



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2017**

**LIFE SCIENCES P2**

**MARKS: 150**

**TIME: 2½ hours**



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This question paper consists of 15 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 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 Alternation of generations is exhibited by ...

- A Bryophytes.
- B Pteridophytes.
- C Spermatophytes.
- D All plants

1.1.2 The event that leads from the haploid stage to the diploid stage in alternation of generations:

- A Germination
- B Fertilisation
- C Meiosis
- D Mitosis

1.1.3 In gymnosperms pollination is exclusively by ...

- A animals.
- B water.
- C wind.
- D insects.

1.1.4 *Dicrocoelium dendriticum* is a flatworm parasite of grazing vertebrates such as sheep and cattle.

Which combination in the table correctly shows the phyla to which the parasite and host species belong?

	<b><i>Dicrocoelium</i></b>	<b>Cattle/Sheep</b>
A	Annelida	Chordata
B	Platyhelminthes	Arthropoda
C	Annelida	Arthropoda
D	Platyhelminthes	Chordata

1.1.5 Which of the following can lead to habitat destruction?

- I. Mining
  - II. Poor agricultural practices
  - III. Reforestation
  - IV. Urbanisation
- A I, II and IV
  - B II, III and IV
  - C III
  - D I, II and III

1.1.6 Land plants are probably descendants of which of these groups?

- A Green algae
- B Red algae
- C Brown algae
- D Angiosperms

1.1.7 The part of the flower which becomes the fruit is the ...

- A petals.
- B ovary.
- C ovule.
- D anther.

1.1.8 Which of the following is NOT a threat to food security?

- A Climate change
- B Human exponential population growth
- C Birth control
- D Wastage

**QUESTION 1.1.9 IS BASED ON THE INFORMATION GIVEN BELOW:**

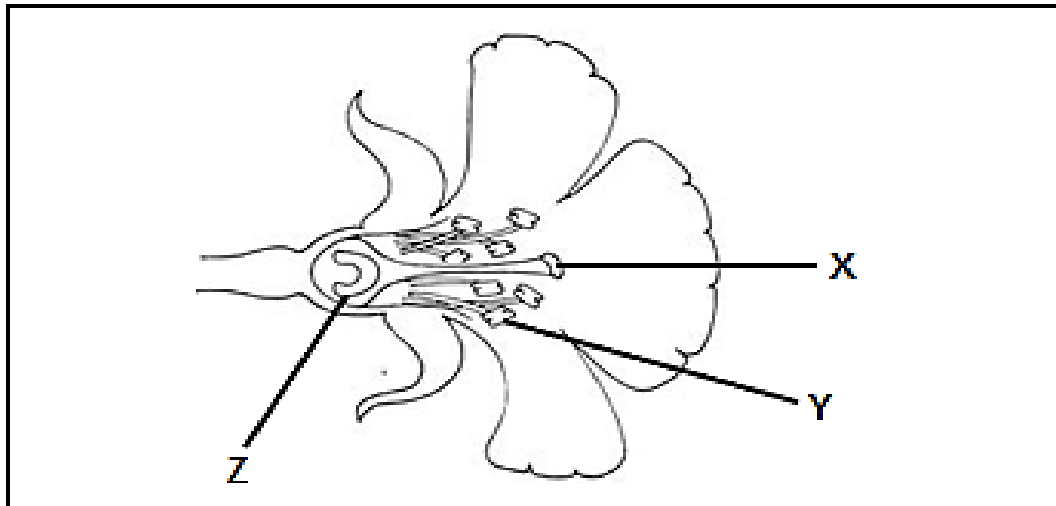
The virulence or ability of an infectious organism to cause disease is defined as the *case fatality risk* (CFR). CFR can be represented as the percentage of infections that result in death. The table below shows the number of people infected by the “bird flu” virus (H5N1) and the numbers of people who died from it over a five year period.

