



# education

Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**LIFE SCIENCES P2**

**NOVEMBER 2006**

**MARKS: 150**

**TIME: 2 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 answer 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. Write neatly and legibly.
6. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
7. ALL drawings should be done in pencil and labelled in blue or black ink.
8. Only draw diagrams or flow charts when requested to do so.
9. The diagrams in this question paper are NOT necessarily drawn to scale.
10. The use of graph paper is NOT permitted.
11. Non-programmable calculators, protractors/compasses may be used.



**SECTION A****QUESTION 1**

- 1.1 Various possible options are provided as answers for 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) in the answer book, for example 1.1.7 D.

1.1.1 Which of the following is the correct sequence of a food chain?

- A Green plant → locust → frog
- B Frog → locust → green plant
- C Locust → frog → green plant
- D Green plant → frog → locust

1.1.2 Which classification system did Carl Linnaeus introduce?

- A 3 kingdom
- B 5 kingdom
- C 7 kingdom
- D 9 kingdom

1.1.3 An animal that captures and kills other animals for food is a ...

- A prey.
- B predator.
- C primary consumer.
- D decomposer.

1.1.4 What is the CORRECT order for classifying an organism?

- A Kingdom, phylum, class, order, family, genus, species
- B Kingdom, phylum, genus, class, order, family, species
- C Kingdom, order, family, phylum, class, genus, species
- D Phylum, kingdom, class, order, family, genus, species

1.1.5 A region with a distinct climate and set of organisms is referred to as a/an ...

- A ecosystem.
- B energy chain.
- C food chain.
- D biome.



- 1.1.6 The animals at the end of a food chain are generally fewer in number because...
- A they have long gestation periods and few offspring.
  - B predators have high levels of intra-specific competition and infant mortality is high.
  - C there is insufficient energy to support large numbers of tertiary consumers as a result of energy losses in the food chain.
  - D they are always the largest organisms in the food chain.
- (6 x 2) (12)**

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 - 1.2.8).

- 1.2.1 Organisms that are able to manufacture their own food
- 1.2.2 The loss of water in vapour form from the leaves of plants
- 1.2.3 Fuels such as coal and oil that have taken millions of years to form from ancient living things
- 1.2.4 Organisms that recycle nitrogen back into the air
- 1.2.5 All the living factors within an environment
- 1.2.6 A relationship between two organisms in which both benefit
- 1.2.7 Species that no longer exist
- 1.2.8 The movement of water from the atmosphere to the earth **(8)**



- 1.3 Match the descriptions in COLUMN A with the items in COLUMN B. Write only the letter (A - L) next to the question number (1.3.1 - 1.3.7), for example 1.3.8 M.

COLUMN A		COLUMN B	
1.3.1	Organisms having cells that contain a nucleus	A	herbivores
1.3.2	An organism that feeds on dead and decaying matter	B	prokaryotes
1.3.3	The air surrounding the earth's surface	C	exploitation
1.3.4	Organisms that eat both plant and animal material	D	lithosphere
1.3.5	Using natural resources to meet human needs with no consideration about their future availability	E	parasitism
1.3.6	Balance of the rate we use resources against their rate of formation	F	fungi
1.3.7	Competition between related species that have the same ecological requirements	G	omnivores
		H	atmosphere
		I	inter-specific
		J	eukaryotes
		K	sustainability
		L	intra-specific

(7)



- 1.4 Read the following passage and answer the questions that follow:

