



DEPARTMENT OF EDUCATION
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION – 2005

BIOLOGY P2

STANDARD GRADE

FEBRUARY/MARCH 2005

Marks: 150

2 Hours

This question paper consists of 14 pages.



INSTRUCTIONS AND INFORMATION TO CANDIDATES

Read the following 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 exactly as the questions are numbered.
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 ink.
8. Only draw diagrams and flow charts when requested to do so.
9. The diagrams in the question paper may not necessarily be drawn to scale.
10. The use of graph paper is NOT permitted.
11. Non-programmable calculators and compasses may be used.

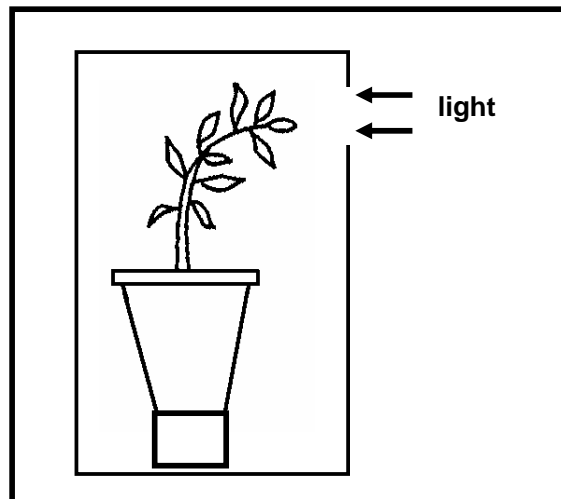
SECTION A**QUESTION 1**

1.1 Various possible answers are provided for each question. Indicate the correct answer by writing only the **letter** of your choice next to the relevant question number.

1.1.1 A potometer is used to ...

- A demonstrate root pressure.
- B measure the rate of transpiration.
- C demonstrate suction force of capillarity.
- D demonstrate osmosis.

QUESTIONS 1.1.2 and 1.1.3 refer to the following diagram.



1.1.2 The bending of the stem is caused by ...

- (i) cell elongation.
 - (ii) auxin distribution in the stem.
 - (iii) wind.
 - (iv) water.
- A (i) and (iii)
 - B (ii) and (iv)
 - C (i) and (ii)
 - D (iii) and (iv)

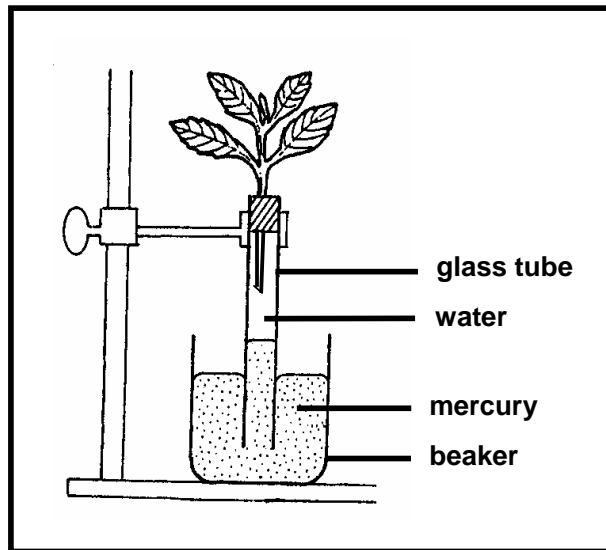
- 1.1.3 An advantage of the bending of the stem in the direction of the light is to ...
- A facilitate transpiration.
 - B expose the leaves to light for photosynthesis.
 - C limit transpiration.
 - D prevent lengthening of the plant.
- 1.1.4 If the pH of blood becomes too low, which substance will the cells of the renal tubule extract from the blood and pass into the filtrate to correct this imbalance?
- A Potassium ions
 - B Carbonate ions
 - C Bicarbonate ions
 - D Hydrogen ions
- 1.1.5 After which ONE of the following activities would a person produce most concentrated urine, assuming that conditions are similar in all other aspects before the start of the various activities?
- A A strenuous game of rugby
 - B One hour of swimming in cold water
 - C One hour rest on a cool morning
 - D Drinking a litre of cold water
- (5 x 2) **(10)**
- 1.2 Give the correct **biological term** for each of the following descriptions. Write only the **term** next to the relevant question number.
- 1.2.1 A membrane separating the outer and middle ear
- 1.2.2 Colourless fluid filling the bony labyrinth of the ear
- 1.2.3 The tissue that carries water and inorganic ions from the roots
- 1.2.4 The process that results in the loss of water droplets from the margins of leaves
- 1.2.5 The physical phenomenon causing the spontaneous rise of water in very thin tubes
- 1.2.6 Group of plants which have sunken stomata
- 1.2.7 Movement of molecules from a region of their high concentration to a region of their low concentration
- 1.2.8 The covering of leaves that greatly reduces the loss of water vapour **(8)**

- 1.3 Match the items in COLUMN I with the information in COLUMN II by writing only the correct **letter** next to the relevant question number.