Year	2004	2005	2006	2007	2008
<b>Total infections of H5N1</b>	46	98	115	88	44
<b>Number dying from H1N5 infection</b>	32	43	79	59	33

1.9 In which year was H5N1 most virulent?

- A 2004
- B 2006
- C 2007
- D 2008

1.1.10 The diagram shows the structure of a flower.



Where does pollination and fertilisation takes place?

	Pollination	Fertilisation
1	X	Y
2	Y	X
3	X	Z
4	Z	Y

- A 1
- B 2
- C 3
- D 4

(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 (1.2.1–1.2.7) in the ANSWER BOOK.

- 1.2.1 The cutting down of trees and the removal of vegetation from a land
- 1.2.2 Reproduction which uses the non-reproductive parts of a plant to produce new plants
- 1.2.3 A measure of the total greenhouse gas emissions by an individual, company or a country per year
- 1.2.4 A cluster of sporangia found on the underside of fern leaflets
- 1.2.5 The increase in concentration of toxic chemicals from trophic level to trophic level
- 1.2.6 Plants without true roots, stems and leaves
- 1.2.7 The layer that shields the earth from the damaging effects of the sun

(7 x 1) (7)

- 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	Naked seeds	A B	Gymnosperms Angiosperms
1.3.2	Site constructed to dispose waste	A B	Reservoir Landfill
1.3.3	Gametophyte is dominant	A B	Ferns Mosses

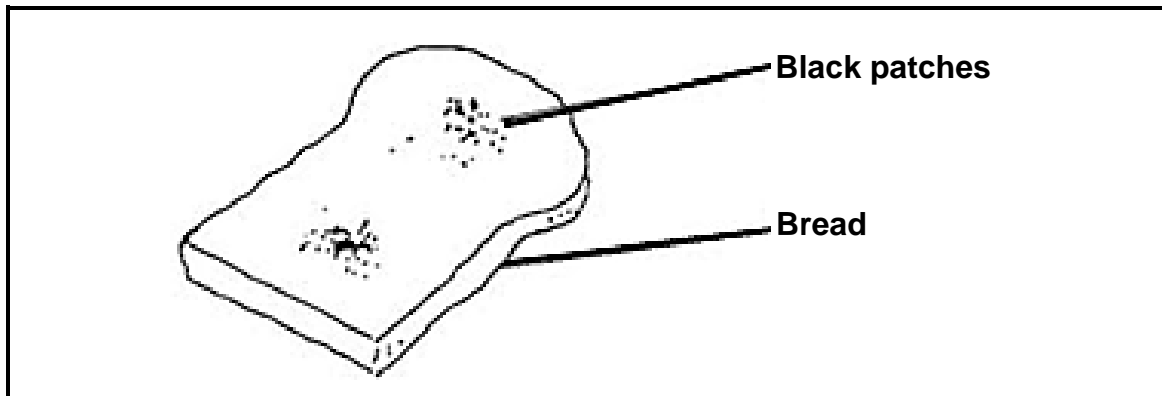
(3 x 2) (6)

- 1.4 Study the temperature chart below showing a patient suffering from a disease caused by a virus. Normal body temperature is about **37 °C**.

Day	Body temperature (°C)
0	37
2	37
4	37
6	40,5
8	39,5
10	38
12	39,5
14	38,8
16	37,5
18	37
20	37
22	37

