



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

NOVEMBER 2018

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours



This question paper consists of 16 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 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 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 number (1.1.1–1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

1.1.1 Disease-causing agents are called ...

- A antibiotics.
- B vaccines.
- C antibodies.
- D pathogens.

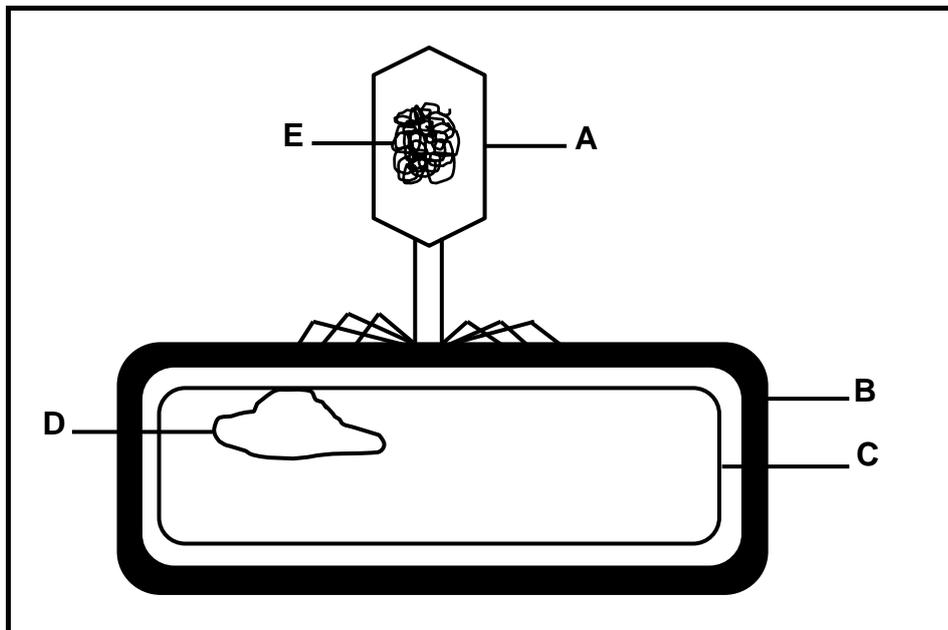
1.1.2 Sponges are a phylum of animals formally known as ...

- A *Cnidaria*.
- B *Porifera*.
- C *Platyhelminthes*.
- D *Arthropoda*.

1.1.3 Cephalisation is generally associated with all of the following except:

- A bilateral symmetry
- B concentration of sensory structures at the anterior end
- C a brain
- D sessile existence

1.1.4 Which structure in the diagram below represents viral RNA?



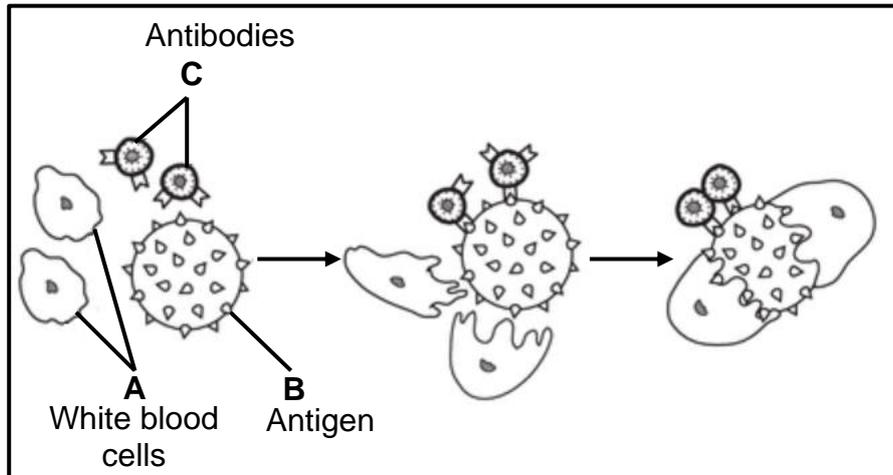
- A Structure B
- B Structure C
- C Structure D
- D Structure E

1.1.5 Mushrooms are a type of fungus. What characteristic of fungi makes them different from plants?

- A Fungal cells are eukaryotic
- B Fungi are multicellular
- C Fungi are heterotrophic
- D Fungi have cell walls

1.1.6 The diagram below illustrates activities taking place in a human body.

Based on the diagram, vaccinations usually stimulate the body to produce more of ...



