



education

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PROVINCIAL ASSESSMENT

GRADE 11

LIFE SCIENCES P2

NOVEMBER 2019

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 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 of each question.
6. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, flow charts or tables 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 may use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

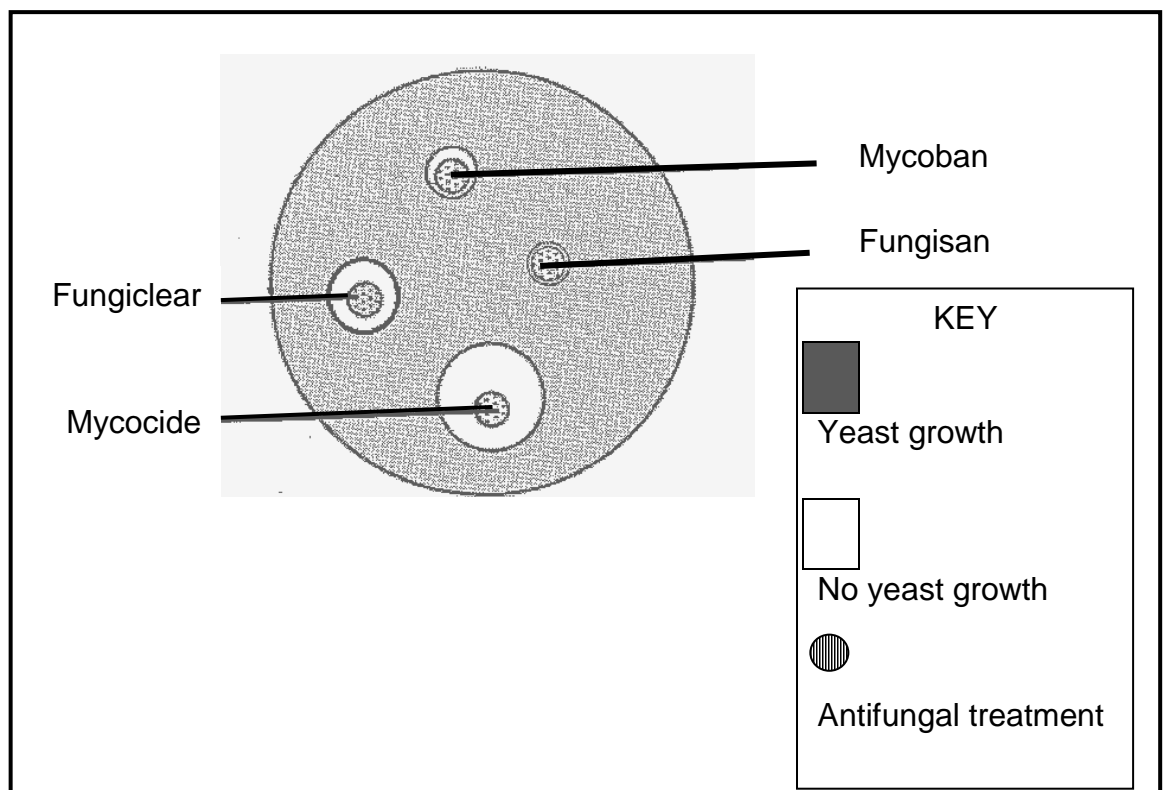
SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.9) in your ANSWER BOOK, for example 1.1.10 D.

1.1.1 How does a vaccine work?

- A It prevents the disease-causing agent from entering the body
- B It attacks the disease-causing agent as soon as it enters the body
- C It triggers the immune system to produce antibodies to fight the disease-causing agent
- D It allows the blood to filter out the disease-causing agent

1.1.2 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

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

- A Bright, moist and cold conditions
- B Bright, dry and warm conditions
- C Dark, moist and cold conditions
- D Dark, moist and warm conditions

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

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

1.1.5 During the dominant stage of their life cycle, ferns are ...

- A haploid gametophytes.
- B haploid sporophytes.
- C diploid gametophytes.
- D diploid sporophytes.

1.1.6 A pistil consists of the ...

- A stigma, style and ovary.
- B stigma, petals and ovary.
- C style, perigone and stamen.
- D style, petals and stamen.