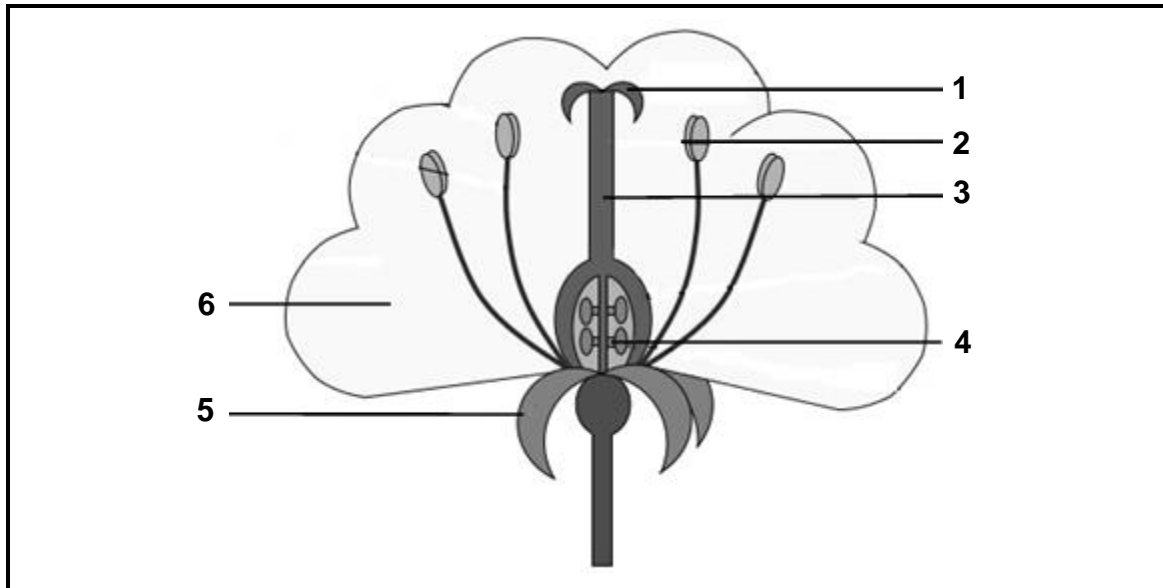
- 1.4.1 What was the maximum INCREASE in body temperature above normal? (2)
- 1.4.2 How long did the:
- (a) Incubation (time the virus took to multiply/increase) period last? (1)
- (b) Fever last? (1)

- 1.5 Tom left a piece of bread in a plastic bag in the kitchen before he went on tour for 2 weeks. When he reached home after 2 weeks, he found some black patches on the bread.



- 1.5.1 Tom's mother told him that the black patches are a type of micro-organisms.  
What type of micro-organisms are the black patches on the bread? (1)
- 1.5.2 List THREE conditions needed for the micro-organisms to grow on the bread. (3)
- 1.5.3 What could Tom do to the piece of bread to prevent micro-organisms from growing on the bread? (1)
- 1.5.4 Why does the method mentioned in QUESTION 1.5.3 work? (2)

1.6 Study the diagram below showing the structure of a flower.



- 1.6.1 What type of pollination can be linked to this flower? (1)
- 1.6.2 Identify the parts labelled **1** and **2**. (2)
- 1.6.3 What do we call **5** and **6** together? (1)
- 1.6.4 Using the NUMBER only, identify the following:
- (a) Part which receives pollen (1)
- (b) Structure where a seed can form (1)

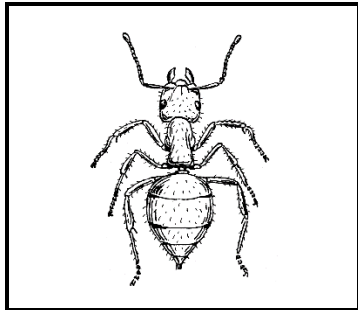
**TOTAL SECTION A: 50**



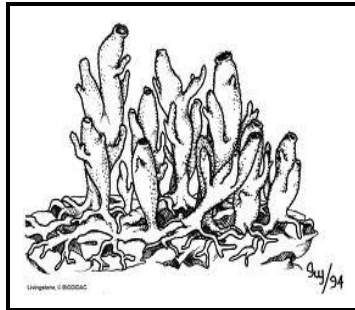
**SECTION B**

**QUESTION 2**

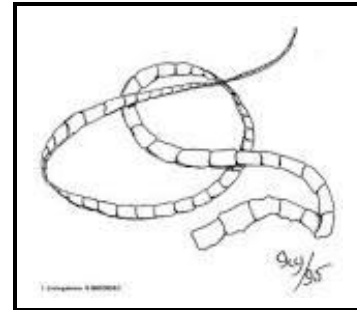
2.1 Figures **A**, **B** and **C** below represent different phyla of animals.