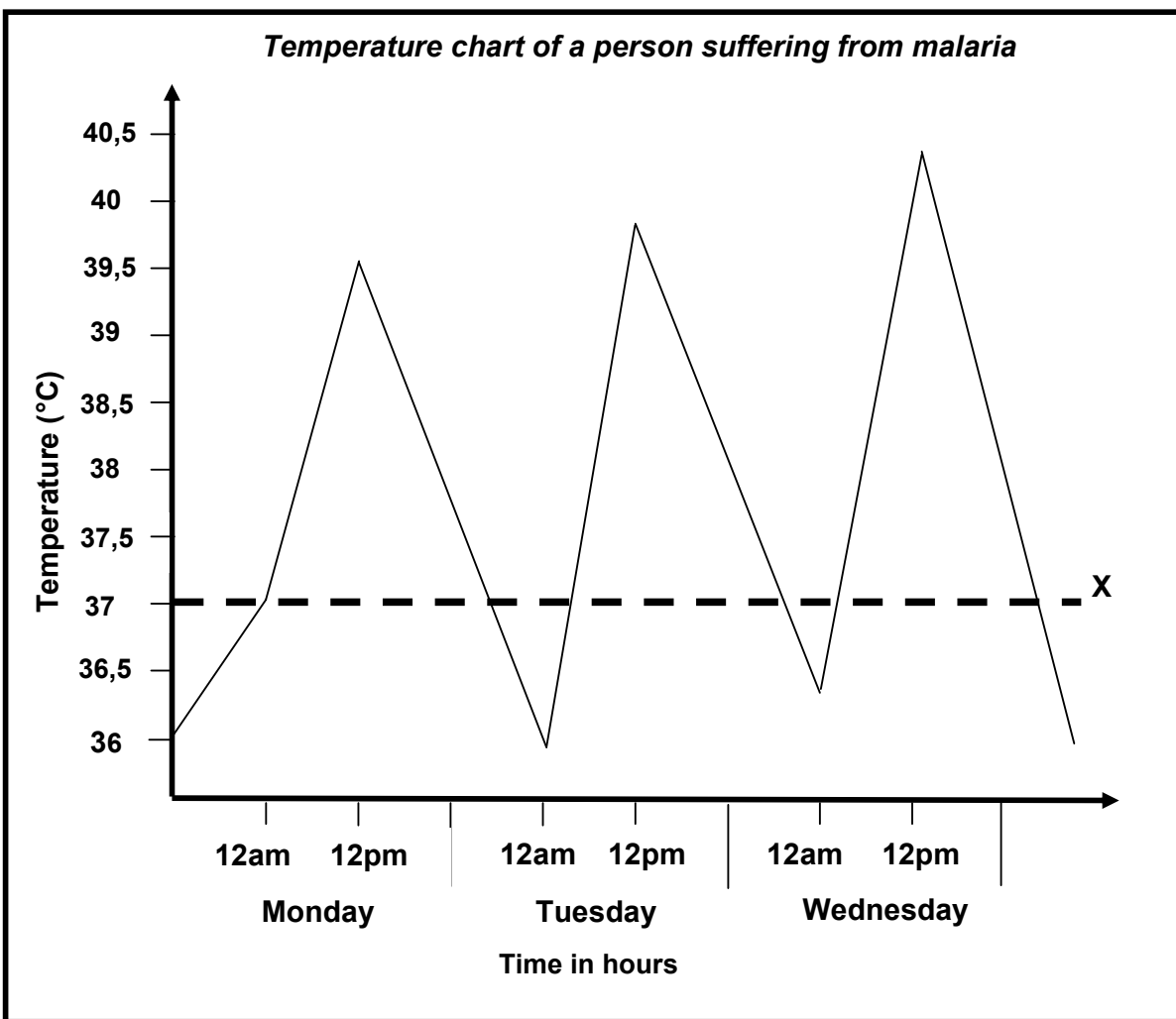
*Although parasites usually have plenty of food, their lives are not usually easy. The tapeworm, for example, has to grip tightly to the wall of its host's alimentary canal, so that is not swept away by peristalsis. To do this, it has hooks and suckers on its head. It also protects itself from being digested by its host's enzymes. An enzyme-resistant covering performs this function. They also produce a high number of eggs, to increase the chances of finding its way into a new host.*

- 1.4.1 What is a *parasite*? (1)
- 1.4.2 From the passage, name THREE adaptations of the tapeworm to parasitic life. (3)
- 1.4.3 List TWO more adaptations of any parasite not mentioned above. (2)
- (6)**



- 1.5 Malaria is a disease that is caused by a parasite. When a human is infected with malaria, it causes fever attacks. Such an attack can be identified by three phases, namely a cold, a hot and a sweating phase. The following graph represents the temperature chart of a person suffering from malaria.