- A structure **A**, only.
- B structure **B**, only.
- C structures **A** and **C**, only.
- D structures **A**, **B**, and **C**.

1.1.7 Which characteristic is shared by *Cnidarians* and *Platyhelminthes*?

- A Dorsoventrally flattened bodies
- B Radial symmetry
- C A digestive system with a single opening
- D A distinct head

1.1.8 Which row in the table below correctly pairs a human activity with its impact in the environment?

Human activity		Impact
A	Decrease in the use of pesticides	Erosion of rock in soil
B	Increase in housing developments	Improvement in air quality
C	Increase in human population	Reduction in water usage
D	Decrease in recycling	Reduction in amount of available resources

QUESTIONS 1.1.9 AND 1.1.10 REFER TO THE GRAPH AND TABLE BELOW:

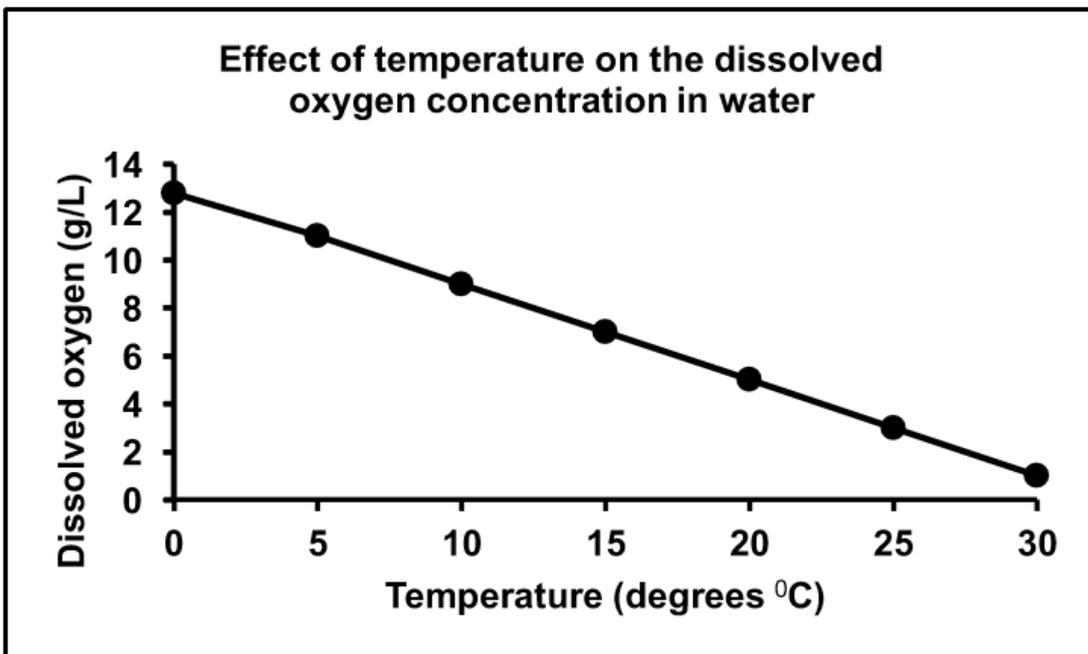


Table of oxygen requirements of different organisms in a river.

