



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES P2

EXEMPLAR 2013

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Start the answers 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 for 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 necessarily all drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and compass.
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 to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

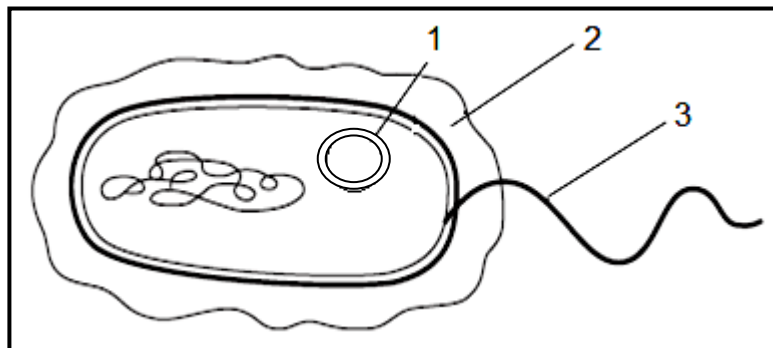
1.1.1 Which of the following produce antibodies?

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

1.1.2 Which of the following is a characteristic feature of mosses?

- A Xylem
- B Phloem
- C Seeds
- D Spores

1.1.3 The diagram below represents a bacterial cell.



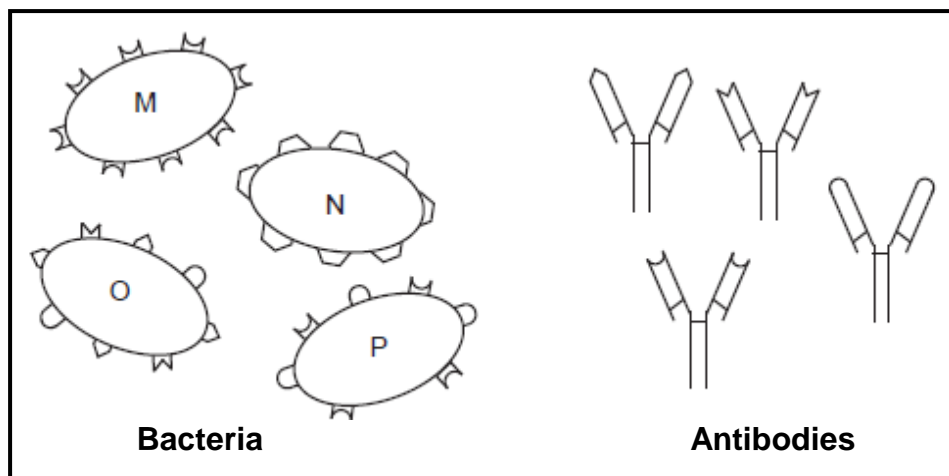
Which of the following represent parts **1**, **2** and **3**?

- A Plasmid, flagellum, capsule
- B Flagellum, capsule, plasmid
- C Plasmid, capsule, flagellum
- D Capsule, plasmid, flagellum

1.1.4 The mechanism that forms the first line of defence in humans includes the ...

- A development of fever.
- B action of phagocytes.
- C use of antibiotics.
- D development of antigens.

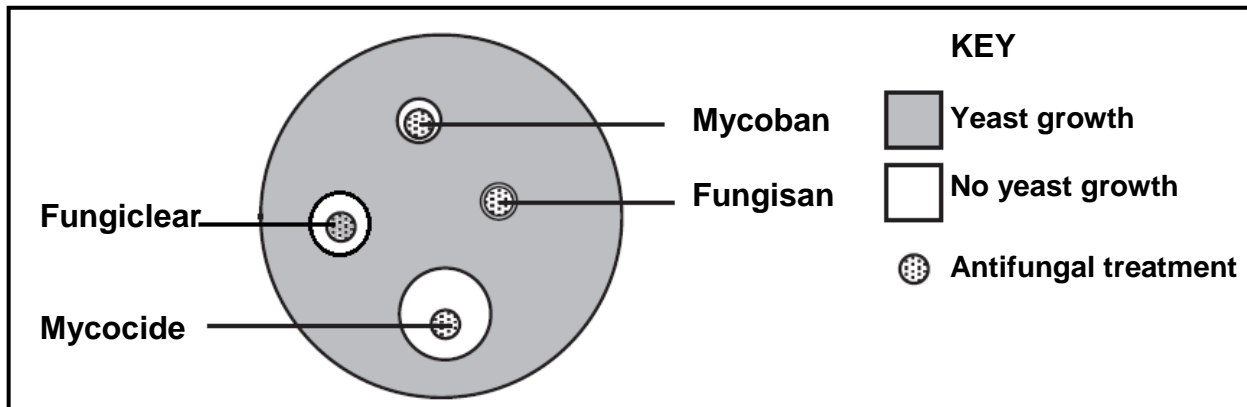
1.1.5 A young woman stepped on a dirty, rusty nail. The diagrams below show bacteria isolated from the wound and a range of antibodies that were already present in her body. The antibodies have a specific shape that binds with the antigen found on the surface of the bacteria.