**A**



**B**



**C**

- 2.1.1 Identify the phylum represented in figures **A**, **B** and **C**. Write the letter with the correct phylum. (3)
- 2.1.2 What type of symmetry does figure **A** have? (1)
- 2.1.3 Give ONE benefit of the type of symmetry mentioned in QUESTION 2.1.2. (1)
- 2.1.4 Which figure(s) has/have the following characteristics?  
Write only the letters **A**, **B** or **C** for example 2.1.4(e) **D**
  - (a) Triploblastic
  - (b) Dorso-ventrally flattened
  - (c) Cephalisation
  - (d) Coelomate (6)
- 2.1.5 Give ONE advantage of having a high surface area to volume ratio for animals. (1)
- 2.1.6 Draw a diagram of a cross section of a triploblastic body plan labelling each tissue layer, then indicate what each tissue layer gives rise to. (6)

- 2.2 Garlic is known to have the ability to fight bacteria and viruses. It is known to be effective against a wide range of bacteria and has the ability to combat the common cold. The antimicrobial substance in garlic is called *allicin*. To maintain the antibacterial properties of garlic, it must be consumed or applied as raw garlic because cooking will destroy the *allicin*.

Scientists wanted to investigate the effectiveness of garlic in killing bacteria.

They conducted the experiment as follows:

- They used three petri dishes prepared with blood agar and stored these in a refrigerator.
- Before the start of the experiment, they removed the petri dishes from the refrigerator to allow them to reach room temperature.
- They prepared three test specimens and labelled them as described below:
  - The three test tubes were labelled **A**, **B** and **C**.
  - The contents of the test tubes were measured and mixed as shown in the table below:

Test tube	Contents of the test tubes		
	100 ml milk	5 ml <i>E.coli</i> bacterium	Garlic extract
<b>A</b>	✓	x	x
<b>B</b>	✓	✓	x
<b>C</b>	✓	✓	✓

- The petri dishes were labelled **A**, **B** and **C**.
- They removed the lid in petri dish **A** and used the syringe to extract 10 ml of the sample from test tube **A** and placed it in the centre of petri dish **A**.
- In the same way, using a new syringe a 10 ml sample was extracted from test tube **B** and placed in petri dish **B** and the procedure was repeated for petri dish **C**.
- The petri dish lids were replaced and the petri dishes were stored in a cool and shaded place.
  - The diameter of the *E.coli* colony was measured every day for 5 days and recorded in the table below:

Petri dish	Diameter of bacteria colony (mm)				
	Day 1	Day 2	Day 3	Day 4	Day 5
<b>A</b>	0	1,7	3,0	4,6	7,1
<b>B</b>	0	4,2	8,4	15,1	36,5
<b>C</b>	0	0	0	0	0