1.1.7 The statements below are applicable to sexual reproduction in plants.

- (i) It generates variation in unstable environments
- (ii) Seeds facilitate dispersal of offspring to more distant locations
- (iii) Dormancy of seeds allow growth to be suspended until unfavourable environmental conditions are reversed
- (iv) Offspring can be rapidly reproduced

Which statements are advantageous of sexual reproduction in plants?

- A (i), (ii), (iii) and (iv)
- B (i) and (iv)
- C (ii), (iii) and (iv)
- D (i), (ii) and (iii)

1.1.8 The phylum to which the organism below, belongs:



- A *Cnidaria*
- B *Arthropoda*
- C *Platyhelminthes*
- D *Annelida*

1.1.9 Which factor is NOT a threat to biodiversity?

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

(9 x 2) **(18)**

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 1.2.9) in your ANSWER BOOK.

- 1.2.1 Micro-organisms that lives on and obtains nutrients from dead organic material
- 1.2.2 The swelling at the tip of a vertical hyphae of Rhizopus in which spores develop
- 1.2.3 A collective name for animals without a backbone
- 1.2.4 The body plan of organisms, in which parts of matching size and shape are arranged on either side or around an axis
- 1.2.5 Animals that remain attached to a substrate for most of their lives
- 1.2.6 The concentration of nerve cells or sense organs at the anterior end of the body
- 1.2.7 The gradual change of a productive land into an increasingly barren one, losing all its vegetation and wildlife
- 1.2.8 The sensible and careful use of resources so that they will be available to future generations
- 1.2.9 Substances that can be broken down naturally by micro-organisms

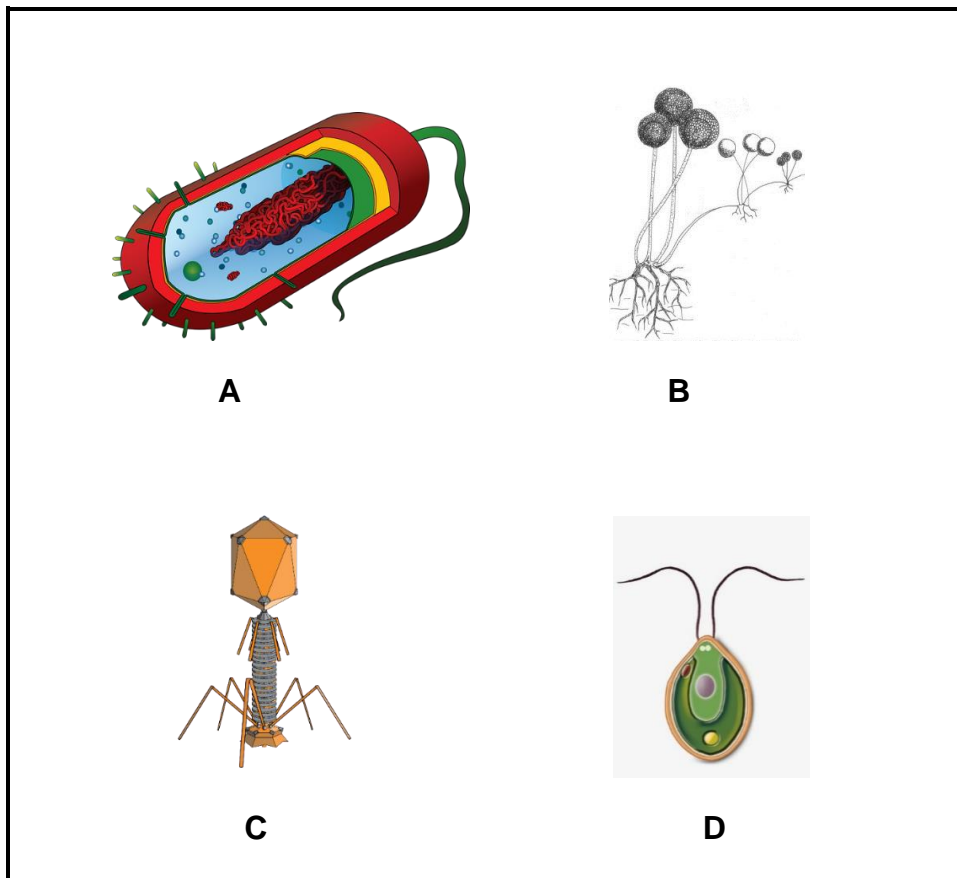
(9)

