



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2011**

**LIFE SCIENCES P2**

**MARKS: 150**

**TIME: 2½ hours**

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This question paper consists of 13 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. 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 – 1.1.5), for example 1.1.6 D.

1.1.1 Which of the following conditions will allow bread mould to flourish?

- A bright, moist, cold
  - B bright, dry, warm
  - C dark, moist, cold
  - D dark, moist, warm
- (2)

1.1.2 Ringworm and athlete's foot are caused by ...

- A bacteria.
  - B viruses.
  - C fungi.
  - D algae.
- (2)

1.1.3 Which factor is NOT a threat to biodiversity?

- A Agriculture
  - B Genetically modified crops
  - C Botanical gardens and nature reserves
  - D Global warming
- (2)

1.1.4 The phrase "survival of the fittest" is often used when evolution is discussed. What does an organism's "fitness" refer to?

- A Its strength when fighting other individuals
  - B The number of fertile offspring it produces
  - C Its mutation rate
  - D Its ability to be strong
- (2)

1.1.5 The following arthropod is one of the most successful pollinators in an ecosystem:

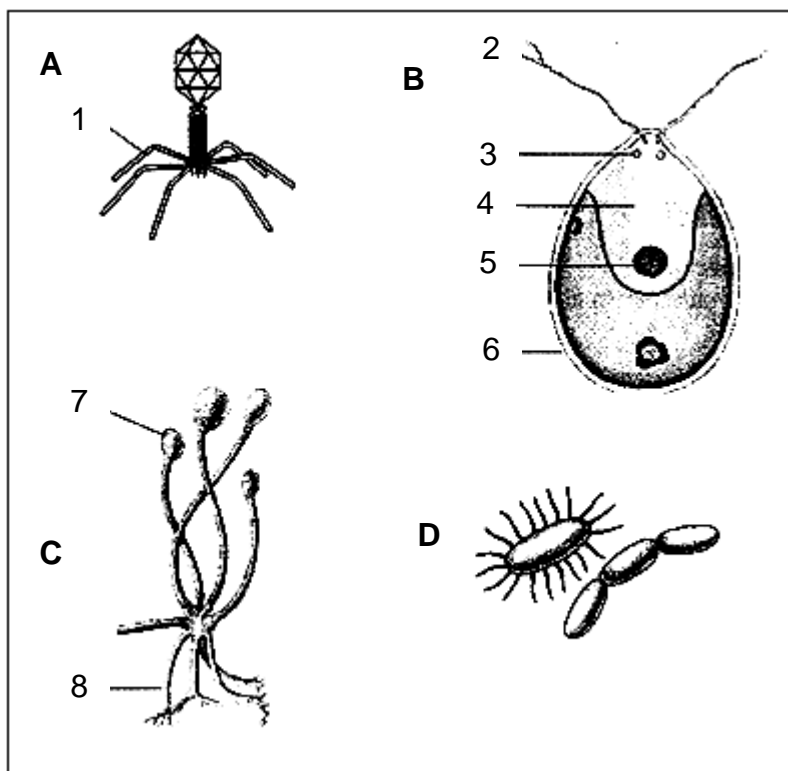
- A honeybee
  - B tick
  - C locust
  - D spider
- (2)

- 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 Micro-organism that lives on and obtains nutrients from dead organic material (1)
- 1.2.2 The ability to resist infection (1)
- 1.2.3 Complex organisms with cells that have a distinct nucleus and specialised organelles (1)
- 1.2.4 A plant body that has no differentiation into roots, stems and leaves (1)
- 1.2.5 Animals that remain attached to a substrate for most of their lives (1)
- 1.3 For each of the statements in COLUMN I, state whether it applies to A only, B only, both A and B, or none of the items in COLUMN II. Write down A only, B only, A and B, or none next to the question number (1.3.1 – 1.3.5) in your answer book.

|       | COLUMN I   | COLUMN II |                 |
|-------|--|-----------|-----------------|
| 1.3.1 | Some are autotrophic while others are heterotrophic  | A         | Bacteria        |
|       |  | B         | Protists        |
| 1.3.2 | It/they are classified as prokaryotes  | A         | Diatoms         |
|       |  | B         | Dinoflagellates |
| 1.3.3 | Triploblastic animals may have body cavities which are a ...                                   | A         | True coelom     |
|       |  | B         | Pseudo coelom   |
| 1.3.4 | The outer layer of cells in the embryo that will develop into the epidermis and nervous system | A         | Ectoderm        |
|       |  | B         | Endoderm        |
| 1.3.5 | A type of white blood cell that is capable of engulfing and destroying foreign particles       | A         | Antibody        |
|       |  | B         | Phagocyte       |

(5x2) (10)

- 1.4 Study the diagram of the four types of microbes and answer the questions that follow.