Animal	Striped Bass	Shad	Yellow perch	Clams	Blue Crab	Spot fish	Worms
Minimum oxygen requirements (mg/L)	6	5	5	4	3	2	1

1.1.9 Thermal pollution causes the level of dissolved oxygen in water to ...

- A decrease.
- B increase then decrease.
- C remain unchanged.
- D increase.

1.1.10 Due to the release of water from a factory, the temperature of water in a stream is 30 °C.

Two organisms that are likely to be found living in the stream are ...

- A striped bass and blue crab.
- B worms and clams.
- C worms and spot fish.
- D yellow perch and spot fish.

(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 (1.2.1–1.2.10) in the ANSWER BOOK.

1.2.1 Measurement of the total amount of carbon dioxide emissions of an individual per year

1.2.2 The accumulation of nutrients in ponds from the over-use of fertilisers on land stimulating excessive growth of algae

1.2.3 Having access to enough food on a daily basis to ensure healthy living

1.2.4 The planting of trees for commercial purposes

1.2.5 A single crop species is planted on the same piece of land for consecutive years

1.2.6 The male part of a flower

1.2.7 Animals that remain attached to the substrate for their entire life cycle

1.2.8 The tissue layer which gives rise to the outer covering of the animal

1.2.9 Type of symmetry in which an animal can be cut in any vertical plane through its central axis to give two mirror images

1.2.10 Shedding of the exoskeleton in arthropods to allow growth

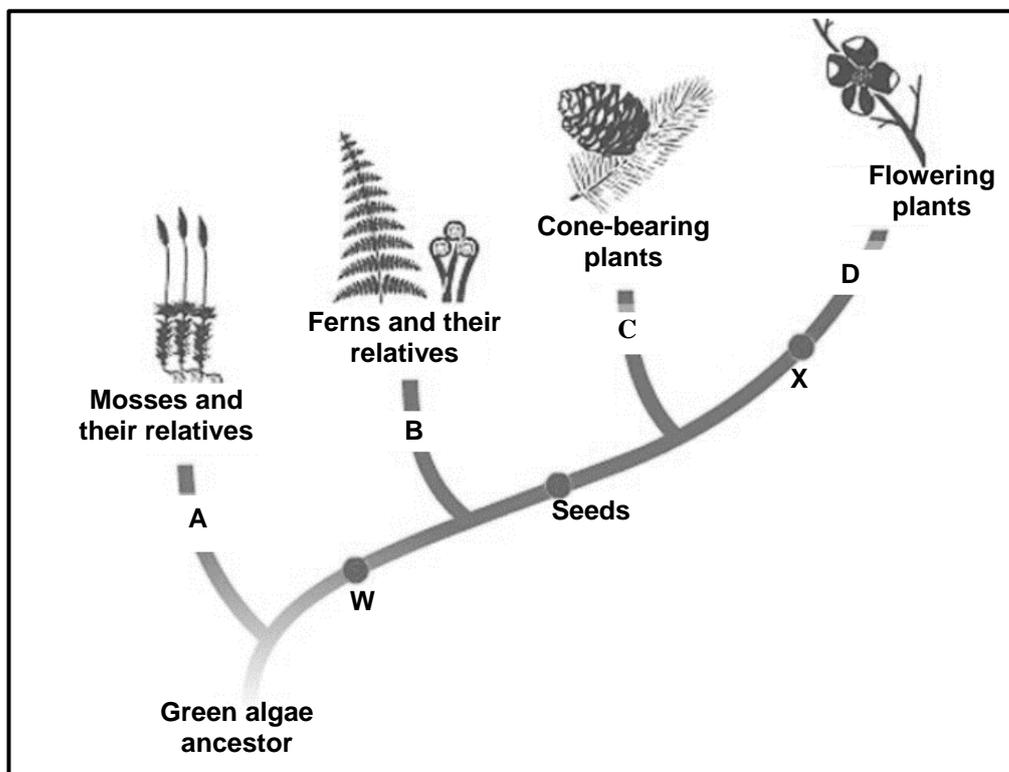
(10 x 1) (10)

1.3 Indicate whether each of the descriptions 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 (1.3.1–1.3.3) in the ANSWER BOOK.