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 to 1.3.3) in your ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The division of the body into a series of similar units	A: Cephalisation B: Segmentation
1.3.2 Animals with a true body cavity	A: Coelomates B: Acoelomates
1.3.3 A site constructed to dispose of waste	A: Reservoir B: Landfill

(3 x 2) (6)

1.4 Study the diagrams of the four types of microbes below.



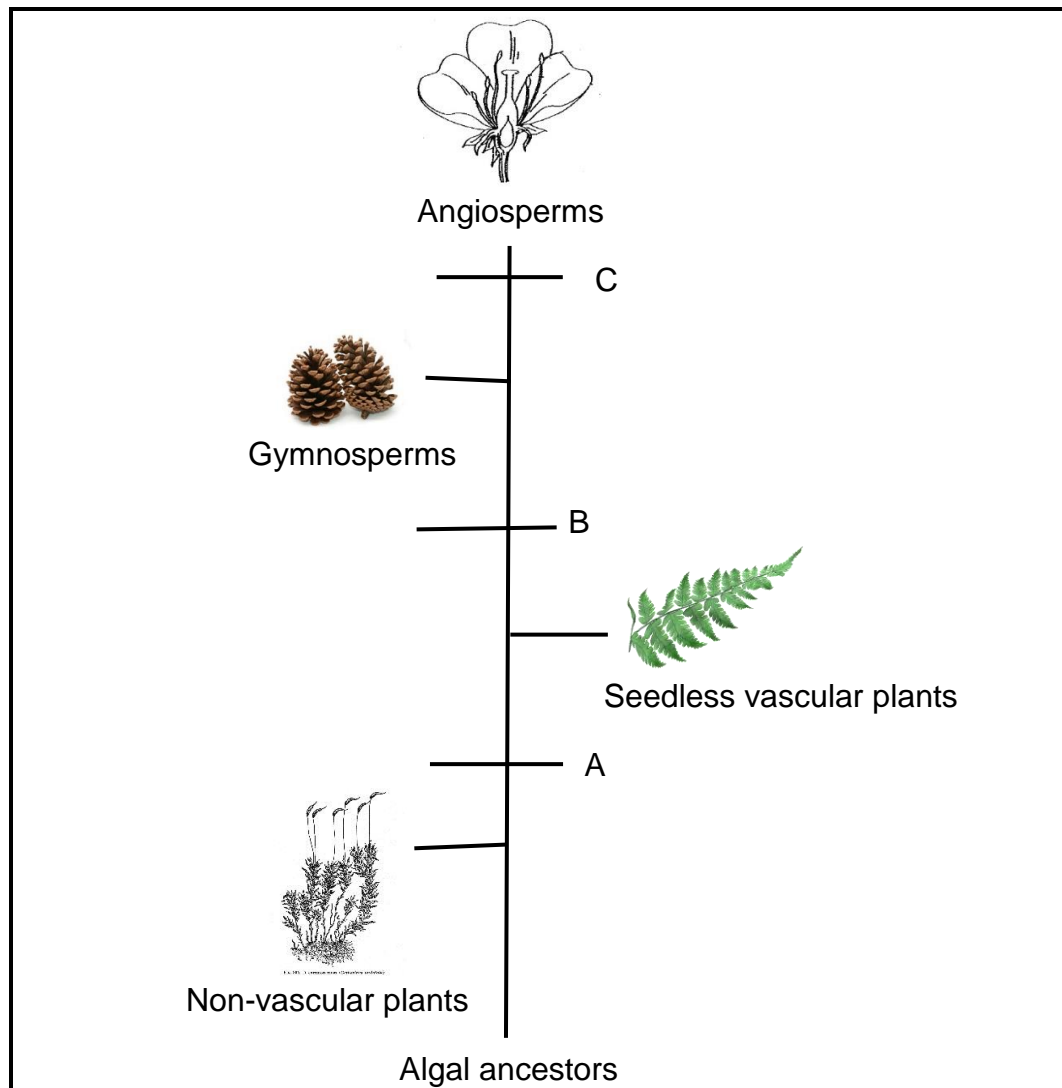
1.4.1 Give the LETTER of the diagram (A – D) that represents each of the following micro-organisms:

- | | |
|-----------------|-----|
| (a) a virus | (1) |
| (b) a bacterium | (1) |
| (c) a protist | (1) |
| (d) a fungus | (1) |