COLUMN I	COLUMN II
1.3.1 Pits	A Transports urine to the exterior
1.3.2 Calyces	B Organ for temporary storage of urine
1.3.3 Urethra	C Strengthening material in tracheids
1.3.4 Hormones	D Enable lateral movement of water in xylem vessels
1.3.5 Lignin	E Transports urine to the renal pelvis
	F Facilitates growth and development in plants
	G Unperforated cross walls in water conducting tissue

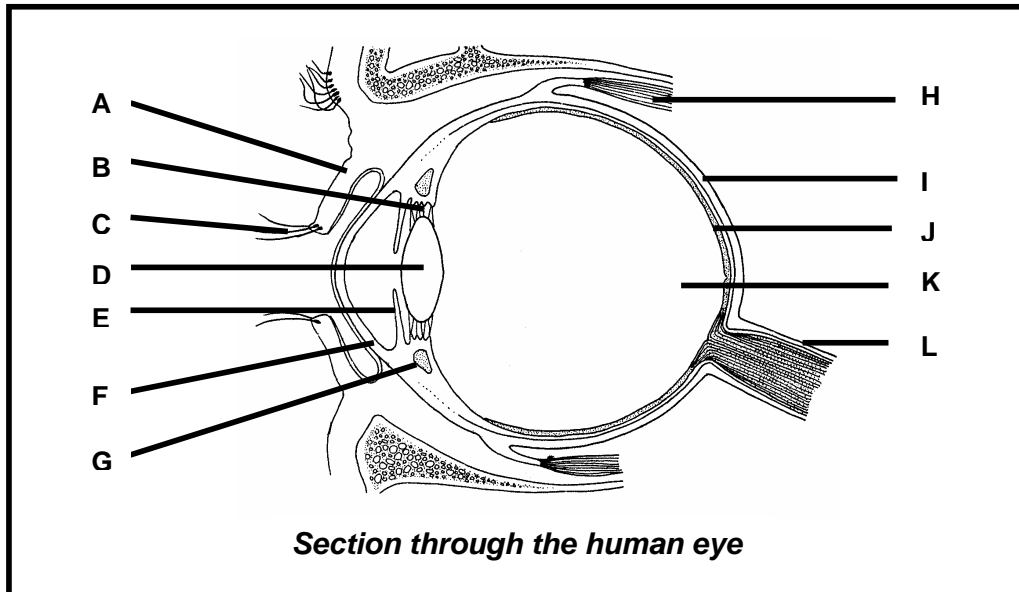
(5 x 2) (10)

- 1.4 Study the diagram below and answer the questions that follow.



- 1.4.1 What would you observe if this apparatus was left in the sun for several hours? (1)
- 1.4.2 List TWO reasons why mercury is used in the beaker instead of water. (2)
- 1.4.3 Explain TWO precautions you would take while setting up the apparatus. (4)
(7)

1.5 Study the following diagram and answer the questions that follow.



1.5.1 Write the **letters** of the parts which are responsible for the following:

- | | | |
|-----|--|-----|
| (a) | Protection of the eye from physical damage | (3) |
| (b) | Accommodation | (3) |
| (c) | Refraction of light rays | (3) |

1.5.2 Write the **name** of the labelled part which is responsible for the following:

- | | | |
|-----|---|-----|
| (a) | Movement of the eye ball | (1) |
| (b) | Conversion of light stimuli into impulses | (1) |

