



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2012**

**LIFE SCIENCES P1**

**MARKS: 150**

**TIME: 2½ hours**



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This paper consists of 16 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 your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Present your answers according to the instructions of each question.
5. Do ALL drawings in pencil and label them in blue or black ink.
6. Draw diagrams or flow charts only when asked to do so.
7. The diagrams in this question paper are NOT necessarily drawn to scale.
8. Do NOT use graph paper.
9. You may use a non-programmable calculator, protractor and compass.
10. 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 numbers (1.1.1 – 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which of the following is a function of the human skeleton?

- A Producing hormones.
- B Bringing gases into the body.
- C Removing waste from the body.
- D Providing a site for blood cell formation.

1.1.2 The growth of ecotourism and sustainable use of our fragile environment must be guided by a set of principles. Which ONE of the following is not a guiding principle for tour operators, managers and tourists?

- A Minimise impact on the environment.
- B Develop environmental and cultural awareness and respect for the local people.
- C Provide maximum financial benefits for tour operators and encourage the local people to be volunteers at various ecologically sensitive sites.
- D Provide positive experiences for both visitors and hosts.

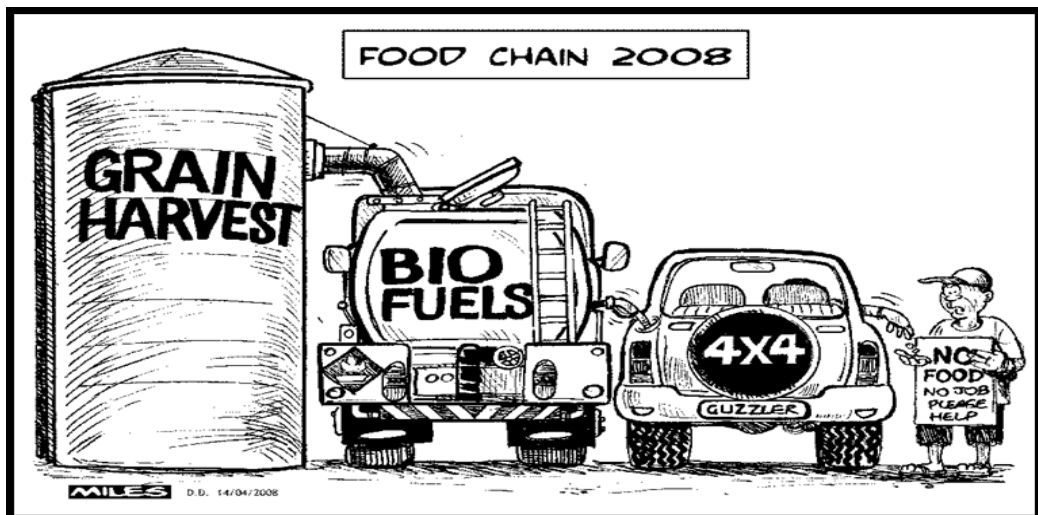
1.1.3 For every kilometre a car travels, an average of 3 litres of oxides of nitrogen and 20 litres of carbon monoxide and lead is produced. There is an annual increase in the number of cars on our roads and a subsequent increase in the emission of poisonous gases. The emission levels can be reduced by ...

- A using public transport.
- B declaring a car as a luxury item and impose heavier taxes on its sale.
- C doubling the tax on petrol and diesel.
- D distributing free gas masks to pedestrians.

1.1.4 Waste production can be reduced by ...

- A buying over-packaged products.
- B buying disposable plates, cups and cutlery on a daily basis.
- C taking your own basket or re-usable plastic bags to a shopping complex.
- D using only one side of the paper for printing, in the office and at school.

- 1.1.5 Increasing population growth accompanied by urbanisation and industrialisation has resulted in dramatic increase in the volume of waste generated in our cities. Recently, many municipalities have been accused of poor waste management due to ...
- A drought and shortage of water to clean cities.
  - B shortage of labour.
  - C inefficient collection methods due to lack of funds to provide the necessary machinery and vehicles.
  - D a new initiative to transfer and share key responsibilities with the public at large.
- 1.1.6 Which ONE of the following statements is wrong with regard to conservation?
- A Protecting only the desirable and useful organisms and eliminating the rest of the organisms in an ecosystem.
  - B Managing human activities in order to maximise the benefits to humans of the surrounding ecosystems.
  - C Minimise damage to ecosystems and rehabilitate ecosystems which have been damaged.
  - D Responsible for the development and implementation of strategies to increase biodiversity.
- 1.1.7 The following cartoon highlights an ethical dilemma regarding the production of bio-fuel as an environmentally friendly alternative energy source.