1.4.2 Give a structural reason for your answer in:

- | | |
|-------------------------|------------|
| (a) QUESTION 1.4.1. (a) | (1) |
| (b) QUESTION 1.4.1. (b) | (1) |
| (c) QUESTION 1.4.1. (c) | (1) |
| (d) QUESTION 1.4.1. (d) | (1) |
| | (8) |

1.5 The diagram below shows a phylogenetic tree of plants and their algal ancestors.



1.5.1 Name the most important adaptation that evolved at each of the following positions:

- (a) A (1)
- (b) B (1)
- (c) C (1)

1.5.2 Which division of plants is represented as nonvascular plants in the diagram? (1)

1.5.3 Explain why the seedless vascular plants are able to grow taller than the nonvascular plants. (2)

1.5.4 In what way are the seeds of gymnosperms different to seeds of angiosperms? (2)

1.5.5 Under what division of plants is seed-bearing plants classified? (1)

(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.

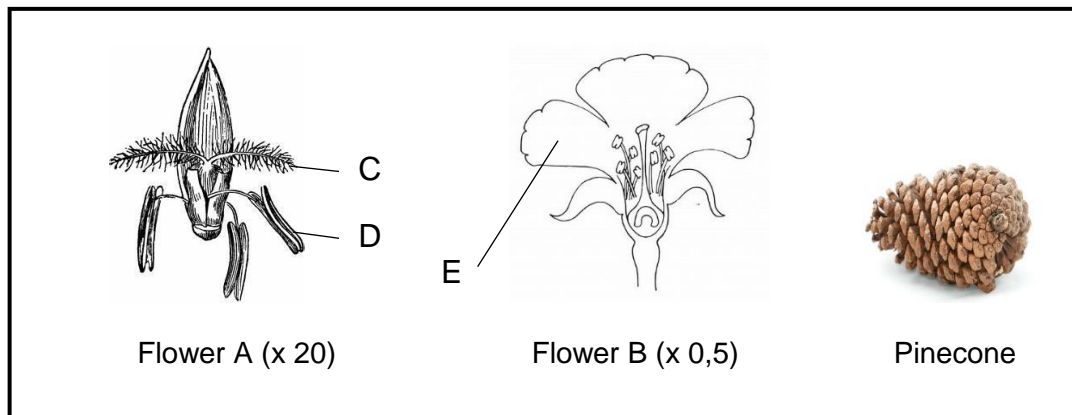
Culture plate Number	Nutrient A	Nutrient B	Nutrient C
1	√	√	
2		√	√
3	√	√	√
4	√		√

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 learners' results. (6)
- 2.1.2 (a) In which plate were the most colonies found? (1)
- (b) Suggest a reason for this result. (1)
- 2.1.3 What is the most important nutrient for bacterial growth according to these results? (1)
- 2.1.4 Give a positive hypothesis for the investigation. (2)
- 2.1.5 Name TWO variables that the learners had to keep constant in the investigation. (2)
- 2.1.6 How could the learners increase the reliability of the investigation? (1)
- (14)**

- 2.2 Study the diagrams below that show the structure of two flowers as well as a pinecone. The magnification of each flower is indicated between brackets.



- 2.2.1 Label parts **C**, **D** and **E**. (3)
- 2.2.2 (a) Which flower (**A** or **B**) is probably pollinated by insects? (1)
- (b) Give ONE observable reason for your answer to QUESTION 2.2.2. (a). (1)
- 2.2.3 Which flower (**A** or **B**) is larger? (1)
- (6)
- 2.3 Angiosperms is a group of plants that produce seeds by means of sexual reproduction.
- 2.3.1 Explain how each of the following features of seeds is important for the plants' survival:
- (a) Seed can remain dormant for long periods of time (1)
- (b) Some seeds contain endosperm tissue (1)
- 2.3.2 A seed bank in Norway has been storing seeds of a rare and endangered plant. To keep the seeds fresh, 120 of the seeds of this plant were selected to be grown. Out of these 120 seeds, only 90 germinated.
- What percentage of the seeds was not fertile? Show all your calculations. (2)
- (4)
- 2.4. Plants use a great amount of energy to produce flowers.
- Explain why it is still an evolutionary advantage to produce flowers in plants. (3)