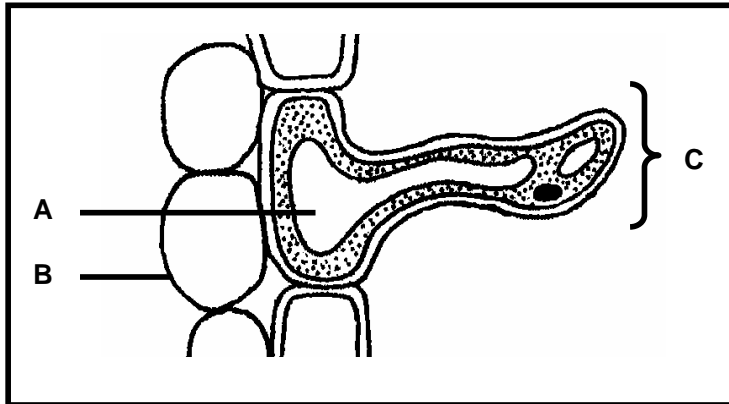
1.5.3 Explain the role of part E in bright light conditions. (4)
(15)

Total Question 1: 50

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

2.1 Study the following diagram and answer the questions that follow.



2.1.1 Identify the following:

- (a) Parts A and C (2)
- (b) Cell B (1)

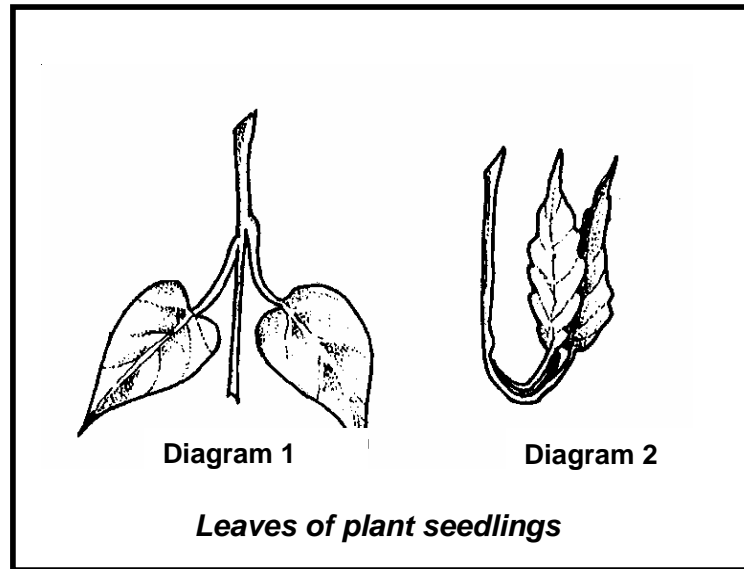
2.1.2 List TWO structural features of cell B that make it suitable for the translocation of water. (2)

2.1.3 Describe how part C absorbs water. (4)

(9)

- 2.2 The following diagrams represent the leaves of seedlings of a mesophytic plant that were transplanted at different times during a hot summer month. One seedling was transplanted at 12:00 and the other at 20:00. All other factors were the same for both seedlings during transplantation.

Study the diagrams and answer the questions that follow.

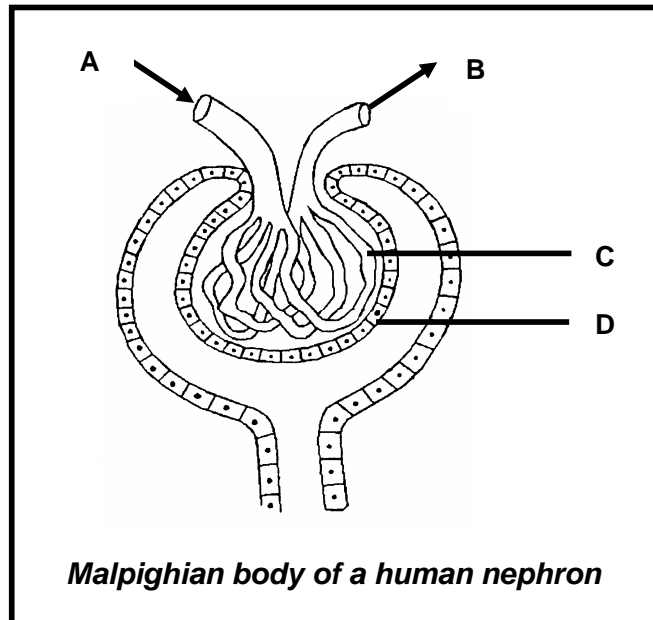


- 2.2.1 (a) Which diagram (1 or 2) shows the seedling that was transplanted at 12:00? (1)
- (b) Give an observable reason for your answer in QUESTION 2.2.1(a). (1)
- (c) Explain the reason given in QUESTION 2.2.1(b). (3)
- 2.2.2 Draw a diagram showing the state of the guard cells and stoma of the leaves of the seedling which was transplanted at 20:00. (5)
- (10)**
- 2.3 A pig's bladder was filled with a 20% sugar solution and securely tied. The bladder was placed in a beaker of distilled water. After a while the bladder had doubled its original mass. The contents of the bladder and the beaker were tested. There was still sugar in the bladder but no sugar in the beaker.
- 2.3.1 Which molecules were able to diffuse freely through the bladder? (1)
- 2.3.2 Explain why there was no sugar in the beaker. (2)
- 2.3.3 Explain why the bladder had doubled its original mass. (3)
- (6)**