- 1.4.1 Which diagram (A – D) represent the following:

- (a) Virus
- (b) Bacteria
- (c) Protists
- (d) Fungi

(4x1) (4)

- 1.4.2 Give a reason for each of the answers in QUESTION 1.4.1.

- (a) QUESTION 1.4.1 (a)
- (b) QUESTION 1.4.1 (b)
- (c) QUESTION 1.4.1 (c)
- (d) QUESTION 1.4.1 (d)

(4x1) (4)

- 1.4.3 Identify the structures number 1 – 8.

(8)

- 1.5 The following table shows the comparison of diversity amongst six phyla of animals. Complete the table by writing down the missing characteristics opposite the corresponding question number (1.5.1 – 1.5.9) in your answer book:

| PHYLA    | SYMMETRY           | TISSUE LAYER  | COELOM    | THROUGH-GUT    |
|----------|--------------------|---------------|-----------|----------------|
| Porifera | 1.5.1              | Diploblastic  | 1.5.2     | No through-gut |
| Cnidaria | 1.5.3              | Diploblastic  | No coelom | No through-gut |
| 1.5.4    | Bilateral symmetry | Triploblastic | No coelom | No through-gut |
| Annelida | Bilateral symmetry | 1.5.5         | 1.5.6     | A through-gut  |
| 1.5.7    | Bilateral symmetry | Triploblastic | Coelomate | A through-gut  |
| Chordata | 1.5.8              | Triploblastic | Coelomate | 1.5.9          |

(9)

TOTAL SECTION A: 50

**SECTION B****QUESTION 2**

- 2.1 Learners wanted to investigate the growth of bacteria on culture plates. The culture plates contained different nutrients as shown in the table below.

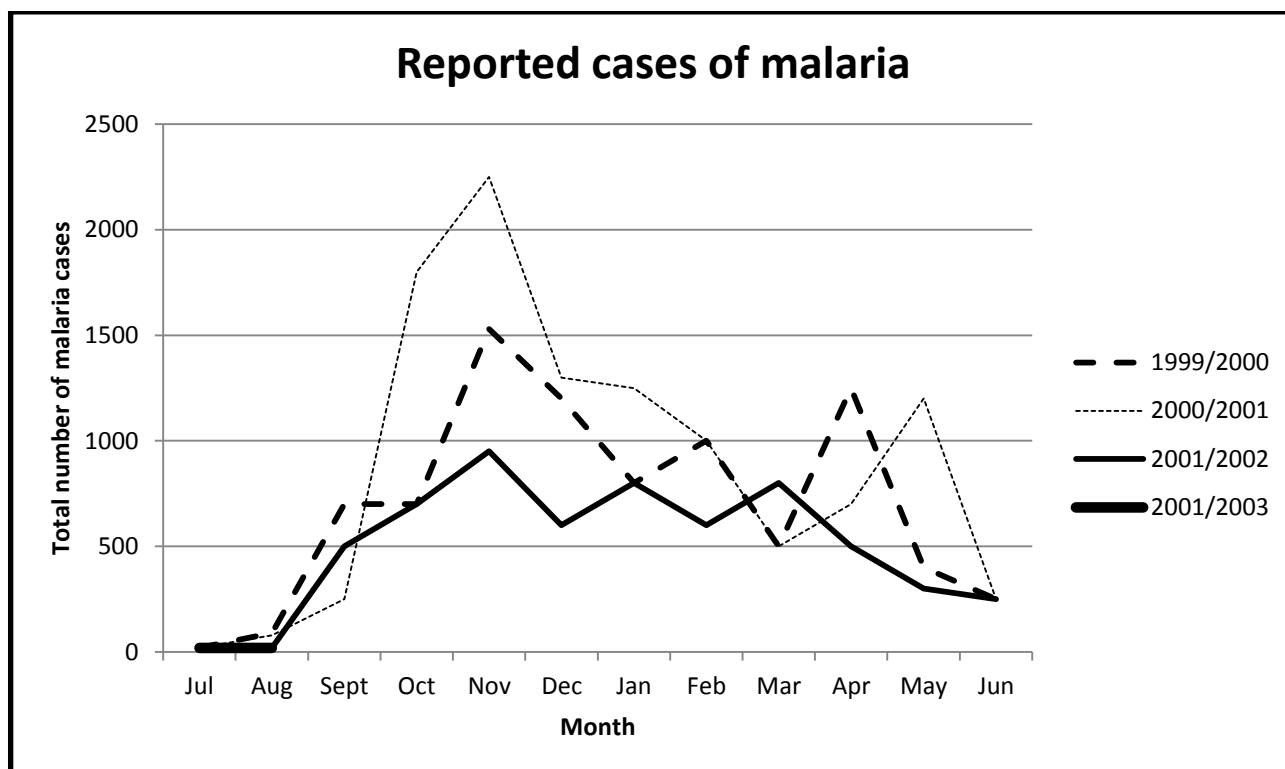
| Culture plate number | Nutrient A | Nutrient B | Nutrient C |
|----------------------|------------|------------|------------|
| 1                    | ✓          | ✓          |            |
| 2                    |            | ✓          | ✓          |
| 3                    | ✓          | ✓          | ✓          |
| 4                    | ✓          |            | ✓          |