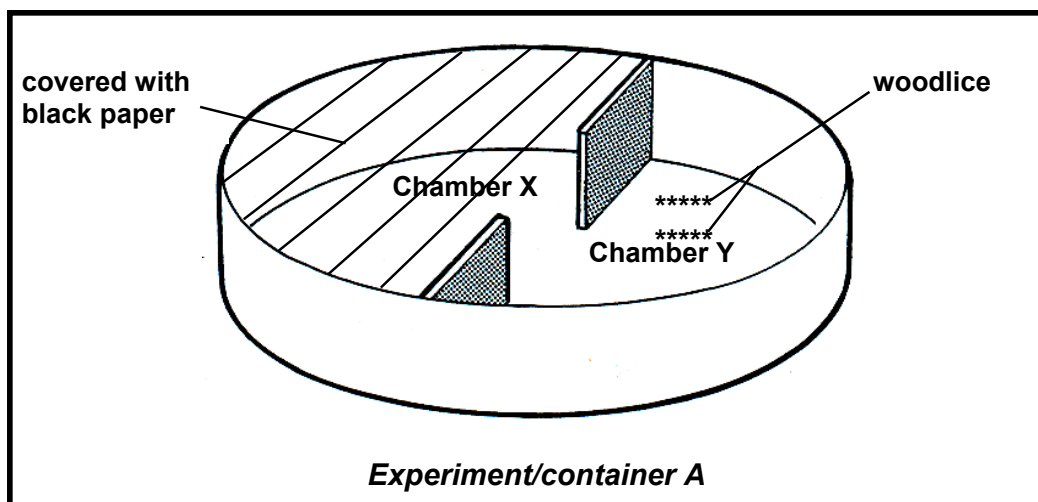
The normal body temperature of a person is represented by line X.



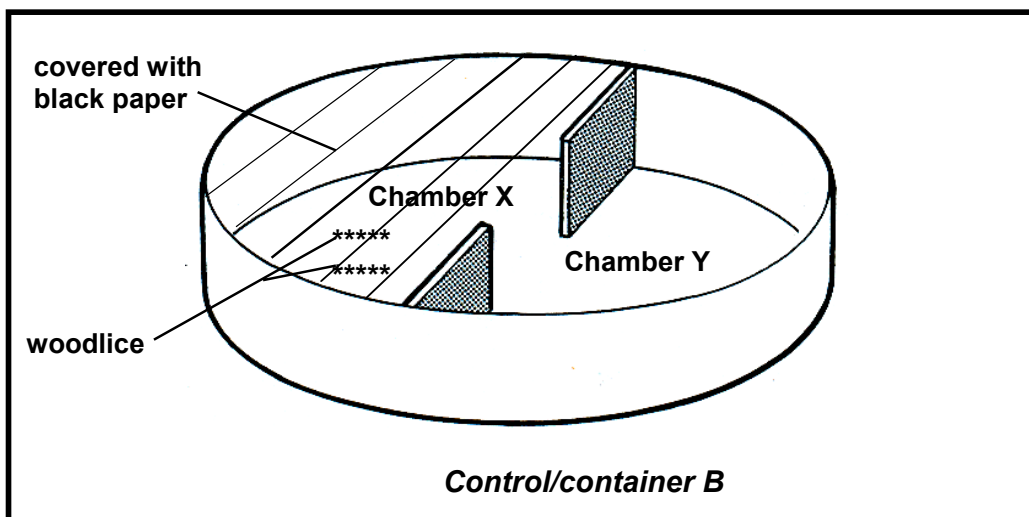
- 1.5.1 Use the information in the graph to write down:
- (a) The normal temperature of a healthy person (2)
  - (b) The number of fever attacks recorded (1)
  - (c) The lowest temperature in °C on Tuesday (1)
- 1.5.2 On which day and at what time would you expect the next fever attack to start? (3)
- 1.5.3 Explain why there is a sweating phase. (2)
- (9)**



- 1.6 A student did an investigation on woodlice. She used two containers A and B, which, except for the top, do not allow light to pass through. The containers consisted of two chambers, X and Y, as shown in the diagrams below. She set up the experiment by placing ten woodlice inside chamber Y of container A, and covered chamber X with black paper. After 10 minutes she removed the paper and recorded the position of the woodlice.



She set up a control by putting ten woodlice in chamber X of container B and covered it with black paper. After 10 minutes she removed the paper and recorded the position of the woodlice. The results are shown in the table.





	Number of woodlice after 10 minutes	
	Chamber X	Chamber Y
<b>Experiment</b>	9	1
<b>Control</b>	10	0

- 1.6.1 State the hypothesis used for this investigation. (2)
- 1.6.2 Explain why container B is the control. (2)
- 1.6.3 What can you conclude about the hypothesis from the results obtained? (2)
- 1.6.4 State ONE way in which the reliability of this investigation could be improved. (2)
- (8)**

**TOTAL QUESTION 1: 50**

**TOTAL SECTION A: 50**



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

- 2.1 The abundance of a particular type of organism in a river can indicate the water quality of the river.