Total Question 2: 25

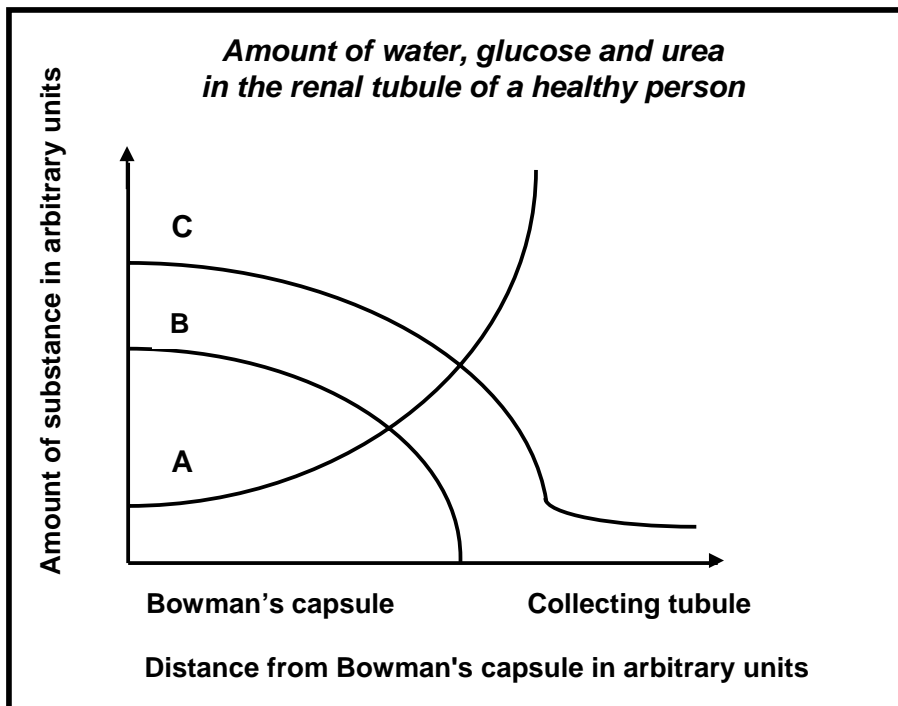
QUESTION 3

3.1 Study the following diagram and answer the questions that follow.



- 3.1.1 In which region of the kidney would you find this structure? (1)
- 3.1.2 Name the process of urine formation that occurs in this structure. (1)
- 3.1.3 Identify part C. (1)
- 3.1.4 Explain TWO structural adaptations of part C for the process mentioned in QUESTION 3.1.2 above. (4)
- 3.1.5 Part A is wider than part B. What is the importance of this? (1)
- 3.1.6 Name the type of specialised cells found in part D. (1)
- 3.1.7 Name the hormone secreted when there is a shortage of water in A. (1)
- 3.1.8 How does the hormone named in QUESTION 3.1.7 function? (2)
- (12)**

3.2 Study the following graph and answer the questions that follow.



3.2.1 Which graph (A, B or C) represents each of the following substances:

- | | |
|-------------|-----|
| (a) Water | (1) |
| (b) Glucose | (1) |
| (c) Urea | (1) |

3.2.2 Explain your answer in:

- | | |
|-----------------------|-----|
| (a) QUESTION 3.2.1(a) | (2) |
| (b) QUESTION 3.2.1(b) | (2) |
| (c) QUESTION 3.2.1(c) | (2) |