2.5 There is a great animal diversity on earth.

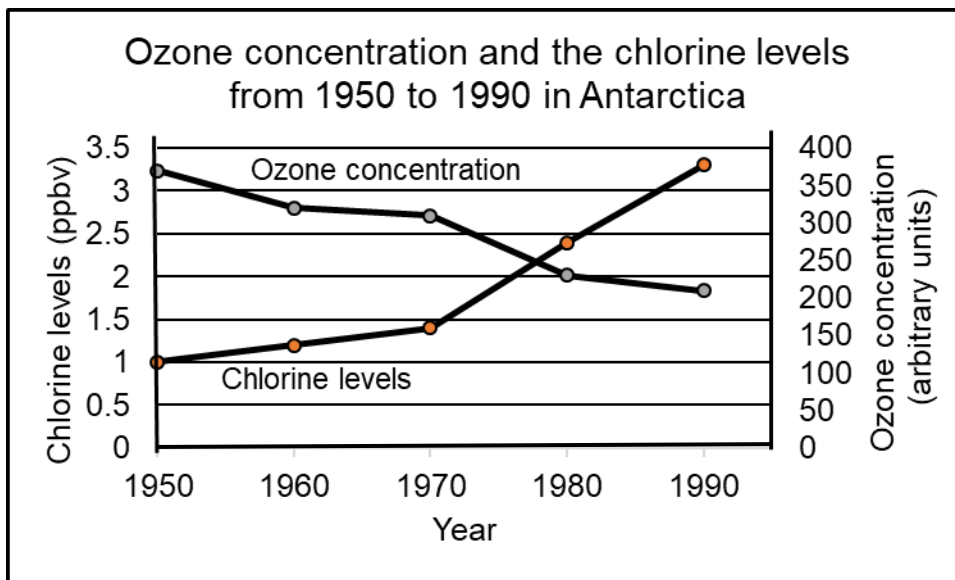
2.5.1 Name a phylum which is acoelomate and has a triploblastic body plan. (1)

2.5.2 Describe ONE way in which the coeloms of annelids and arthropods differ from each other. (2)
(3)

2.6.1 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 CFC's (chlorofluorocarbons). The CFC's 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]

2.6.1 What is the relationship between the levels of chlorine and the concentration of ozone? (2)

2.6.2 Name the dependent variable(s) in the investigation. (2)

2.6.3 In which 10-year period was the ozone depletion the greatest? (1)

2.6.4 In 1987 the Montreal Protocol was signed to lay down targets to reduce the use of CFC's by countries.

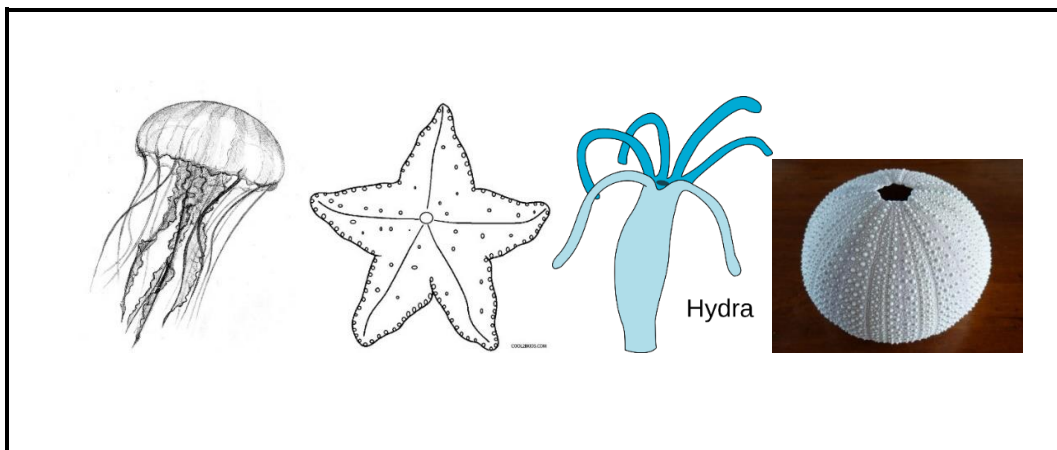
Give TWO reasons why, despite a reduction in the use of CFC's, there was a decline in the ozone layer. (2)