The bacterium most likely to cause a severe infection is ...

- A M.
- B N.
- C O.
- D P.

- 1.1.6 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 most effective and Fungisan is least effective.
 - D Fungisan is most effective and Mycocide is least effective.
- 1.1.7 In which of the following plant groups do male gametes depend on water/moisture to swim towards the ovum?

- A Pteridophytes and gymnosperms
- B Pteridophytes and angiosperms
- C Bryophytes and pteridophytes
- D Bryophytes and gymnosperms

- 1.1.8 The following are characteristics of different plant groups:

- 1 Vascular tissue
- 2 Seeds
- 3 Flowers
- 4 True leaves and roots

The characteristics found in pteridophytes are ...

- A 1, 2, 3 and 4.
- B 1, 2 and 4.
- C 1 and 4.
- D 2, 3 and 4.

1.1.9 Which ONE of the following represents a positive human impact on the environment?

- A Pollution
- B Conservation
- C Environmental degradation
- D Population explosion

1.1.10 When an infection was treated with a new drug, the inflammation decreased. In a few patients the inflammation returned after one week. The probable reason for this is that ...

- A the patients developed an allergic reaction to the drug.
- B the decrease in inflammation allowed the pathogens to become resistant to the drug.
- C the white blood cells were not functioning properly and therefore the inflammation returned.
- D a few pathogens resistant to the drug were present at the start of treatment, the drug could not kill them and so they reproduced. (10 x 2)

(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 to 1.2.10) in the ANSWER BOOK.

1.2.1 Species living in a habitat in which they are not naturally found

1.2.2 The variety of life on Earth

1.2.3 A micro-organism used in the manufacturing of beer and bread

1.2.4 A collective name for animals without a backbone

1.2.5 The sensible and careful use of resources so that they will be available to future generations as well

1.2.6 A type of reproduction that does not involve the fusion of male and female gametes

1.2.7 A measure of the total greenhouse gas emissions by an individual, company or a country per year

1.2.8 The gradual change of a productive land into an increasingly arid one, losing all its vegetation and wildlife

1.2.9 The type of fertilisation occurring in flowering plants

1.2.10 The group of sporangia in a fern plant

(10)

- 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 (1.3.1 to 1.3.10) in the ANSWER BOOK.

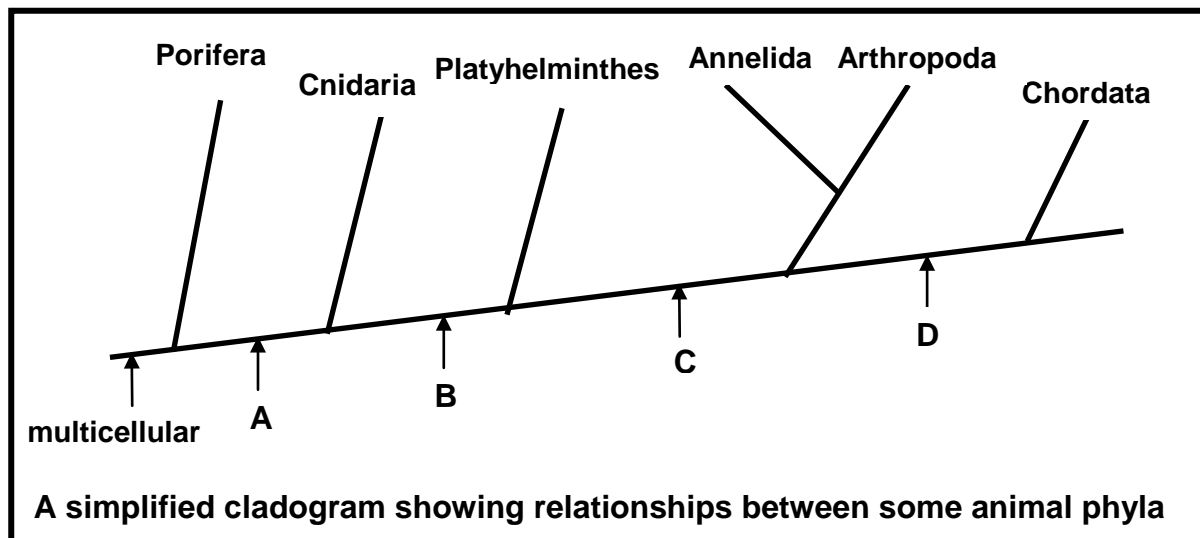
COLUMN I		COLUMN II
1.3.1	The type of symbiotic relationship displayed by <i>E. Coli</i> living in the human intestines	A: commensalism B: mutualism
1.3.2	All organisms in this phylum are sessile	A: Porifera B: Chordata
1.3.3	The role of antigens in the body's defence	A: trigger an immune response B: bind to the invading pathogen
1.3.4	Reproduce through binary fission	A: viruses B: fungi
1.3.5	Site constructed to dispose of waste	A: reservoir B: landfill
1.3.6	Greenhouse gases	A: carbon dioxide B: methane
1.3.7	Factors decreasing water availability	A: destruction of wetlands B: exotic/alien plants
1.3.8	The result of an increase in carbon dioxide in the atmosphere	A: global warming B: acid rain
1.3.9	The dominant generation in flowering plants	A: gametophyte B: sporophyte
1.3.10	Root-like structures in moss plants	A: thallus B: rhizoids