The table below indicates the type of water quality indicated by the presence of the organisms listed.

Organism	Water quality
Mayfly nymph	Clean
Flatworm	Slightly polluted
Dragonfly	Slightly polluted
Water snail	Moderately polluted
Sludge worm	Badly polluted

The following results were obtained when doing a water investigation to look at the numbers of each organism living in the river.

The results are indicated in the table below:

Organisms	Number present in sample
Mayfly nymph	0
Flatworm	4
Dragon Fly	5
Water snail	1
Sludge worm	0

- 2.1.1 How would you describe the water quality of the river? (1)
- 2.1.2 Explain your answer in QUESTION 2.1.1. (2)
- 2.1.3 If there are a large number of sludge worms present in the water sample, what will the water quality be? (1)
- 2.1.4 List the steps that would be followed when conducting the above investigation. (4)
- 2.1.5 List TWO ways in which you can prevent water pollution. (2)
- (10)**



2.2 Answer the following questions on the South African Red Data Book:

- 2.2.1 What information will you find in the South African Red Data Book? (2)
- 2.2.2 Name ONE species listed in the Red Data Book. (1)
- 2.2.3 What is meant by *indigenous species*? (1)
- 2.2.4 State ONE way in which conservation is achieved in South Africa. (1)  
**(5)**

2.3 Answer the following questions related to resource limitations:

- 2.3.1 Name a nutritional disorder, which you have studied, that arises from resource limitations. (1)
- 2.3.2 What is the cause of the disorder mentioned in QUESTION 2.3.1? (2)
- 2.3.3 List TWO possible ways in which nutritional disorders in poor communities can be prevented. (2)  
**(5)**

2.4 Plants and animals have various adaptations to survive in their environments.

- 2.4.1 List THREE adaptations of animals that live in an aquatic environment. (3)
- 2.4.2 List THREE adaptations of plants that live in an aquatic environment. (3)  
**(6)**

2.5 According to John Ledger of the Endangered Wildlife Trust, human activities are placing too many demands on the earth's biological resources, causing a loss in biodiversity.

- 2.5.1 Explain any ONE human activity that could lead to a loss in biodiversity. (2)
- 2.5.2 What legislation is in place or could be in place to prevent this loss in biodiversity? (2)  
**(4)**