2.2.1 State:

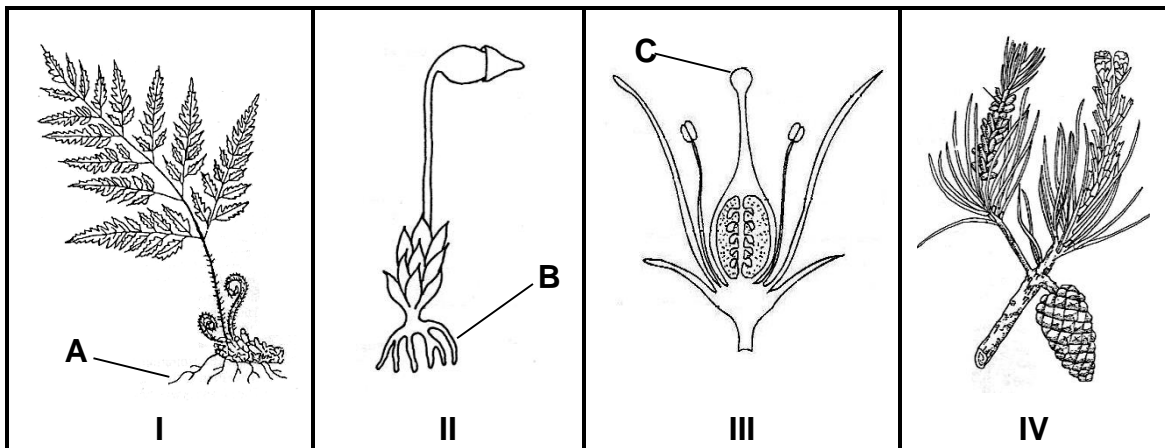
- (a) The independent variable (1)
- (b) The dependent variable (1)
- (c) Two fixed variables (2)

2.2.2 Use the information from the table to draw THREE line graphs showing results of petri dish **A**, **B** and **C**. (6)

2.2.3 Explain why the petri dishes were kept in the fridge before the start of the experiment. (2)

2.2.4 Describe and explain the results obtained in Petri dish **C**. (3)

2.3 The diagrams below show plants from different divisions of the plant kingdom.



2.3.1 Identify plant division **I** and **II** respectively. (2)

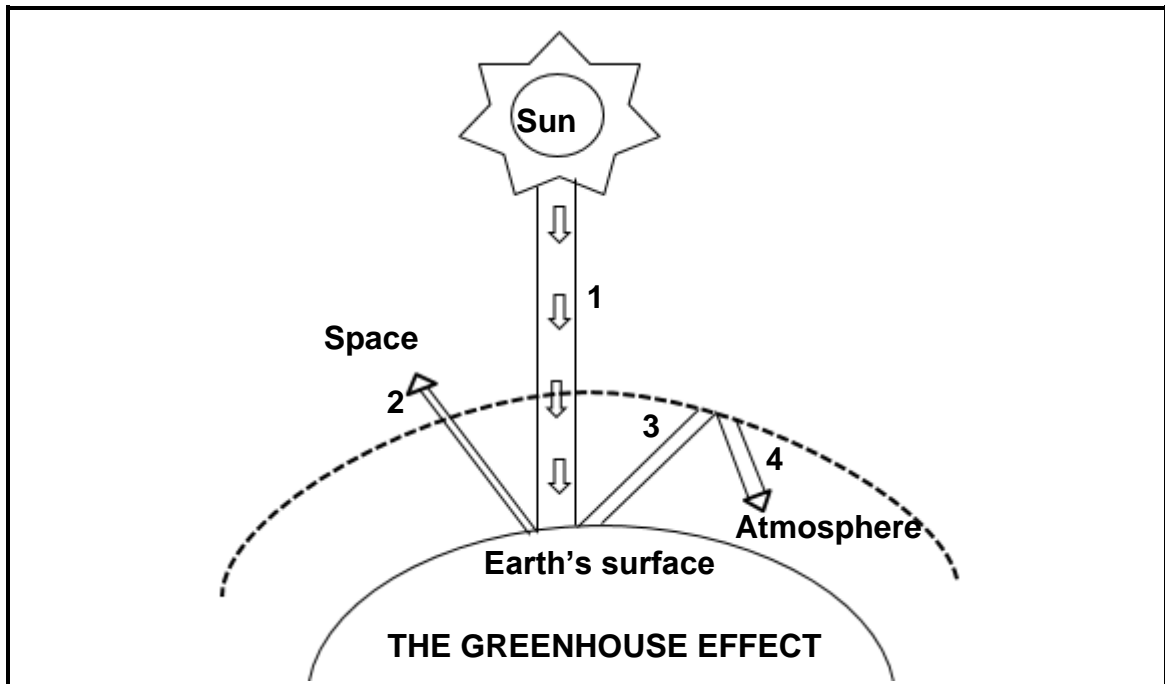
2.3.2 State TWO differences between plants **I** and **IV** with reference to reproduction. (4)