(10 x 2)

(20)**TOTAL SECTION A:****50**

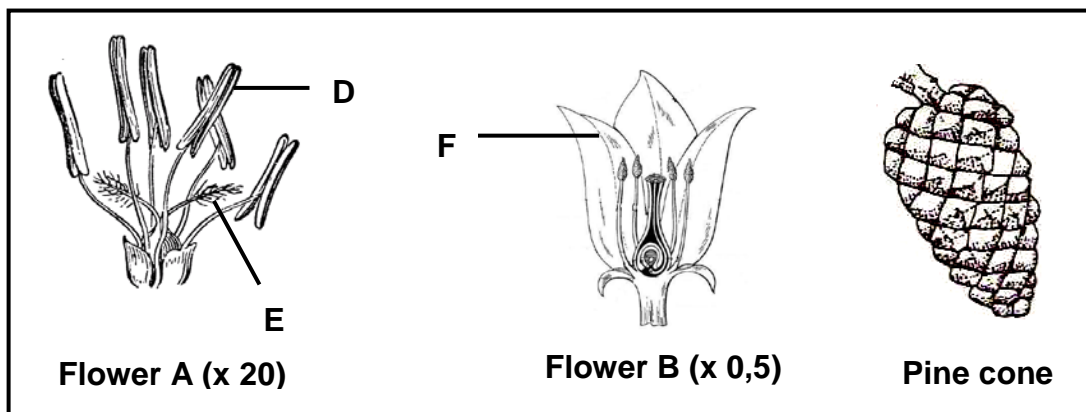
SECTION B**QUESTION 2**

- 2.1 The diagram below represents a cladogram (phylogenetic tree) showing relationships between animal phyla. The letters (A to D) indicate the characteristics shared by the different phyla of animals which follow the letter. The point where various phyla differ from each other is indicated by the branching-off/split into new phyla.



- 2.1.1 Which characteristic is shared by all the organisms in the animal kingdom according to the cladogram? (1)
- 2.1.2 Which LETTER represents each of the following characteristics with respect to the body plan: (1)
- (a) Cephalisation (1)
 - (b) Triploblasty (1)
 - (c) Coelom (1)
 - (d) Bilateral symmetry (1)
 - (e) Segmentation (1)
 - (f) Vertebral column (1)
 - (g) Symmetry (1)
- 2.1.3 Explain ONE importance of the development of a coelom. (2)
- 2.1.4 Write down the names of the phyla that display the characteristic represented by **C** but not the characteristic represented by **D**. (2)
- 2.1.5 Describe ONE way in which the coelom of annelids and arthropods are different. (2)
- 2.1.6 State ONE role of arthropods in agriculture. (1)
- (15)**

- 2.2 Study the diagrams below showing the structures of two flowers as well as a pine cone. The magnification of each flower is indicated in brackets.



- 2.2.1 Label parts **D**, **E** and **F**. (3)
- 2.2.2 Which flower (**A** or **B**) is probably pollinated by insects? (1)
- 2.2.3 Give ONE observable reason for your answer to QUESTION 2.2.2. (1)
- 2.2.4 Which flower (**A** or **B**) is larger? (1)
- 2.2.5 Identify the groups to which flower **A** and the pine cone belong. (2)
- 2.2.6 State ONE way in which the seeds of the groups named in QUESTION 2.2.5 differ. (2)
- 2.2.7 Explain how the dependency on water for reproduction is reduced in the group represented by the pine cone. (2)
- 2.2.8 State TWO advantages of seeds over spores. (2)
- (14)**

2.3 Study the extract about malaria below.

Malaria is a parasitic disease which occurs mainly in tropical and subtropical regions. It is transmitted in humans through the bite of a female mosquito of the *Anopheles* species, which is the vector for the parasite. It is estimated that 1 to 3 million people die from malaria every year and the majority are children from Sub-Saharan Africa.