COLUMN I		COLUMN II	
1.3.1	Reduces greenhouse gases in the atmosphere	A:	Landfill sites
		B:	Deforestation
1.3.2	Decreases biodiversity	A:	Alien plant invasion
		B:	Urbanisation
1.3.3	Triploblastic animals with a blind gut	A:	Platyhelminthes
		B:	Annelida

(3 x 2) (6)

1.4 The diagram below is a cladogram of plant evolution.



1.4.1 Identify the plant divisions labelled **A**, **B**, **C** and **D**. (4)

1.4.2 Name the evolutionary features at **W** and **X**, respectively, that distinguishes:

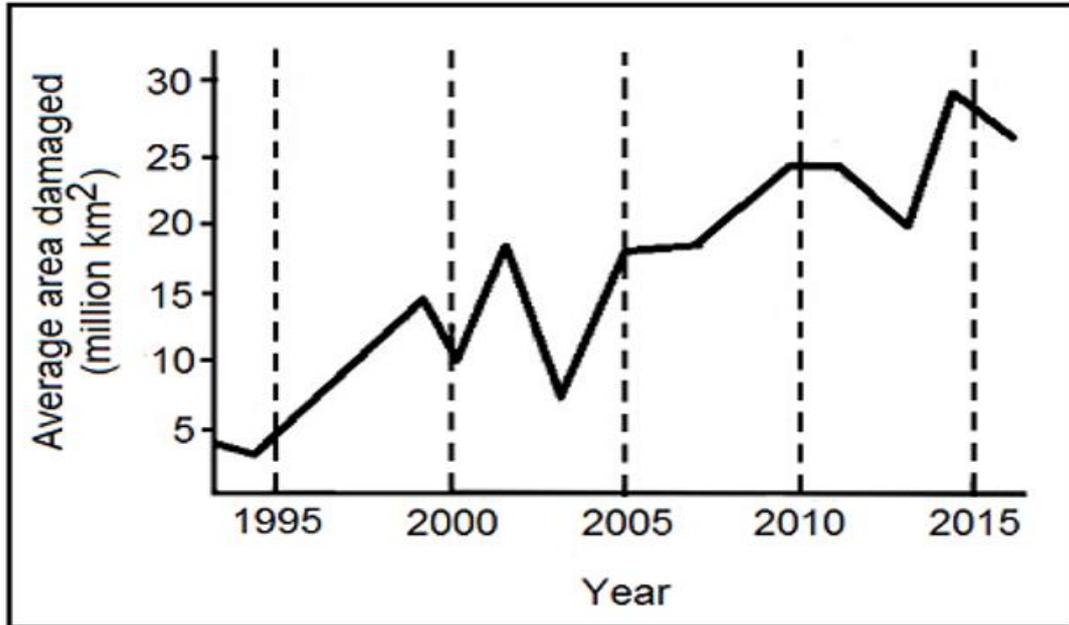
(a) Mosses and ferns (1)

(b) Cone-bearing plants and flowering plants (1)

1.4.3 Both cone-bearing plants and flowering plants are seed-bearing plants.

What is the collective name used for seed-bearing plants? (1)

- 1.5 Chlorofluorocarbons (CFCs) unfortunately have caused considerable damage to the ozone layer, resulting in the formation of a big holes. The graph below shows the extent of the damage in the Antarctic ozone layer.