3.2.3 If a graph is drawn to represent the amount of amino acids, will it look like A, B or C? Explain your answer. (2)

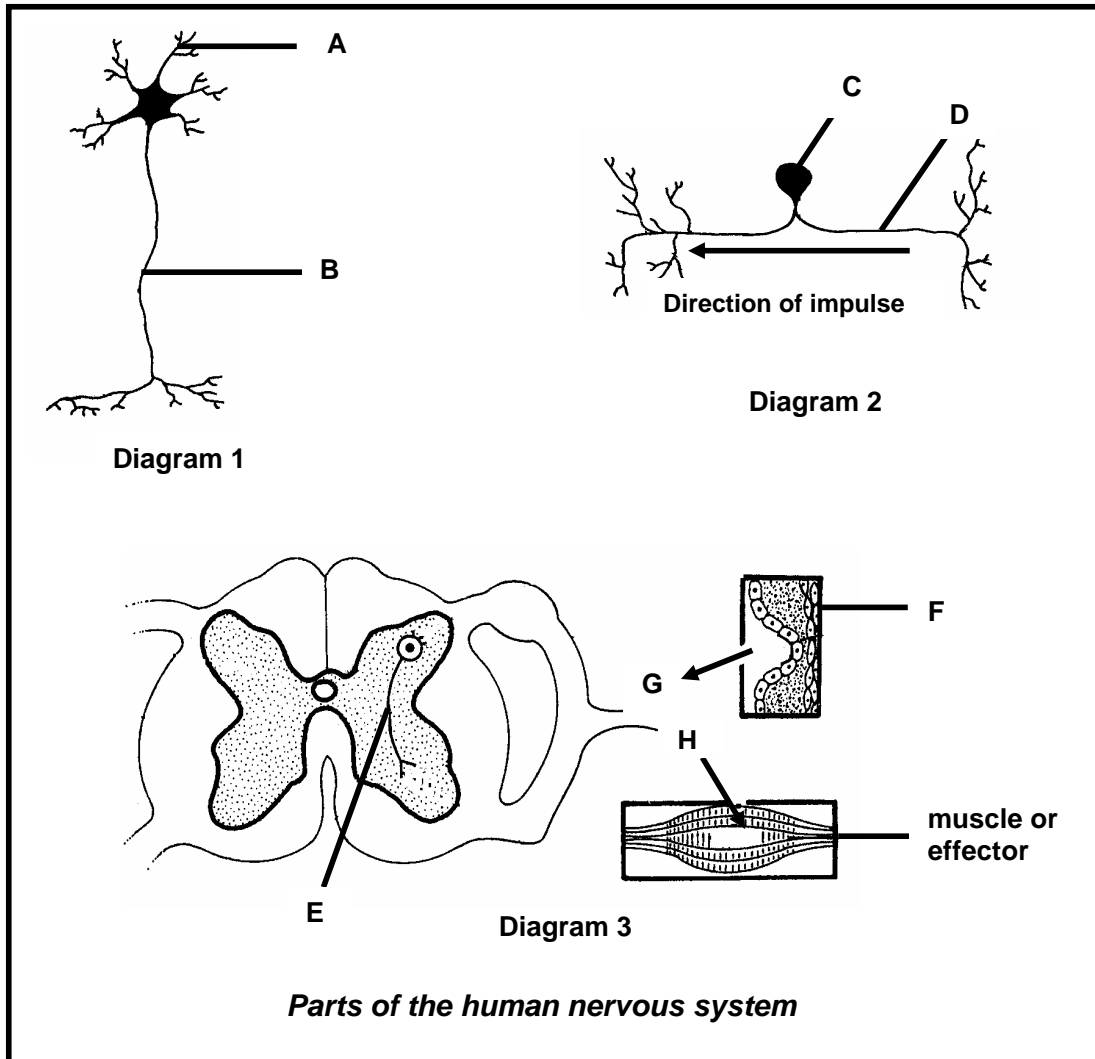
3.2.4 Explain why proteins are not part of the substances shown in the graph above. (2)

(13)

Total Question 3: 25

QUESTION 4

4.1 Study the following diagrams and answer the questions that follow.



4.1.1 Identify parts A, B, C, D, E and F. (6)

4.1.2 Write the **name** and **diagram number** (1 or 2), of the neurons which are represented by each of the following **arrows** in Diagram 3:

(a) G (2)

(b) H (2)

4.1.3 State ONE function of the neuron represented by:

(a) Diagram 1 (2)

(b) Diagram 2 (2)

4.1.4 What is a synapse? (2)

4.1.5 What is the functional unit of the nervous system? (1)
(17)

4.2 Study the following passage and answer the questions that follow.

Messenger substances are produced in endocrine glands of the human body and then transported to other parts of the body where they are involved in regulating the activity of particular parts. Slow, sustained or ongoing responses to these substances complement or support the other more rapid and short-lived responses of the body.