[Printed with permission from Mr Cuan Miles, *Daily Dispatch*]

The production of bio-fuel from staple food sources ...

- A destroys the agricultural industry and makes the farmers very poor.
- B will encourage the petroleum producing countries to increase their output and drop the fuel price.
- C will increase the demand for bio-fuel and would increase the demand for grains and therefore food will become very expensive or it will lead to acute shortage of staple foods for ordinary citizens.
- D will cause an increase in carbon emissions.

1.1.8 In some people, their bodies produce too much uric acid. The uric acid accumulates in the form of crystals in the joints, causing pain. This condition is known as ...

- A rickets.
- B arthritis.
- C gout.
- D osteoporosis.

1.1.9 The presence of ONE of the following carbohydrates is responsible for the thickened wall of xylem vessels.

- A Chitin
- B Cellulose
- C Starch
- D Lignin

1.1.10 Varicose veins are formed in some people due to ...

- A defective blood capillaries.
- B weak semi-lunar valves in their veins.
- C weak semi-lunar valves in their arteries.
- D defective bicuspid valves in the heart.

(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 numbers (1.2.1 – 1.2.9) in the ANSWER BOOK.

1.2.1 Cells that make bone tissue

1.2.2 Fluid that lubricates joints

1.2.3 The protein that forms part of the matrix of a cartilage

1.2.4 The valve that occurs between the right atrium and right ventricle

1.2.5 The blood vessel that transports absorbed nutrients from the small intestine to the liver

1.2.6 A condition resulting from the sudden shortage of oxygen in the brain

1.2.7 Cancer of the white blood cells or leucocytes

1.2.8 The pressure in the blood vessels when the heart contracts

1.2.9 Release of drops of water from tiny pores (hydathodes) on the leaf margin

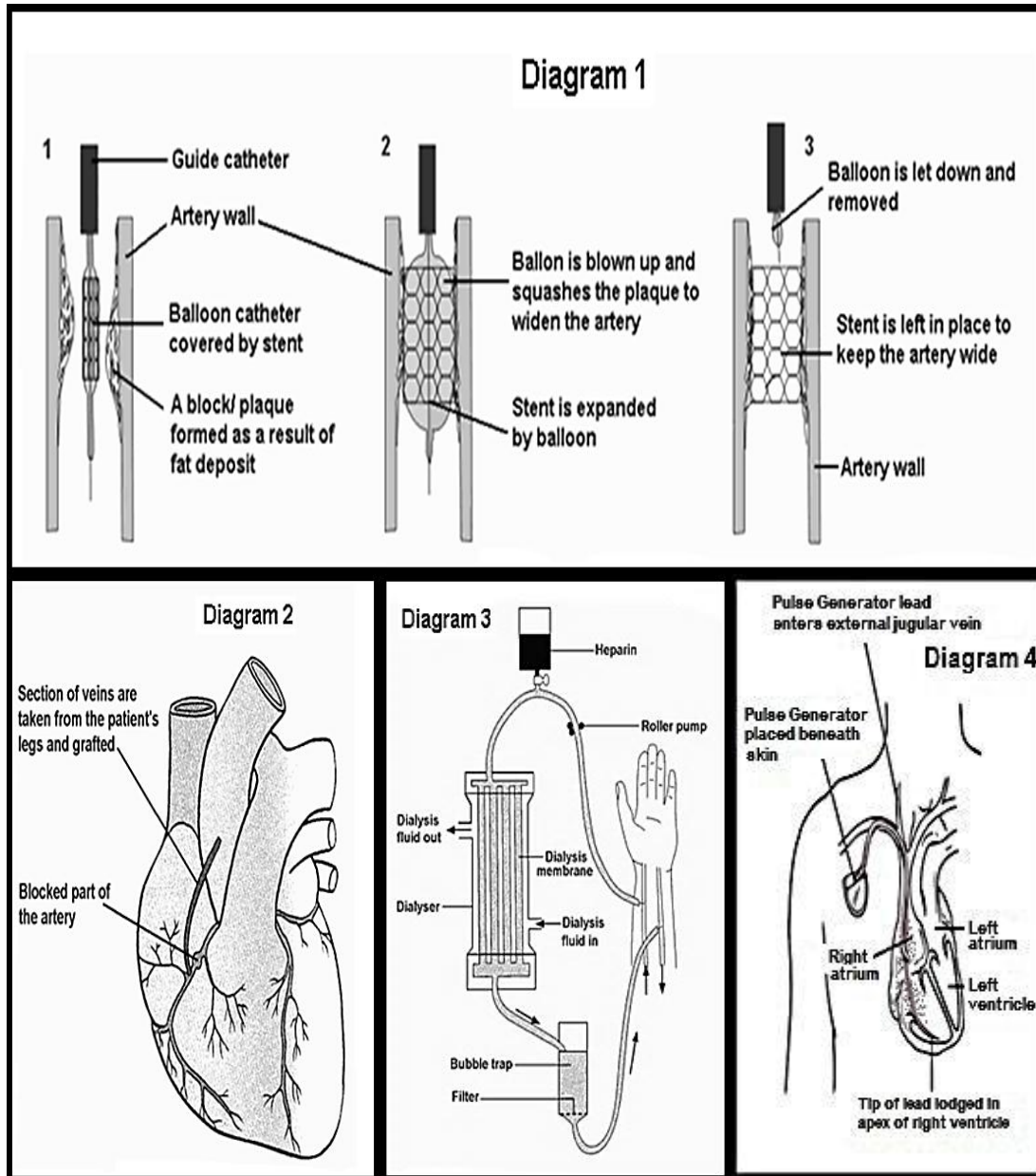
(9 x 1) (9)