They used a sterile needle to place the bacteria on each plate. After a few days they counted the number of colonies on each culture plate. The results are shown in the table below.

| Culture plate number | Number of bacterial colonies |
|----------------------|------------------------------|
| 1                    | 10                           |
| 2                    | 9                            |
| 3                    | 50                           |
| 4                    | 2                            |

- 2.1.1 Draw a bar-graph to show the learner's results. (7)
- 2.1.2 (a) In which plate were the most colonies found? (1)
- (b) Suggest a reason for this result. (1)
- 2.1.3 According to these results, which is the most important nutrient for bacterial growth? (1)
- 2.1.4 Write a positive hypothesis for the investigation. (2)
- 2.1.5 Mention TWO variables that learners should keep constant in their investigation. (2x1) (2)

- 2.2 Study the graph below which shows the number of cases of malaria in Limpopo between 1999 and 2002.



- 2.2.1 During which months do the number of cases increase?  
Suggest why this increase occurs. (2)
- 2.2.2 During which months were the number of cases the lowest? (1)
- 2.2.3 When was this data collected? (1)
- 2.2.4 (a) How many cases of malaria were reported in  
Nov/December 2001? (1)
- (b) If there were 10 000 cases of malaria in this period in  
South Africa, what percentage occurred in Limpopo?  
Show all calculations. (3)



2.3 Read the article and answer the questions that follow.

### The story of penicillin

In 1928 a Scottish bacteriologist called Alexander Fleming was growing bacteria on dishes of agar. Normally Fleming covered his bacterial colonies with a lid to prevent them from getting contaminated, but on one occasion, he accidentally left a dish uncovered. When he examined the dish later, he found that a mould fungus was growing on the agar. The really interesting thing was that close to the mould, no bacterial colonies were present. He went on to discover that the substance produced by the mould fungus had the power of destroying all kinds of bacteria that cause human disease. He identified the mould as *Penicillium notatum*.

It took scientists about 10 to 12 years to obtain the substance in a usable form. This was achieved by two biochemists, Howard Florey and Ernst Chain. The substance was called penicillin. Most of their tests were completed by 1940, and because it was during the Second World War, there was an urgent need for penicillin. Today, vast amounts of penicillin are commercially produced.

2.3.1 Why do you think the name 'penicillin' is appropriate? (2)

2.3.2 What name is given to all substances/drugs that are produced by microbes and have the power to kill bacteria? (1)

2.3.3 It is often said that Fleming discovered penicillin by luck, but it was not luck only.

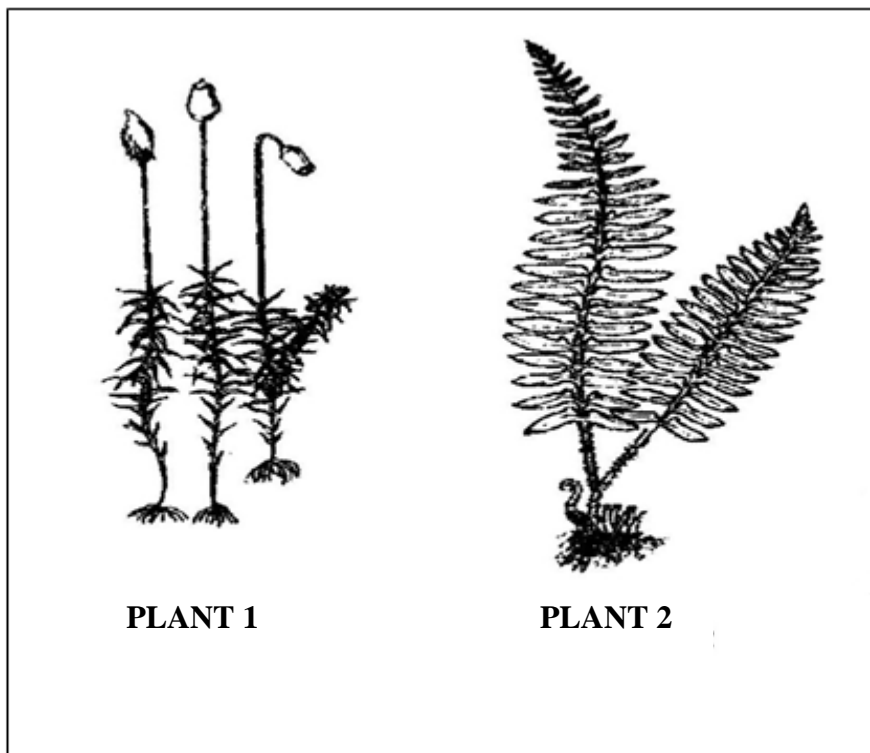
State TWO scientific skills that were involved when he made this discovery. (2x1) (2)