4.2.1 Write a scientific name for each of the following phrases taken from the passage:

(a) Messenger substances (1)

(b) Particular parts whose activities are regulated (1)

4.2.2 Name ONE system in the human body involved in co-ordination. (1)

4.2.3 Tabulate TWO differences between the way in which the systems named in QUESTION 4.2.2 operate. (5)
(8)

Total Question 4: 25

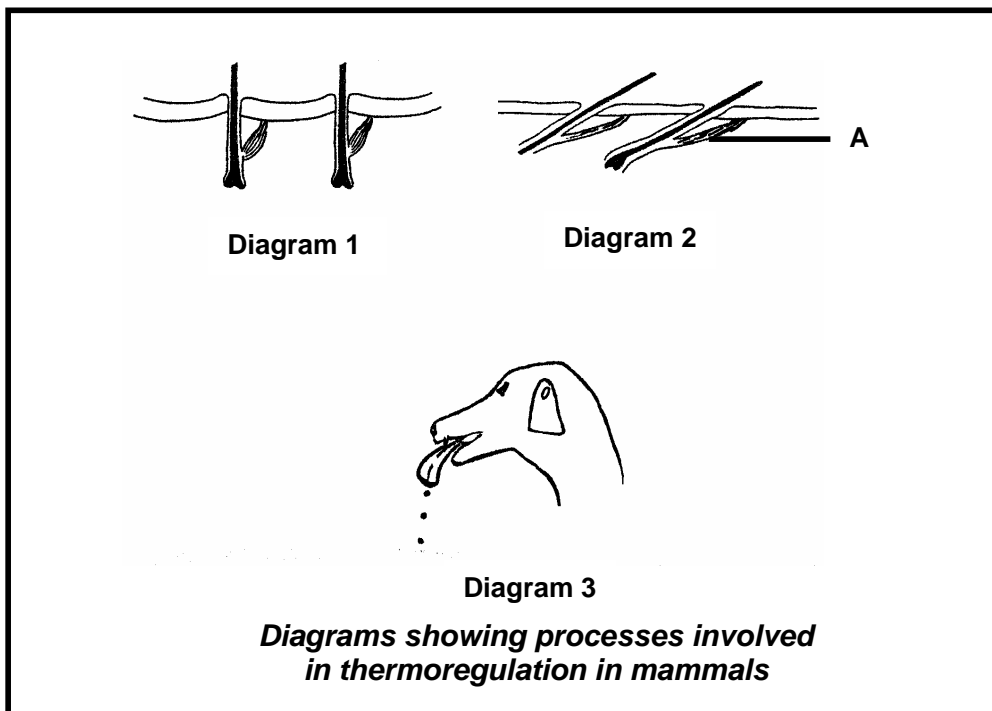
QUESTION 5

- 5.1 Complete the following table by writing the numbers 5.1.1 to 5.1.9 in your answer book and next to each number the correct missing information. (Do not redraw the table.)

Gland	Position in the body	Hormone	Function of hormone
5.1.1	5.1.2	Growth hormone	5.1.3
5.1.4	Below the larynx	5.1.5	5.1.6
5.1.7	5.1.8	5.1.9	Prepares the body for an emergency

(9)

- 5.2 Study the following diagrams and answer the questions that follow.



- 5.2.1 Identify part A and state its function. (2)
- 5.2.2 In which diagram (1 or 2) will:
- (a) The skin be pale if the person is light-skinned (1)
 - (b) The sweat glands produce more sweat (1)
- 5.2.3 Explain your answer in QUESTION 5.2.2(a). (2)

- 5.2.4 Diagram 3 shows a response to a particular environmental temperature. Which diagram (1 or 2) shows a response of a human to the same environmental temperature? Explain your answer. (3)
- 5.2.5 Describe how the process illustrated in diagram 3 helps in the regulation of the body temperature of the dog. (3)
(12)
- 5.3 Answer the following questions on thermoregulation in some mammals.
- 5.3.1 A mouse will lose more of its body heat than an elephant under the same low environmental temperature conditions. Which ONE of the following can account for this observation:
- The mouse ...
- (a) is smaller than the elephant.
 - (b) is more active than the elephant.
 - (c) has a larger surface area to volume ratio than the elephant.
 - (d) has smaller ears than the elephant. (2)
- 5.3.2 Explain how the mouse can still maintain a constant body temperature although it loses excessive body heat to the cold environment. (2)
(4)

Total Question 5: 25

TOTAL SECTION B: 100

GRAND TOTAL: 150