2.3.3 State only the NUMBER of the plant group which has no vascular tissue. (1)

[40]

**QUESTION 3**

3.1 The diagram given below illustrates the Greenhouse effect.



- 3.1.1 Explain how the Greenhouse Effect occurs by using numbers 1–4 on the diagram. (4)
- 3.1.2 What is the advantage of the natural greenhouse effect for life on earth? (1)
- 3.1.3 Which human activity makes the greatest contribution to carbon dioxide emissions? (1)
- 3.1.4 A big increase in the greenhouse effect can lead to the enhanced greenhouse effect which causes global warming. (4)
- Explain how global warming leads to desertification. (4)

3.2 A scientist carried out an investigation to show how the amount of organic matter present in water affects the amount of oxygen in the water. The scientist collected water from 6 different sites along the course of a river. The table below shows the results he obtained:

Distance from source	Organic content (arbitrary units)	Oxygen concentration (arbitrary units)
Site A – source	10	300
Site B – 1 km	80	80
Site C – 2 km	300	50
Site D – 3 km	150	80
Site E – 4 km	50	100
Site F – 5 km	30	200

3.2.1 There is a commercial farmland along the course of this river.

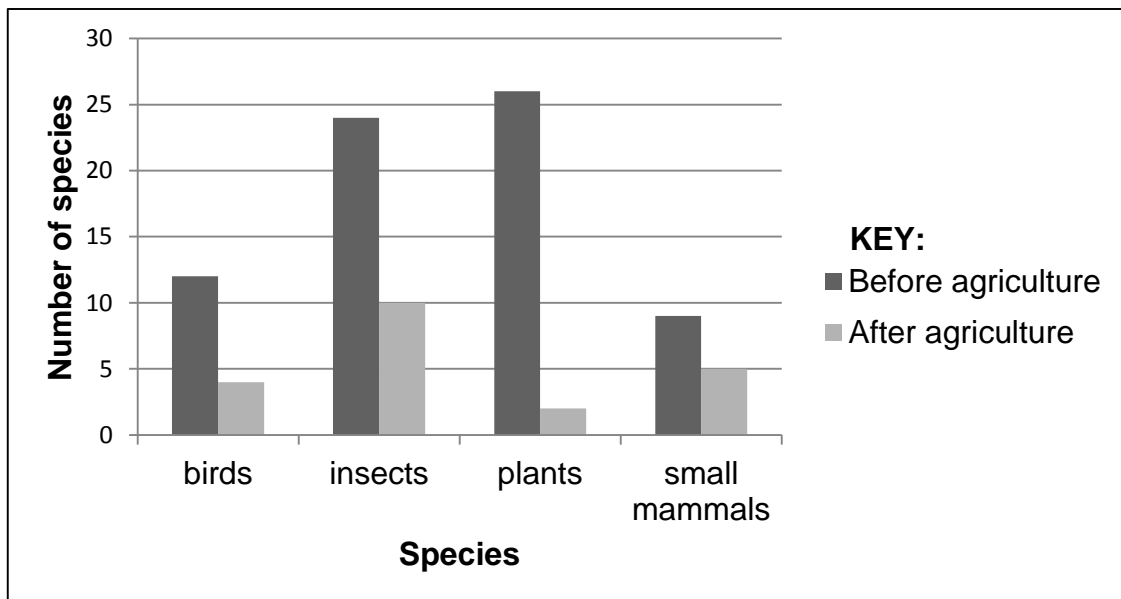
Suggest where this farmland would be located and briefly explain your answer.

(5)

3.2.2 Explain the relationship between the organic content of the water and the oxygen concentration of the water.

(4)

3.3 The graph below shows species diversity in the Northern Cape. An environmental impact study was done before and after the land was used for agriculture.