- 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 numbers (1.3.1 – 1.3.6) in the ANSWER BOOK.

| COLUMN I |  | COLUMN II |                |
|----------|--|-----------|----------------|
| 1.3.1    | The tissue that translocates organic food in the plants                  | A.        | Xylem          |
|          |  | B.        | Phloem         |
| 1.3.2    | An opening at the base of the skull through which the spinal cord passes | A.        | Orbit          |
|          |  | B.        | Foramen magnum |
| 1.3.3    | Type of joint between the atlas and axis                                 | A.        | Gliding joint  |
|          |  | B.        | Hinge joint    |
| 1.3.4    | The liquid that surrounds the cells of the body                          | A.        | Blood          |
|          |  | B.        | Tissue fluid   |
| 1.3.5    | The tissue that lines all blood vessels                                  | A.        | Endothelium    |
|          |  | B.        | Epithelium     |
| 1.3.6    | The region of the kidney in which Malpighian bodies are located          | A.        | Cortex         |
|          |  | B.        | Medulla        |

(6 x 2) (12)

1.4 The diagrams below illustrate FOUR different medical procedures performed to rectify certain health issues. Study the diagrams and answer the following questions.



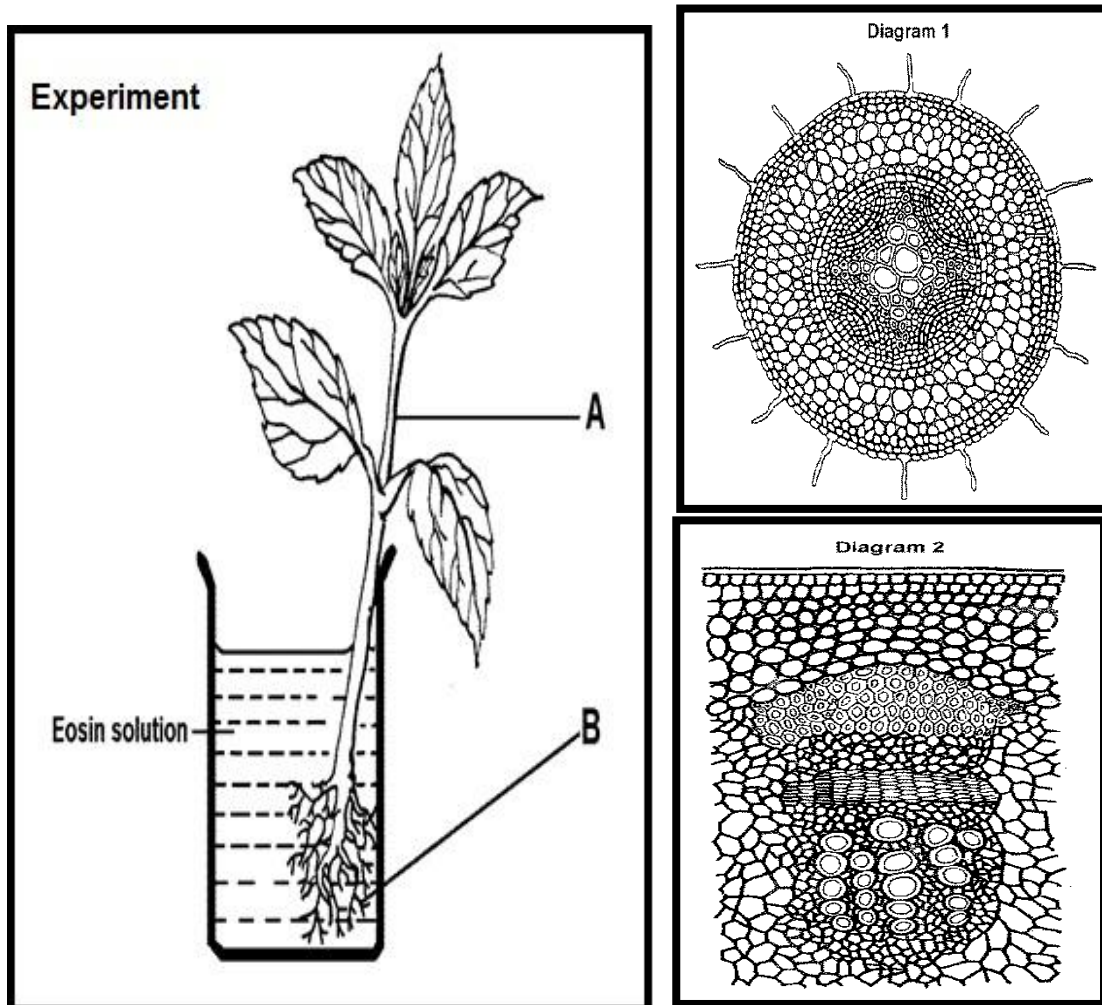
- 1.4.1 Name all the medical procedures illustrated above next to the relevant diagram number 1 – 4. (4)
- 1.4.2 Which health issues are expected to be resolved by performing the above medical procedures? Write your answer next to the relevant diagram number. (4)
- 1.4.3 The medical procedure performed in Diagram 3 is not a permanent solution to the problem. What would the ultimate procedure be to resolve this health issue? (1)

**TOTAL SECTION A: 50**

## SECTION B

## QUESTION 2

- 2.1 A pupil at Njokweni High school has conducted an experiment to find out which tissues are responsible for the transport of water in plants. He set up the experiment as shown in the diagram below. Three hours later, he made transverse section of part labelled A and B and carefully observed the tissues through the microscope. The Diagram 1 and Diagram 2 illustrate his microscopic observation.