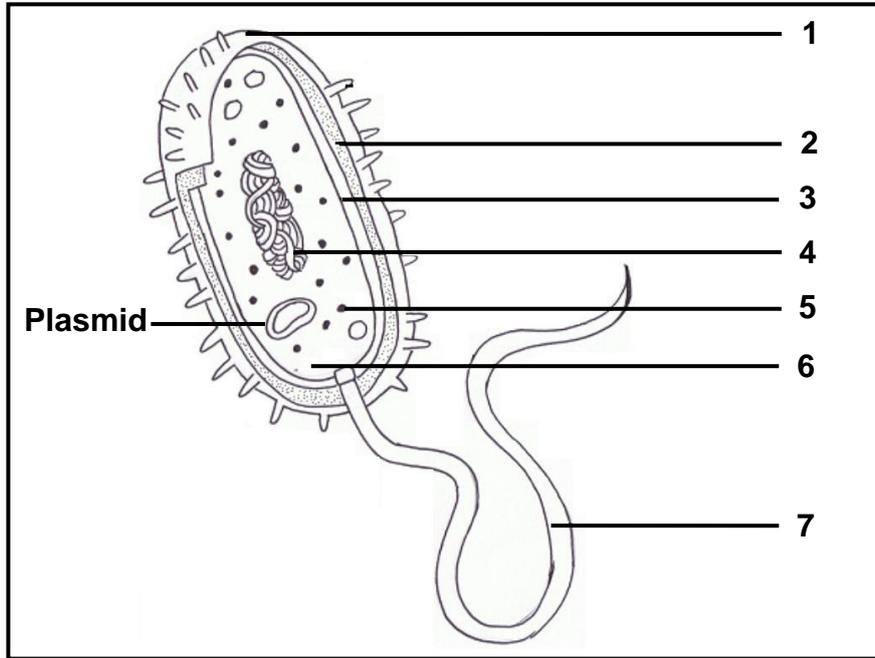
- 1.5.1 During which year was the 'hole' in the Antarctic area the:
- (a) Smallest? (1)
 - (b) Largest? (1)
- 1.5.2 What was the area of the 'hole' (millions km²) in the years:
- (a) 2000 and (1)
 - (b) 2005 (1)
- 1.5.3 Suggest THREE solutions to ozone depletion. (3)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram below is that of a bacterial cell.



2.1.1 Identify parts labelled **5** and **7**. (2)

2.1.2 State the function of the part labelled **1**. (1)

2.1.3 Microorganisms can be used in the production of medicines such as insulin and antibiotics.

Describe how the bacterium *E. coli* is used in the production of insulin for the treatment of diabetes. (5)

- 2.2 The table below shows the global carbon dioxide emissions from fossil fuel combustion and the burning of fossil fuels and some industrial processes in 2014.

COUNTRY	CARBON DIOXIDE EMISSION (%)
China	30
European Union	9
USA	15
India and Russian Federation	12
Japan	4
Other	30

2.2.1 Which single country emitted the most carbon dioxide to the environment? (1)

2.2.2 Explain the impact of the increased carbon dioxide emissions on the environment. (3)

2.2.3 Each country has been given a mandate to reduce its carbon dioxide emissions to reach a certain target. This is reviewed annually by the Conference of Parties (COP), a United Nations organisation comprising of 195 countries that meets to assess progress in dealing with climate change.

Explain TWO reasons why some countries are against reducing the carbon dioxide emissions by their industries. (4)

2.3 Despite a great increase in the demand for food, only 70% 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 pesticides and fertilisers.

In the last 30 years, people have become more aware of the use of chemicals in farming. Some people are concerned about the effect 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.

2.3.1 Give ONE reason for the increase in the demand for food over the years. (1)

2.3.2 State ONE way in which the use of each of the following helps increase productivity:

(a) Pesticides (1)

(b) Fertilisers (1)

2.3.3 Explain how the use of pesticides could destroy food chains. (2)

2.3.4 Explain how GMOs can be considered a threat to food security. (2)

- 2.4 A mycorrhiza is a mutualistic relationship between fungal hyphae and the roots of true plants. The hyphae increase the absorptive surface of the plant's roots by aiding in the absorption of water, phosphorus and other mineral ions from the soil to the roots of plants. The plant is photosynthetic and provides the fungus with carbohydrates.