2.6.5 Name ONE item that humans were using which contained CFC's. (1)

2.6.6 Explain why the ozone layer is important for humans. (2)
(10)
[40]

QUESTION 3

3.1 The diagrams below show different animals.



3.1.1 Identify the phylum to which these organisms belong. (1)

3.1.2 Name the kind of symmetry shown in these organisms. (1)

3.1.3 Explain the advantage this symmetry has for the mode of living of these organisms. (2)

3.1.4 Name ONE phylum that you have studied, which have a coelom. (1)
(5)

3.2 State ONE disadvantage of an exoskeleton in Arthropoda and explain how they overcome this disadvantage. (2)

3.3 Read the passage and study the table below.

An environmental health officer from a local municipality received complaints from residents living along a river that dead fish were floating in the river. The officer noticed a waste water treatment work/plant and a mine nearby and that both released their waste into the same section of the river. The officer took SAMPLE A of the river water from a point before the waste is released into the water and SAMPLE B from a point after the waste is released into the river. The water samples were analysed in a laboratory. The table shows the results of the analysis.

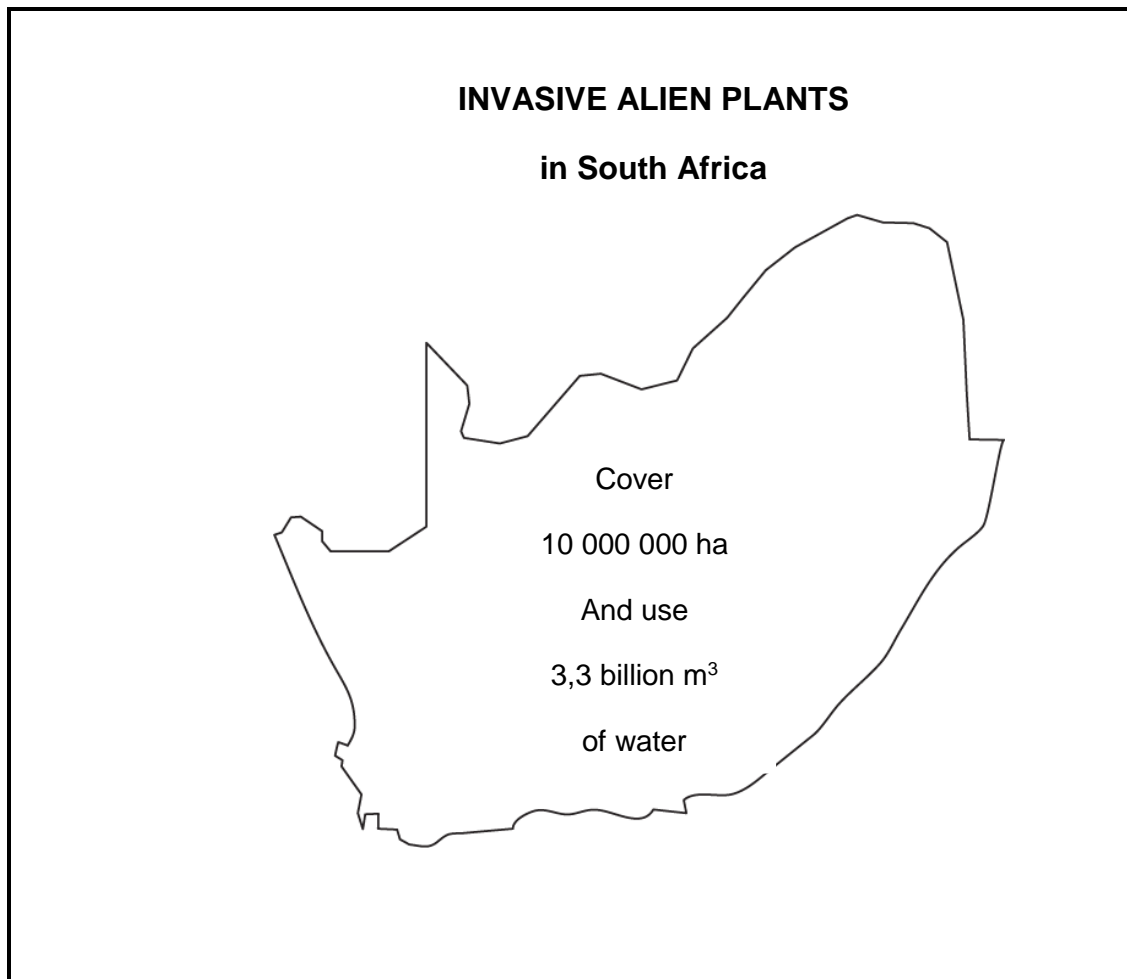
TABLE: RESULTS OF ANALYSIS OF WATER

Substances/factors found in samples	SAMPLE A (Taken before waste was released into river)	SAMPLE B (Taken after waste was released into river)
Faecal coliforms (count/100ml)	500	130 000
Nitrate (mg/l)	1,6	5,2
Phosphate (mg/l)	0,1	0,9
Sodium (mg/l)	25	175
Chlorides (mg/l)	15	180
pH	6,7	3,5

- 3.3.1 Which THREE of the substances are most likely from the waste water treatment works? (3)
- 3.3.2 Comparing the levels of faecal coliforms in sample **A** and sample **B**, how well do you think the waste water treatment works is functioning? Give a reason for your answer. (3)
- 3.3.3 Name TWO waterborne diseases that are spread by untreated waste water. (2)
- 3.3.4 Is the water in sample **B** more acidic, or more alkaline than the water in sample **A**? (1)