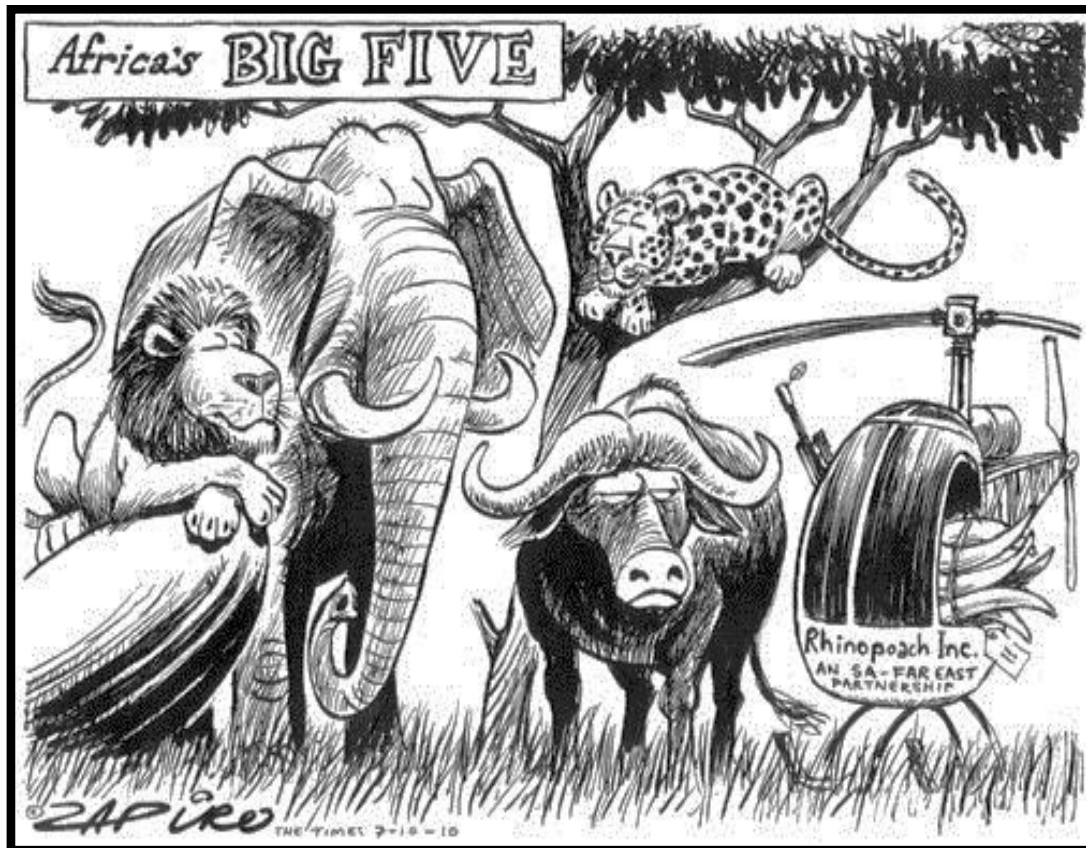


- 2.1.1 Formulate an appropriate hypothesis for this experiment. (1)
- 2.1.2 Supply any TWO steps to be considered during the planning stage of this experiment. (2)
- 2.1.3 Did the pupil use a monocotyledonous or a dicotyledonous plant to conduct the above experiment? Give TWO observable external features to support your answer. (3)
- 2.1.4 Why was eosin used in this experiment? (1)