The most effective way of managing malaria is to destroy its vector. An insecticide which has been successful to date is DDT. The inner walls of the house are sprayed with DDT so that the mosquitoes die if they sit on or near them. However, the use of DDT has been banned since 1972.

In South Africa the incidence of malaria has been less than 10 000 cases per year. South Africa only stopped its use of DDT in 1996. The number of infections recorded since has increased to 64 000 in 2000. When the use of DDT was re-introduced only for disease-vector control, the reported cases in South Africa decreased to 7 000 in 2005.

- 2.3.1 To which group of micro-organisms does the malaria parasite belong? (1)
- 2.3.2 State any TWO ways to avoid contracting malaria. (2)
- 2.3.3 Describe how the malaria parasite is passed from one human to another. (2)
- 2.3.4 Give ONE reason why a person with malaria cannot be treated by using an antibiotic. (2)
- 2.3.5 Explain how an increase in the number of malaria infections would affect the South African economy. (2)
- 2.3.6 Suggest ONE way in which the data about the number of infections was collected. (1)
- 2.3.7 Give ONE reason why the number of infections might have been more than 7 000 in the year 2005. (1)
- (11)**
[40]

QUESTION 3

- 3.1 Study the table below showing the amount of food wasted per person per year in different developed and developing regions of the world.

Region	Level of development	Food loss and waste per person per year (kg)		
		Total	At production and retail stages	By consumers
Europe	Developed	280	190	90
North America and Oceania	Developed	295	185	110
Industrialised Asia	Developed	240	160	80
Sub-Saharan Africa	Developing	160	155	5
North Africa, West and Central Asia	Developing	215	180	35
South and Southeast Asia	Developing	125	110	15
Latin America	Developing	225	200	25

[Adapted from *CUP Biology*, Jones and Jones, 2010]

- 3.1.1 For Sub-Saharan Africa, calculate the food wastage by consumers as a percentage of the total food waste. (3)
- 3.1.2 Give a possible explanation for the low percentage calculated in QUESTION 3.1.1. (2)
- 3.1.3 Give an explanation for the difference in the pattern of food wastage in developed and developing regions. (4)
- 3.1.4 State TWO possible ways of preventing the high levels of food waste that is found in developed countries. (2)
- (11)**

- 3.2 Despite a great increase in the demand for food, only 7% more land is now used for farming. One of the reasons for this is increased productivity, that is a higher yield per hectare, due to GMOs as well as the use of chemicals.