Scientists conducted an experiment to determine the effect of mycorrhizal associations on plant growth. The experiment was conducted as follows:

- Two groups of plants were grown.
- One group was planted in soil that had been sterilised.
- The other group was planted in the same type of soil but the soil had not been sterilised.
- All other factors remained the same between the two groups.
- The plants were allowed to grow for 8 weeks.
- Each week, the height (in centimetres) of each plant was measured.

The table below shows the growth of the plants over the 8-week period.

Week	Height of plants grown in sterilised soil (cm)	Height of plants grown in non-sterilised soil (cm)
1	0,8	2,0
2	1,5	5,5
3	2,0	8,7
4	2,3	10,0
5	2,4	12,0
6	3,8	16,2
7	5,0	19,1
8	6,0	25,0

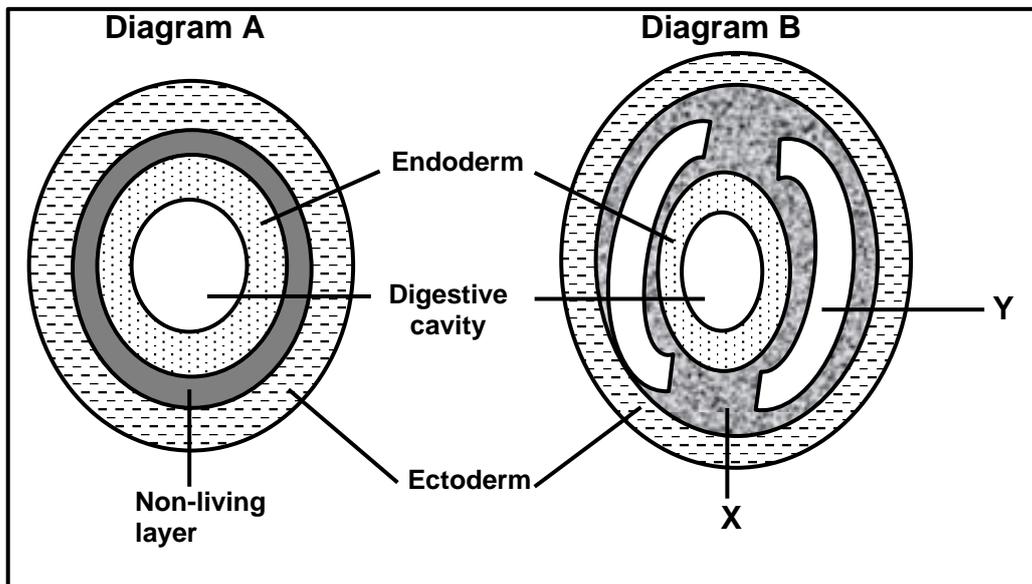
- 2.4.1 Define *mutualism*. (1)
- 2.4.2 Describe the mutualistic relationship between the fungus and the plants. (2)
- 2.4.3 Identify the:
- (a) Independent variable (1)
- (b) Dependent variable (1)
- 2.4.4 Describe ONE way in which the scientists ensured that the results of this investigation are valid. (1)
- 2.4.5 Use the data in the table above to draw two line graphs on the same set of axes. (6)

2.4.6 Explain why the plants grown in sterilised soil grew much slower than plants grown in non-sterilised soil. (3)

2.4.7 What conclusion can be drawn from the results of this experiment? (2)
[40]

QUESTION 3

3.1 The arrangement of body tissues becomes increasingly complex as animals become more evolved. This has allowed animals to develop different feeding strategies. The diagrams below show the tissue layers in animals.