- 2.1.5 Which tissues were stained? (1)



- 2.1.6 Match Diagram 1 and Diagram 2 correctly to the plant parts labelled A and B respectively. (2)
- 2.1.7 Tabulate any THREE observable anatomical features that distinguish a dicotyledonous root from dicotyledonous stem. (7)
- 2.1.8 What was his possible conclusion for this experiment? (2)

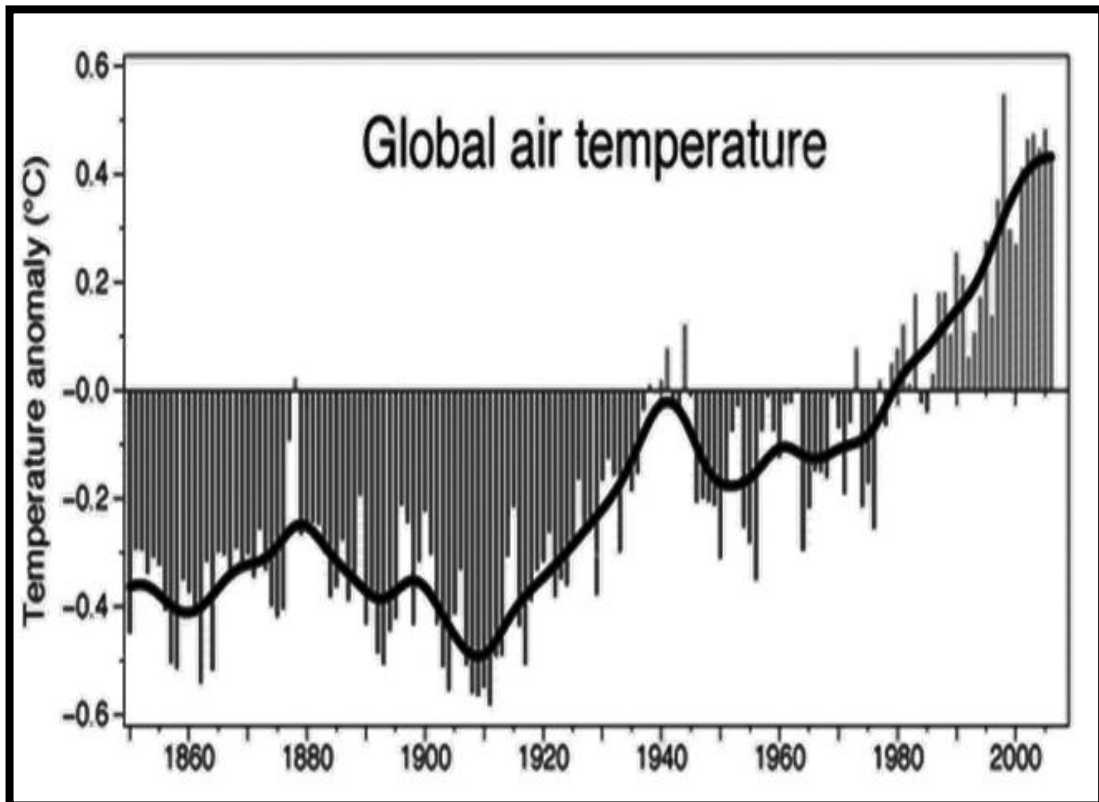
2.2 Study the cartoon below and answer the following questions.