- 3.3.5 Explain what is meant by *acid mine drainage*. (2)
- 3.3.6 Give TWO possible causes for the fish deaths in the river based on the data in the table. (2)

(13)

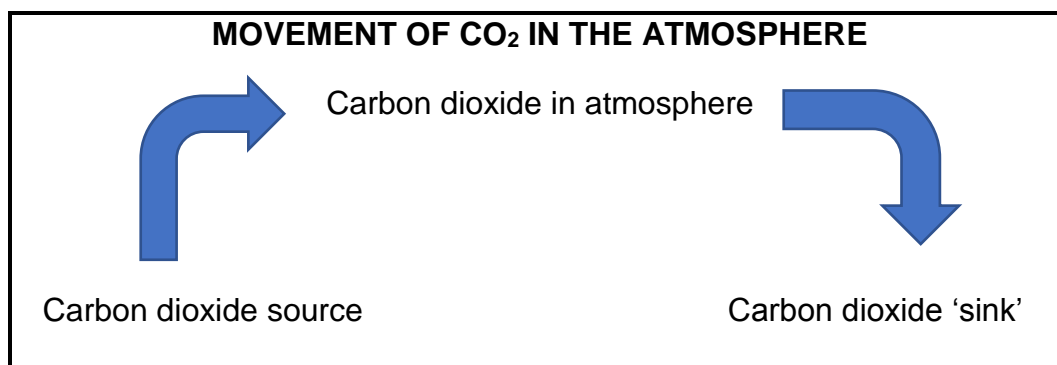
- 3.4 Study the diagram below about invasive alien plants in South Africa. It is estimated that they cover 10 million hectares (ha) in South Africa. Every year they use approximately 3,3 billion cubic meters (m^3) of water more than the amount used by indigenous plants.



[Source <http://www.capenature.co.za/conserving-water-factories-western-cape/>]

- 3.4.1 Differentiate between *alien plants* and *indigenous plants*. (2)
- 3.4.2 Describe the impact on water quality and water availability if alien plants cover such a large area of South Africa as shown in the diagram above. (5)
- 3.4.3 Differentiate between *biological*, *chemical* and *mechanical control* of invasive alien plants. (6)
- (13)**

- 3.5 The diagram below shows the movement of carbon dioxide into and out of the atmosphere.



- 3.5.1 Name a life process that:

- (a) Takes in carbon dioxide (1)
- (b) Releases carbon dioxide (1)

- 3.5.2 (a) What effect do increased levels of carbon dioxide in the atmosphere have on the temperature of the atmosphere? (1)

- (b) Name the effect mentioned in QUESTION 3.5.2 (a). (1)

- 3.5.2 (a) What is a *carbon sink*? (1)

- (b) Give an example of a *carbon sink*. (1)

- (c) What would happen to the levels of carbon dioxide in the atmosphere if *carbon sinks* were reduced? (1)

(7)

[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

Food security has a great impact on the wellness, development and progress of a country.

Explain what is meant by *food security*. Explain how poor farming practices pose a threat to food security in South Africa and how genetically modified food may help to address the problem of food shortage.

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

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

TOTAL SECTION C: 20
GRAND TOTAL: 150