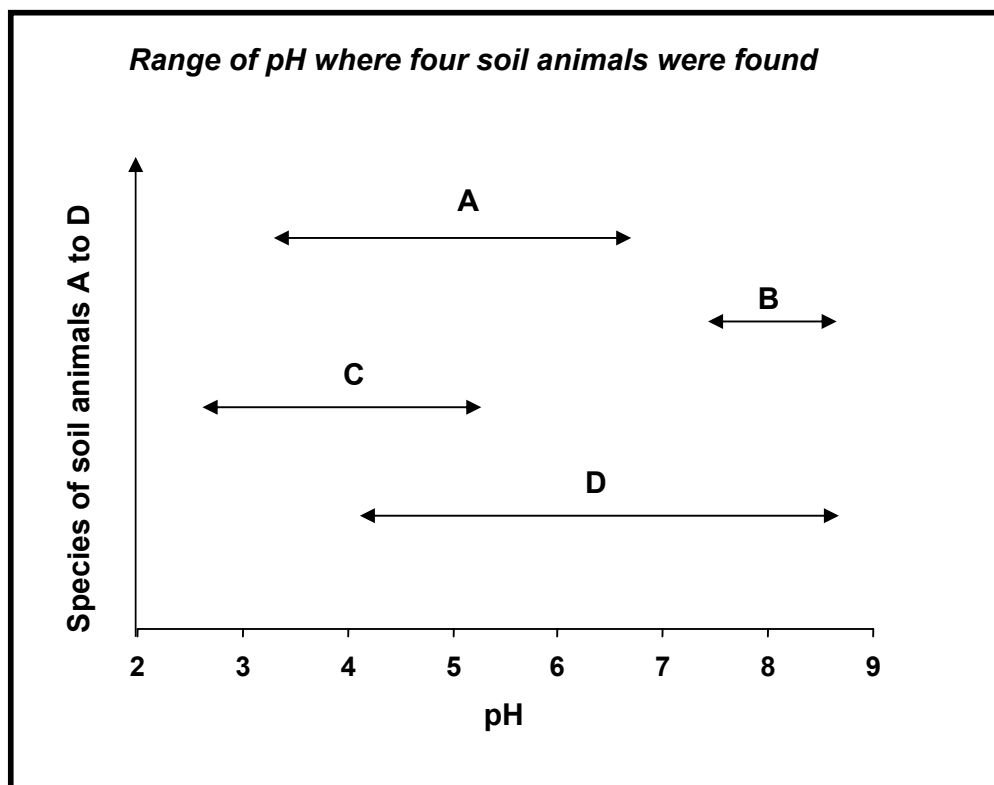
**TOTAL QUESTION 2: 30**



**QUESTION 3**

- 3.1 In an investigation soil samples with different pH values were taken to determine in which pH range different soil animals prefer to live.

Study the following graph, which shows the range of pH within which each of four soil animals (A to D) is found.



- 3.1.1 Which species (A to D):

- (a) Occurs over the widest range of pH conditions? Explain your answer (3)
- (b) Can survive in pH conditions below 4 (2)
- (c) Appears to be least tolerant of acidic conditions (1)

- 3.1.2 Except for pH, name ONE other soil factor that might influence where soil animals would prefer to live. (1)  
(7)



## 3.2 Read the following passage and answer the questions that follow:

*Maize is a food crop eaten by most South Africans. It is planted in spring and early summer and harvested towards the end of summer. Maize is stored until it is needed.*

*Zulu people stored maize in a grain pit which was a hole of 1 to 2 metres deep dug in the ground. It was shaped like a beer-drinking pot and had a wide base and a narrow opening. Fire was made inside the pit which was covered so that smoke could come out very slowly. The fire killed the insects in the soil and baked the soil so it dried out. The inside walls of the pit were then covered with a mixture of cow dung and anthill soil. When the pit was ready, the cobs were put into the pits. After the cobs were covered with grass and the opening of the pit closed with a rock, cow dung was spread over the rock to seal it. Some maize on the sides of the pit fermented and produced carbon dioxide which acted as a natural pesticide because it killed pests such as weevils and rats.*

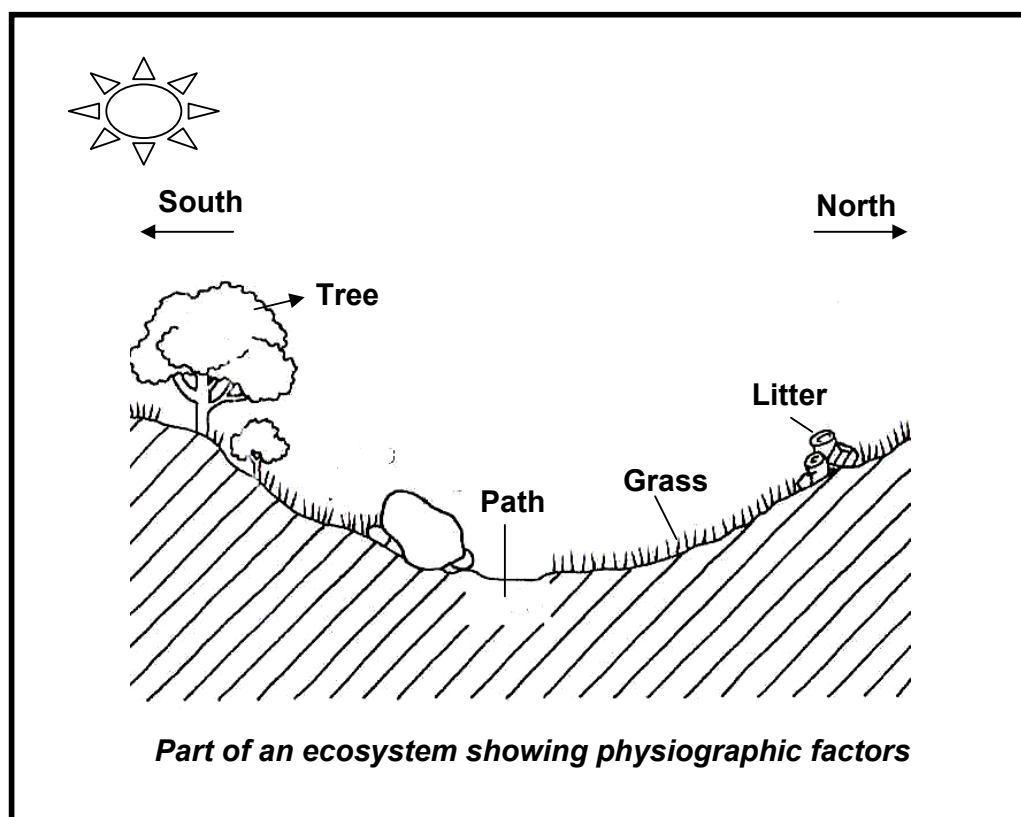
*Today maize is stored in concrete silos and the conditions inside them are similar to the conditions in the grain pit. Special chemicals called pesticides are used to kill pests in the silos. Pesticides are expensive and dangerous to use because they can harm people. Nowadays, carbon dioxide, which is much safer and cheaper than pesticides, is used in silos to kill pests.*