[Printed with permission from www.zapiro.com]

- 2.2.1 Which animal is replaced by the helicopter in the cartoon? (1)
- 2.2.2 Name the human activity that threatens the existence of the animal mentioned in QUESTION 2.2.1. (1)
- 2.2.3 Which body part of the animal, mentioned QUESTION 2.2.1 is regarded as an exotic aphrodisiac substance? (1)
- 2.2.4 With reference to the cartoon, name another animal that is facing a similar challenge in survival. (1)
- 2.2.5 Mention ONE difference between culling and the human activity mentioned in QUESTION 2.2.2. (1)

2.3 Study the following graph and answer the questions below.



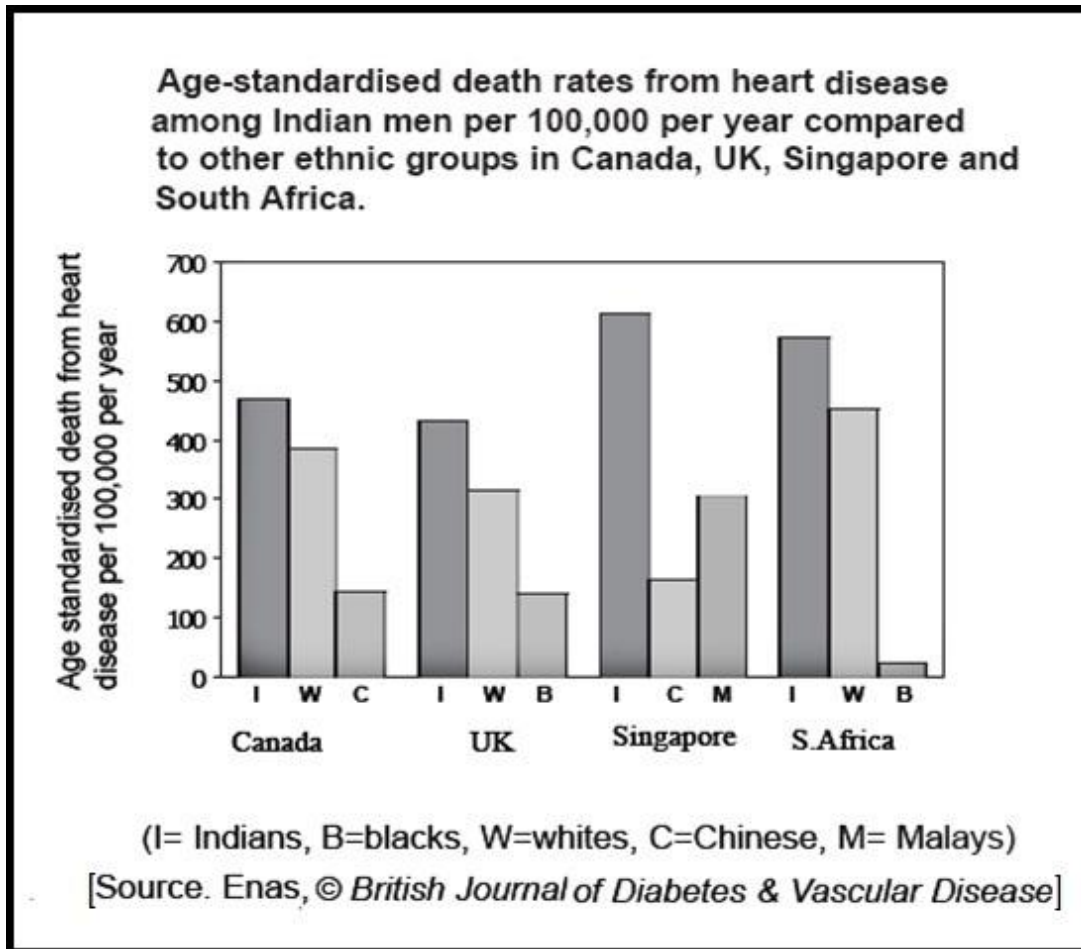
[Source: Phil Jones-Climatic Research Unit, UK]