3.3.1 Describe the difference in the number of species before and after agriculture.

(2)

3.3.2 Explain why the number of species decreases in areas of agriculture.

(4)

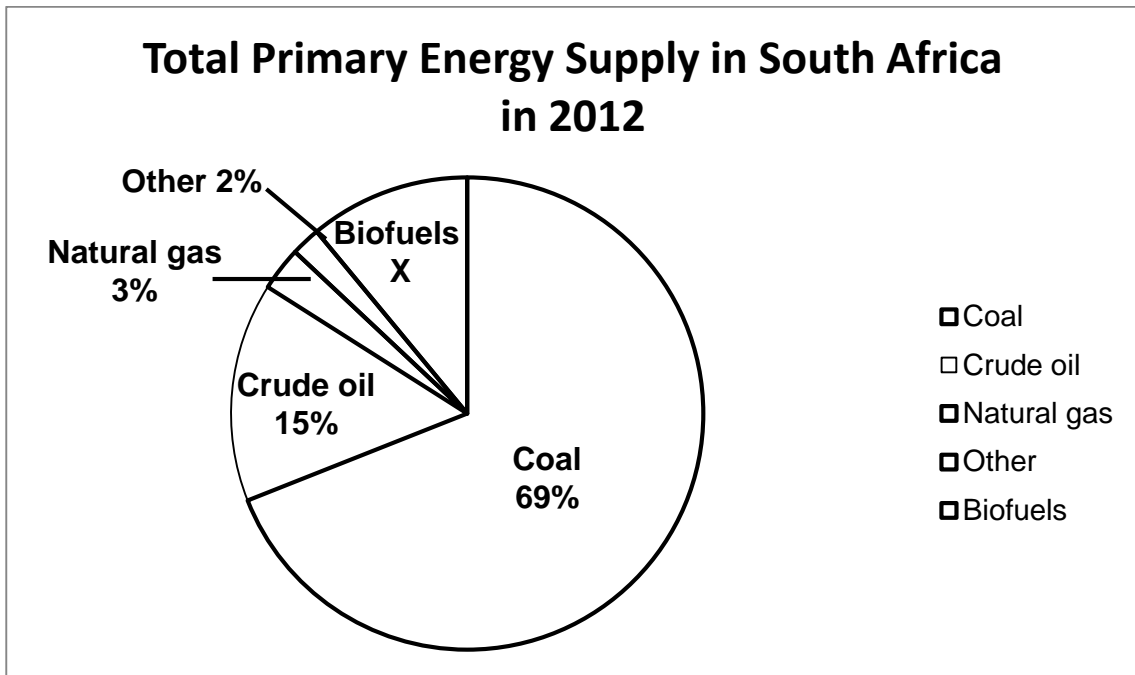
3.3.3 Which group of organisms was affected most by the change?

(1)

3.3.4 What is an environmental impact study and why is it necessary that environmental impact studies are done?

(3)

- 3.4 The pie chart below represents the various sources of energy in South Africa and their contribution in the total primary energy supply.



[Adapted from: [https://en.m.wikipedia.org/wiki/Energy\\_in\\_South\\_Africa](https://en.m.wikipedia.org/wiki/Energy_in_South_Africa)]

- 3.4.1 Determine the value of X. Show ALL calculations. (3)
- 3.4.2 Name the flammable natural gas that is produced in landfill sites. (1)
- 3.4.3 Give TWO ways in which the gas mentioned in QUESTION 3.4.2 is useful to humans. (2)
- 3.4.4 Name TWO alternative energy sources that make up the 2% of 'other' sources. (2)
- 3.4.5 Describe how the mining of coal impacts on biodiversity in South Africa. (3)
- [40]**

**TOTAL SECTION B: 80**

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

Write an essay in which you describe how invasive alien plants affect the quality of water and discuss various ways of controlling invasive alien plants including their advantages and/or disadvantages.

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**