2.3.4 Explain why there was an urgent need, in wartime, for a drug that had the power to kill bacteria. (3)

[30]

**QUESTION 3**

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



3.1.1 Identify the plant group to which above plants (1 and 2) belong. (2)

3.1.2 Describe ONE way in which plant 1 is similar to plant 2. (1)

3.1.3 Describe THREE ways in which plant 1 is different from plant 2. (3)

3.2 The table represents the number of species in the different groups of animals found in South Africa.

| Group of organism | Number of species |
|-------------------|-------------------|
| Flowering plants  | 20 300            |
| Mammals           | 243               |
| Insects           | 80 000            |
| Birds             | 800               |
| Saltwater fish    | 2 000             |
| Freshwater fish   | 220               |
| Reptiles          | 370               |

3.2.1 Which group of organisms has the highest diversity of species? Give a possible reason for this. (2)

3.2.2 Why do you think there is a big difference in diversity between saltwater and freshwater fish? (2)

3.2.3 Give FIVE possible reasons why the number of species in a group of organisms does not remain fixed. (5)

- 3.3 Tabulate THREE morphological/structural differences between a monocotyledonous and a dicotyledonous plant. (7)
- 3.4 Read the article and answer the questions that follow.

**A highway among trees and seedlings**

The N2 highway between Tsitsikamma and Witelsbos on the Garden Route crosses one of the most beautiful parts of the country. Tourists stream in to see its ancient indigenous forests, seascapes and to visit the Tsitsikamma National Park, Otter Trail and Bloukrans bridge.

So it was appropriate that the South African National Roads Agency Limited (Sanral) decided to save a giant Outeniqua yellowwood tree during major road construction on the N2 highway.

“Sanral has gone to great lengths to retain the diversity of species, to the extent of manually collecting seeds for fynbos regeneration,” said Makoa. Indigenous plants were relocated during the road upgrade. This inspired a Sanral employee to start a nursery of indigenous plants that could be used in post-construction rehabilitation.

Sanral also took steps to counter the possible effect of roadwork on the environment during construction. Challenges ranged from flooding and veld fires, to safety consideration and traffic accommodation.

“We have long recognized that infrastructure projects such as road building are generally associated with negative environmental impacts. We therefore put measures in place not only to rehabilitate, but also to support environmental preservation,” Makoa said.

by Janis Theron: adapted from Mail & Guardian June 2008

- 3.4.1 List FOUR of the problems that building this highway could have had on the environment if Sanral had not intervened. (4)
- 3.4.2 Define the term *indigenous*. (1)
- 3.4.3 Which national park is situated close to this highway? (1)
- 3.4.4 What type of tree had been saved by Sanral? (1)
- 3.4.5 For which leisure activity (sky diving, bungee jump, bridge diving) is the Bloukrans bridge known for? (1)

[30]

**TOTAL SECTION B: 60**

**SECTION C****QUESTION 4**

4.1 Read the passage below and answer the questions that follow.

The rhinos were classed as one of the most critically endangered animals in the late 20<sup>th</sup> century. The rhino poaching epidemic in Southern Africa has got to the point where we are losing animals on an almost daily basis.

Rhino poaching has been making the news on a regular basis, so much so that the general public – YOU, THE PEOPLE WE NEED SO MUCH – have become accustomed to the horror stories and gory pictures of yet another dead rhino.