- 2.3.1 What is the trend regarding global air temperature observed on the above graph? (1)
- 2.3.2 What is this phenomenon known as? (1)
- 2.3.3 Give TWO possible reasons for the above phenomenon to occur. (2)
- 2.3.4 Mention any TWO effects of this phenomenon. (2)

**[30]**

**QUESTION 3**

3.1 Study the graph below and answer the following questions.



- 3.1.1 Which population group is more prone to heart disease than any other of the ethnic groups surveyed in the above research? (1)
- 3.1.2 Mention any TWO possible risk factors which contribute to heart diseases. (2)
- 3.1.3 According to the survey, which population group shows the lowest incidence of death from heart diseases? (1)
- 3.1.4 Name the heart muscle that becomes damaged and non-functional during cardiac arrest. Supply a possible reason for your answer. (2)

- 3.2 Study the following newspaper extract on water quality in Port Alfred and answer the questions below.

The excessive growth of algae found in the Port Alfred water-holding dam leads to a “musty, muddy smell in the water”. According to experts, seasonal temperature changes caused the algae to rot and give off the foul odour.

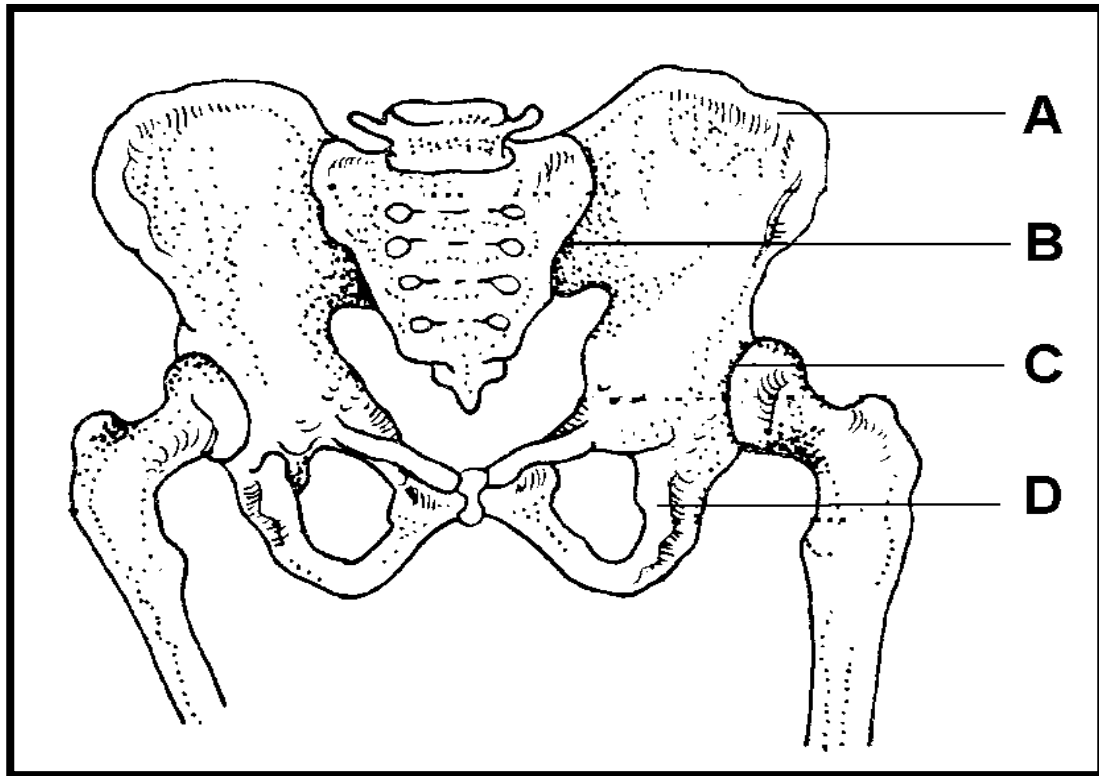


**STINKY OFFENDER:** Slime green monster from the deep. Christiaan ‘Hulk’ van der Merwe, 21, hams it up with rotting algae found in the Port Alfred water-holding dam.