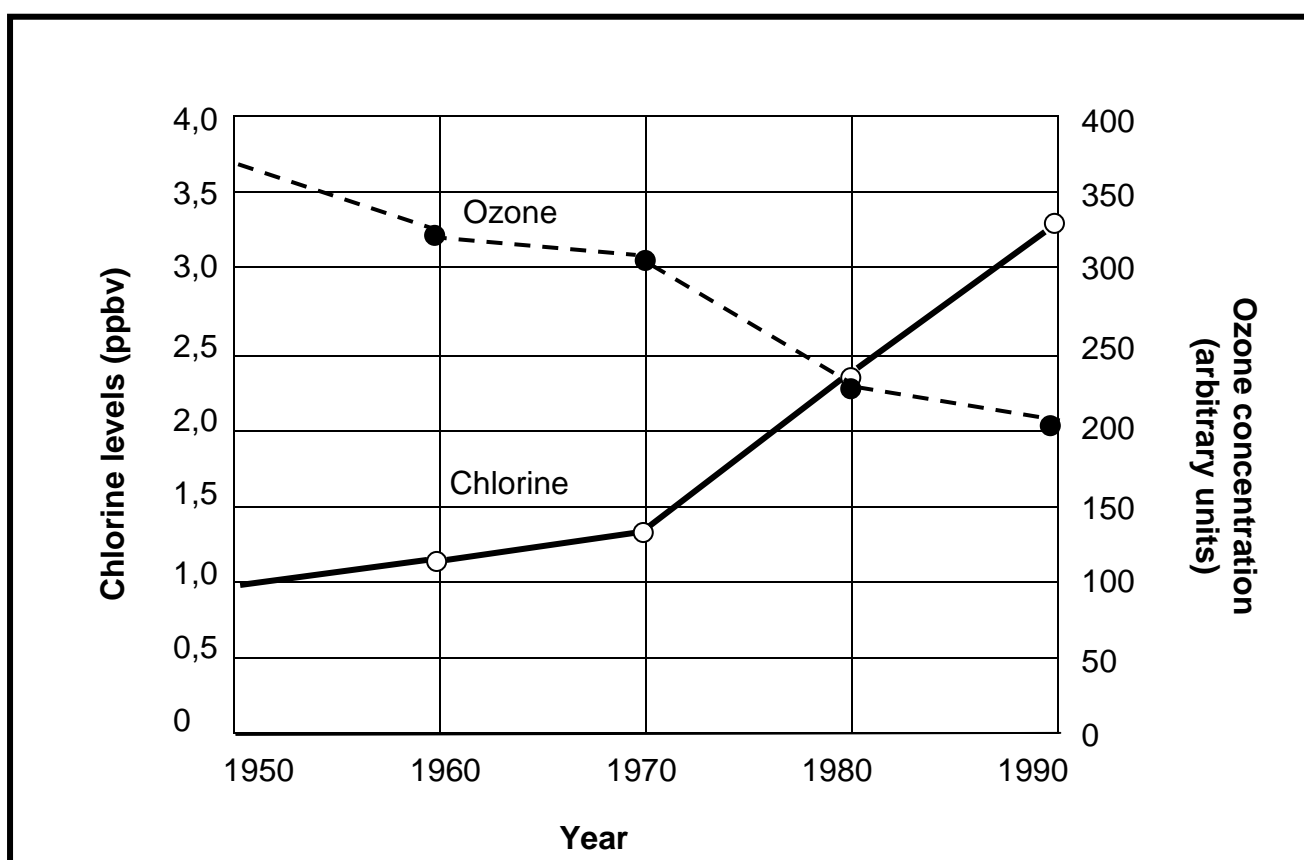
In the last 30 years, people have become more aware of the use of chemicals in farming. Some people are concerned about the effects of these on their health and choose to buy organically grown produce. Farmers who use organic methods to produce food do not use chemicals on their crops.

- 3.2.1 Give ONE reason for an increase in the demand for food over the years. (1)
- 3.2.2 State ONE way in which the use of each of the following helps to increase productivity:
- (a) Pesticides (1)
- (b) Fertilisers (1)
- 3.2.3 Describe how the use of pesticides could destroy food chains. (2)
- 3.2.4 Explain why GMOs can be considered to be a threat to food security. (3)
- 3.2.5 Describe how fertilisers cause eutrophication when they are washed into rivers. (5)
- (13)**
- 3.3 List FOUR strategies you would use to manage solid waste if you were appointed as the head of the waste disposal division of your town. (4)

- 3.4 Ozone is found at low concentrations 15–50 km above the Earth's surface in the stratosphere. Measurements showed that there is a significant decrease in the amount of ozone. It has been observed that there are holes in the ozone layer which get bigger each year.

The main chemical responsible for the depletion of the ozone layer is chlorine, which comes from the breakdown of CFCs (chloroflouro-carbons). The CFCs are broken down by sunlight into chlorine atoms which then react with the ozone. Ozone is destroyed in this reaction. The problem is worse in the polar regions because of the low temperatures.

An investigation to measure the ozone concentration and the chlorine levels have been done in Antarctica since 1950 and the results are shown in the graph below:



[Adapted from *Ecology and Conservation*, Cambridge University Press]

- 3.4.1 Give a caption for the graph. (2)
- 3.4.2 What is the relationship between the levels of chlorine and the concentration of ozone? (2)
- 3.4.3 Name the dependent variable(s) in the investigation. (2)

- 3.4.4 In which 10-year period was the ozone depletion the greatest? (1)
- 3.4.5 In 1987 the Montreal Protocol was signed to lay down targets to reduce the use of CFCs by countries. Give TWO reasons why, despite a reduction in the use of CFCs, there was a decline in the ozone layer. (2)
- 3.4.6 Name ONE item that humans were using which contained CFCs. (1)
- 3.4.7 Explain why the ozone layer is important for humans. (2)
- (12)**
[40]
- TOTAL SECTION B: 80**

SECTION C**QUESTION 4**

The greatest threat to biodiversity is the destruction of habitats. Describe how various human activities may lead to habitat loss.

Content: (17)
Synthesis: (3)
[20]

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

TOTAL SECTION C: 20
GRAND TOTAL: 150