3.1.1 Use letters **A** and **B** to place the diagrams in their correct evolutionary sequence. (1)

3.1.2 Name TWO animal phyla represented by diagram **B**. (2)

3.1.3 Provide labels for **X** and **Y**. (2)

3.1.4 Describe TWO advantages of structure **X**. (2)

3.1.5 Which of the two organisms, **A** or **B** is radially symmetrical? (1)

3.1.6 Explain ONE advantage of being radially symmetrical. (2)

3.2 Read the extract below.

Residents living along the Vall River noticed changes in the river water that flowed along the front of their properties. The water had turned a reddish-brown colour and smelled like rotten eggs. There were also dead fish floating on the water surface. The residents complained to the municipality, who sent out a water quality officer to investigate. The officer took water samples from point A and point B. She sent the water samples to a laboratory for analysis. The table below shows the results of the analysis.

Water quality variable	SAMPLE A	SAMPLE B
pH (acidity and alkalinity)	7,5	5,2
Faecal coliforms (counts per 100 ml)	500	150 000
Nitrate (mg/l)	0,45	4,6
Phosphate (mg/l)	0,18	0,75
Sulphate (mg/l)	60	460
Sodium (mg/l)	29	130
Chlorides (mg/l)	34	140

- 3.2.1 Give TWO indicators of pollution that the residents complained about. (2)
- 3.2.2 Does the water quality data confirm that water pollution has occurred? (1)
- 3.2.3 Explain your answer to QUESTION 3.2.2 by referring to one example in the table above. (2)
- 3.2.4 Which of the changes in water quality between sample point **A** and sample point **B** could be caused by pollution by:
- (a) The mine? (1)
 - (b) Industry? (1)
 - (c) Waste water treatment works? (1)
- 3.2.5 What effects could the water pollution have on:
- (a) The farmers who grow maize and vegetables on the agricultural land? (2)
 - (b) People living in the informal settlement who use the river water for drinking and washing? (2)
- 3.2.6 Suggest TWO ways in which the waste water treatment plant can reduce the amount of pollutants they release into the river. (2)

3.3 Read the extract below.

HUNTING AND HIKING – THE BIGGEST THREATS TO PROTECTED AREAS

A new study in Kuala Lumpur showed that hunting wild animal for food and recreational sports like hiking and mountain biking pose the two biggest threats to the world's protected areas.

Ten researchers studied data collected over the last decade by managers at about 2 000 protected areas, including untouched forests and national parks or reserves.

They found out that hunting posed the biggest threat in developing countries, while recreational activities such as quad-biking, cross-country skiing, mountain biking, hiking and even dog-walking were most damaging to protected areas in more wealthy nations.

The study showed that the hunting of 'wild meat', such as birds, insects, monkeys and snakes occurred in 61% of all areas. The animals are often sold to meet the demands for food or medicine in urban areas. The increase in the number of wild animals being hunted is partly because of an increase in urban demand – big cities and towns are growing and the demand for wildlife to eat is growing.

Another factor is that the road networks are expanding into forest areas, making them more accessible.

[Adapted from an article '*From hunting to hiking: biggest threats to protected areas identified*', Reuters, 2018]

- 3.3.1 What is the illegal hunting and killing of animals called? (1)
- 3.3.2 Give TWO reasons for the increase in the number of wild animals being hunted. (2)
- 3.3.3 Explain how the increase in the killing of wildlife will influence the environment. (3)
- 3.3.4 Suggest TWO possible solutions to each of the following threats:
- (a) Over-hunting (2)
 - (b) Recreational activities (2)

3.4 Human activities have an impact on the environment in many ways.

3.4.1 Besides recycling, state TWO other ways in which we can manage solid waste. (2)

3.4.2 Alien plants are species that are introduced into an area and which compete with the natural plants in the area.

Explain ONE advantage and ONE disadvantage of using biological control to regulate populations of alien plants. (4)
[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

Discuss the adaptations of flowers to pollination by wind and insects.

Content: (17)
Synthesis: (3)

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

TOTAL SECTION C: 20
GRAND TOTAL: 150