[Daily Dispatch news, Tuesday, November 8, 2011]

- 3.2.1 Name the term usually used to denote excessive algal growth in a dam. (1)
- 3.2.2 What process is responsible for the phenomenon mentioned in QUESTION 3.2.1? (1)
- 3.2.3 Mention:
- (a) any TWO possible causes and (2)
  - (b) THREE effects of the process mentioned in QUESTION 3.2.2. (3)

3.3 The following diagram represents a human pelvic girdle. Study the diagram and answer the questions below.



- 3.3.1 Label parts A and D. (2)
- 3.3.2 What type of joints are found at the parts labelled B and C, respectively? (2)
- 3.3.3 Give ONE difference between the joint at C and the similar joint at the pectoral girdle. (1)
- 3.3.4 In many middle aged and older women, the part labelled A gradually becomes porous and fragile.
  - (a) Name the condition. (1)
  - (b) Give a possible reason for physical deterioration of bone. (1)

3.4 Read the following newspaper article and answer the questions below.

### State pushes people out

## Foreign firm profits from traditional muti

by RAY HARTLE

The South African government stands accused of ignoring an Alice community in favour of a German company, forging ahead with policies for harvesting and marketing of plants.

German company, Schwabe Pharmaceuticals, makes up to R800-million a year from selling the medicine extracted from *pelargonium sidoides* or *umckaloabo* plants for homeopathic customers in Europe.

Pelargonium has been used historically by South African communities to treat common coughs and colds, respiratory tract infections, TB and various other bacterial, viral and parasitic infections. Local people are able to make a cough mixture by soaking a piece of the plant's root and crushing it in a glass of water. This mixture is consumed twice daily until the coughs disappear.

The company Schwabe pays South African suppliers of pelargonium about 8c for enough plants to produce 100 ml of the medicine – with local harvest gatherers getting even less than that. The company makes up to R116 profit on every bottle.

Ironically, the company has been allowed by the post-apartheid provincial government to collect pelargonium plants in the Seymour and Balfour areas under Ciskei Nature Conservation Act permit. Sales of the medicine increased by 100% over a six-year period, with a concomitant increase in wild harvesting of the plants in the Eastern Cape.

According to the African Centre for Bio-safety, a Johannesburg based organisation, more than 70% of South Africans rely on traditional use of indigenous plants for health care requirements.

In Grahamstown, some 14 000 hectares of land have been stripped bare of *pelargonium* through illegal or unsustainable wild harvesting, according to a report by a provincial conservation officer in 2009.

The official reported that over an eight-year period, more than 330 million plants were uprooted.

**[Modified and adapted from an article published on 4 October 2011 by the *Daily Dispatch* newspaper]**

- 3.4.1 Supply the scientific name of the indigenous plant with medicinal properties. (1)
- 3.4.2 Name any TWO human ailments that can be effectively treated by this plant. (2)
- 3.4.3 Which part of the plant is commonly used for treatment? (1)
- 3.4.4 Foreign multi-national companies tend to exploit rural communities to make huge profits. Supply any evidence of exploitation of indigenous knowledge and resources for profit making, from the above article. (2)
- 3.4.5 Uncontrolled exploitation of indigenous medicinal plants, within a short span of time, could lead to the extinction of this plant species. This possibility can become a reality in the Eastern Cape. Support this statement by listing relevant facts from the above article. (2)
- 3.4.6 Give TWO suggestions for the sustainable use of medicinal plants in South Africa. (2)

**[30]**

**TOTAL SECTION B: 60**

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

- 4.1 A report by Environmental Protection Unit (USA) reflects a breakdown of Municipal Solid Waste (before recycling).

**2010 Total Municipal Solid Waste (MSW) Generation (by material)  
250 million tons (Before recycling)**

| Garbage item                 | Percentage of waste |
|------------------------------|---------------------|
| Yard trimmings               | 13,4                |
| Food scraps                  | 13,9                |
| Paper and paper board        | 28,5                |
| Plastics                     | 12,4                |
| Metals                       | 9,0                 |
| Rubber, leather and textiles | 8,4                 |
| Wood                         | 6,4                 |
| Glass                        | 4,6                 |
| Other                        | 3,4                 |

- 4.1.1 Study the information above and present it in the form of a pie chart. Show all your calculations. (12)
- 4.1.2 Name THREE non-biodegradable items from the above table. (3)
- 4.1.3 What process can be employed to convert items such as yard trimmings, food scraps and wood to useful by-products for crop-farming? (1)
- 4.1.4 Mention any FOUR effects of poor domestic waste management. (4)
- 4.2 Write a short essay explaining the homeostatic functioning of the nephron if a person is suffering from dehydration.

**N.B. No flow chart can be accepted as an essay.** (17)

Synthesis: (3)

**TOTAL SECTION C: 40**

**GRAND TOTAL: 150**