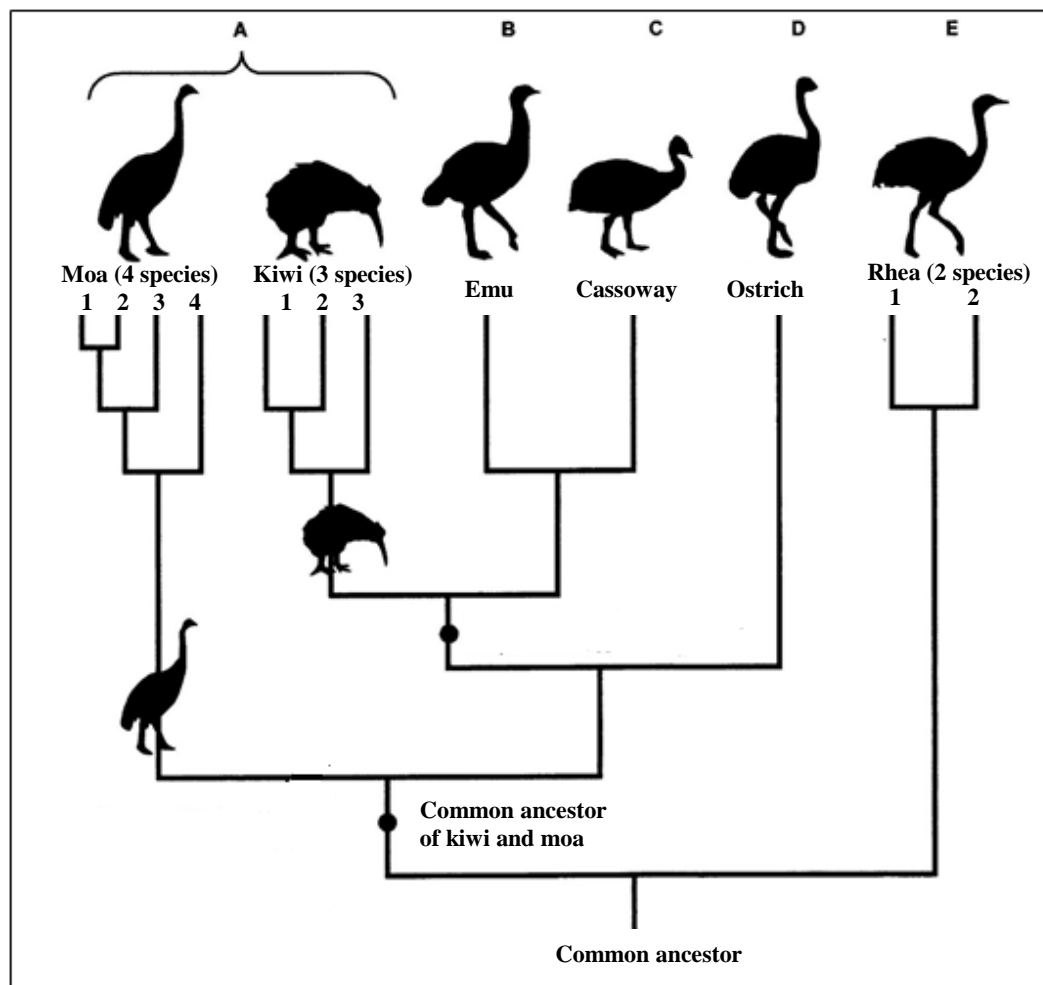
Rhinos play a very important role in landscaping their habitats. They are important seed dispersers. The rhino takes more than three days to digest a meal and as a result the seeds are transported large distances before they are deposited in the dropping. The droppings maintain the fertility of the soil.

A war is currently on the go between poachers and police on the Cape south coast. The police are seizing stockpiles of perlemoen from the poachers. This multimillion rand perlemoen business is linked to international drug syndicates and gangs from the Cape Flats.

Source: Adapted from WWF-Press release. [www.id.co.za/news](http://www.id.co.za/news)

- 4.1.1 Give TWO reasons why the rhino has been placed on the critically endangered list? (2x1) (2)
- 4.1.2 Why do you think the international drug syndicates and the Cape Flats gangs are linked? (2)
- 4.1.3 Perlemoen poaching is more commercial than subsistence.  
Explain what is meant by this statement. (4x1) (4)
- 4.1.4 Why are the rhinos being seen as important seed dispersers? (2)

- 4.2 The diagram shows the evolution of flightless birds, living and extinct. The diagram shows six varieties of flightless birds.



- 4.2.1 Identify the country from which each (A – E) of the varieties comes. (5)
- 4.2.2 What is the scientific view on the evolution of flightless birds and the reason for their worldwide distribution? (5)
- 4.3 Write a mini-essay on how Darwin's theory of evolution supports the bio-geographical distribution of species. Use the examples of the finches of Galapagos. (17)
- Synthesis (3)

**TOTAL SECTION C: 40**

**GRAND TOTAL: 150**