- 3.2.1 Explain why it is necessary to store maize and other food products. (2)
- 3.2.2 Why did they stop using pesticides to preserve the maize in the silos? (2)
- 3.2.3 Why did the Zulu people make fire inside the pits? (2)
- 3.2.4 State ONE difference between the grain pits used in the past and silos they use nowadays. (2)
- 3.2.5 State ONE similarity between grain pits and silos. (1)
- 3.2.6 List TWO ways in which other vegetables, for example peas can be stored nowadays. (2)

**(11)**



- 3.3 Study the diagram below which shows physiographic factors of part of an ecosystem and answer the questions that follow:



- 3.3.1 List TWO physiographic factors and briefly state what is meant by each. (4)
- 3.3.2 Which side of the ecosystem will be the coldest (north-facing or south-facing)? Give a reason for your answer. (3)
- 3.3.3 Draw a table to show ONE difference between the north and south side of the mountain with reference to: (1)
- |                   |             |
|-------------------|-------------|
| (a) Water content | (2)         |
| (b) Vegetation    | (2)         |
|                   | <b>(12)</b> |

**TOTAL QUESTION 3: 30**

**TOTAL SECTION B: 60**



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

- 4.1 An investigation was done to determine the effect of temperature on the growth of grapevines in South Africa. The table below shows the data on the mass of grapes produced by the vines at different temperatures.

Study the results in the table and then answer the questions that follow:

Temperature (°C)	Mass of grapes produced (kg)
10	0,5
15	1,0
20	1,5
25	2,5
30	2,0

- 4.1.1 What is the optimum (best) temperature for growing vines in South Africa? (2)
- 4.1.2 List TWO reasons why you think it is economically important to grow vines in South Africa. (4)
- 4.1.3 With reference to the data, name the following:
- (a) Dependent variable (1)
- (b) Independent variable (1)
- 4.1.4 Express the mass of grapes per vine grown at 20 °C in grams. Show ALL workings. (3)
- 4.1.5 Use the data given to explain the relationship between temperature and the mass of grapes produced. (3)
- 4.1.6 Draw a bar graph of the results shown in the table. (11)
- (25)**



- 4.2 Read the following statements about the knowledge of indigenous communities on traditional medicine:

**Statement 1**

*With about 24 500 plant species, it is feared that South Africa might become a prime target for unscrupulous pharmaceutical researchers.*

**Statement 2**

*About 80% of the world's population depends on traditional medicines made from wild plants and animals. This pushes many medicinal plant and animal species towards extinction.*

With the above-mentioned information in mind, write an essay to express your view on this issue. Explain examples of ways in which pharmaceutical companies have a negative impact on the environment and indigenous communities, as well as ways in which they can reduce this negative impact on the environment and indigenous communities.

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

**(15)**

The following rubric will be used to assess your essay:

Criteria	Marks			
	0	1	2	3
Viewpoint on negative impact	Views not stated	One view stated	Two views stated	Three views stated
Explanation on negative impact	No explanation given	One explanation given	Two explanations given	Three explanations given
Ways to reduce impact	None mentioned	One view stated	Two views stated	Three views stated
Explanation on ways to reduce impact	No explanation given	One explanation given	Two explanations given	Three explanations given
Synthesis	Not attempted/ nothing written other than question number	Attempted but with significant gaps in the logic and flow of the answer	Minor gaps in the logic and flow of the answer	Well structured, demonstrates insight and understanding of question

**TOTAL QUESTION 4: 40**

**TOTAL SECTION C: 40**

**GRAND TOTAL: 150**