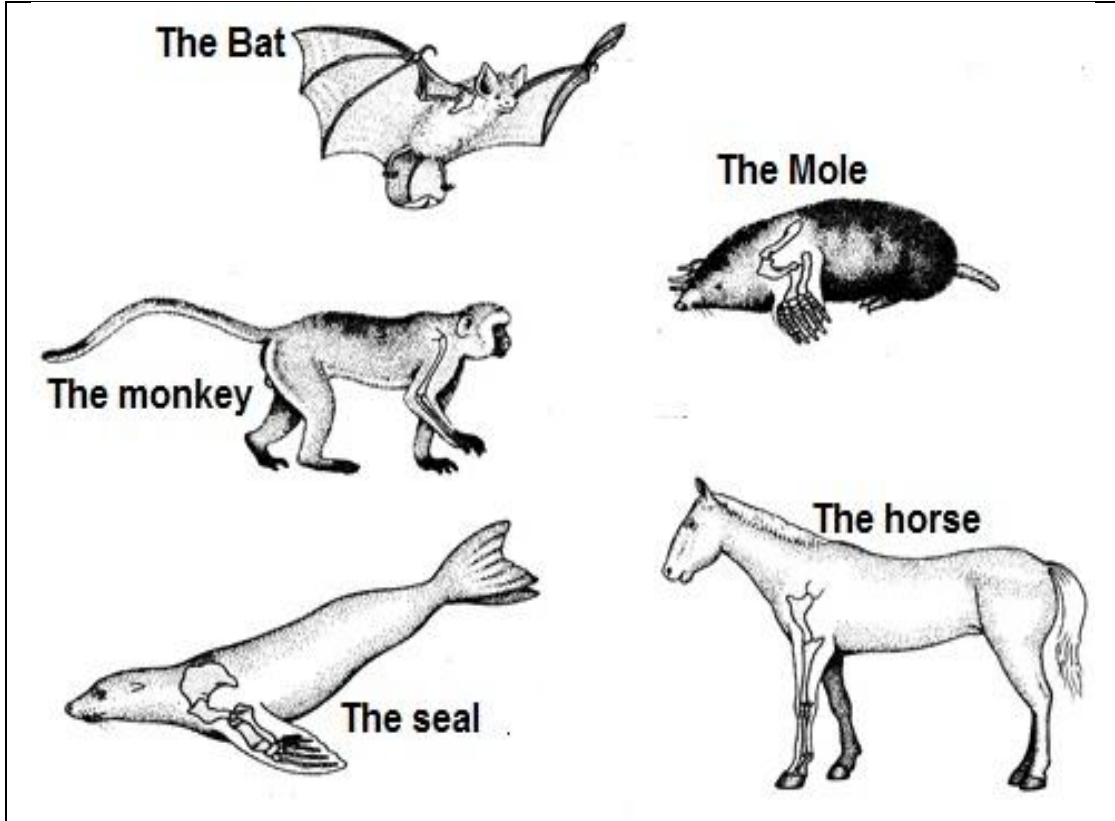
To help counter this, conservation officials have begun implanting microchip transponders into the trunks of these plants in the national collections, in order to help the "Green Scorpions" - the elite police unit responsible for enforcing conservation laws - to identify stolen specimens and trace their owners.

For additional protection, they are also spraying the plants with a coded DNA "paint", where each batch contains a unique identifying feature.

Dr John Donaldson, chairman of the World Conservation Union's cycad specialist group, said: "In South Africa and Swaziland, 60% of the decline in population of cycads can be attributed to trade in wild-collected plants." He warned: "We are on the cusp of extinctions. We have a lot of rare plants that are down to less than 100 individuals in the wild."

- 4.2.1 Describe the identifying features of a cycad. (2)
- 4.2.2 Who are the "Green Scorpions"? (2)
- 4.2.3 What methods have been instituted to protect South Africa's cycads? (2)

4.3 Forelimbs of mammals are built on the same pattern but have different functions. Study the diagram of FIVE mammals and write a mini-essay where you discuss the modification and functions of their forelimbs. Include in your discussion Charles Darwin's explanation for the differences in the structures of the forelimbs of the five mammals although they are built on the same pattern.



Content (17)
Synthesis (3)

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

TOTAL SECTION C: 40

GRAND TOTAL: 150

