



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2005

BIOLOGY P2

STANDARD GRADE

OCTOBER/NOVEMBER 2005

Marks: 150

2 Hours

This question paper consists of 20 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, protractors 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.

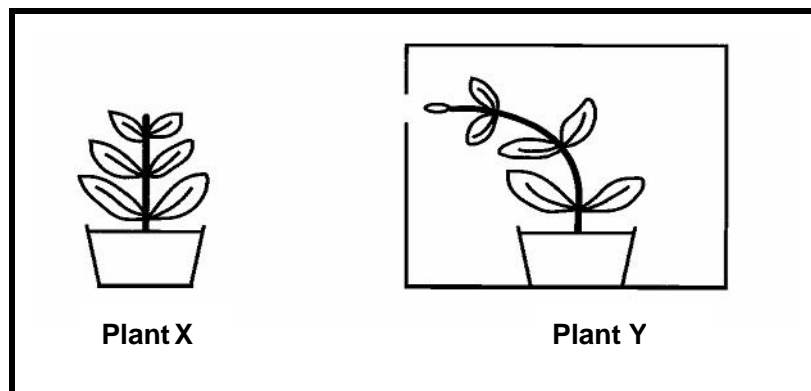
1.1.1 Which of the following is a reaction to a unilateral stimulus of light?

- A Hydrotropism
- B Geotropism
- C Phototropism
- D Turgor movements

QUESTIONS 1.1.2 and 1.1.3 are based on the information and diagram below.

Two potted plants, X and Y, of the same age and size were placed in the light, but plant Y was placed in a box with a hole on one side.

The diagram below shows the plants after 5 days.



1.1.2 Which combination of the following statements is correct?

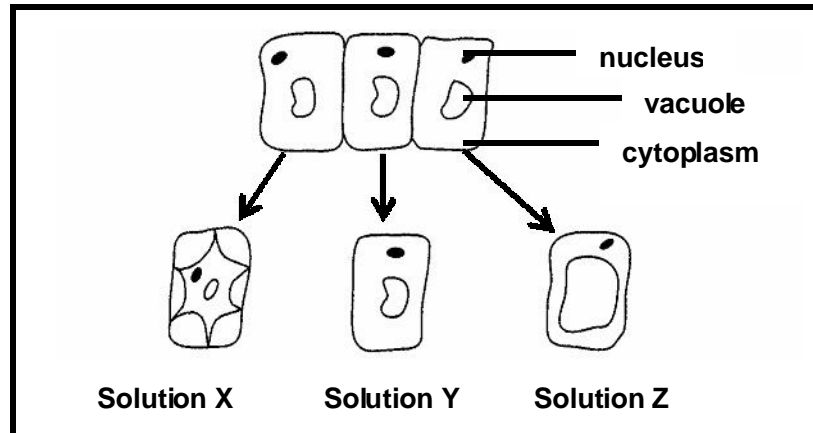
- (i) The shoots of both plants have grown towards moisture
 - (ii) The shoot of plant Y has grown more than the shoot of plant X
 - (iii) The shoot of plant Y has grown against the force of gravity but the shoot of plant X has not
 - (iv) The shoot of plant Y has grown towards light from one side but the shoot of plant X has not
 - (v) The shoots of both plants have grown in the direction of the force of gravity
- A (i) and (ii)
 - B (ii) and (iv)
 - C (iii) and (v)
 - D (i) and (v)



1.1.3 The reaction of plant Y is caused by growth hormones that ...

- A formed only in the presence of light.
- B stimulates cell elongation on the shaded side.
- C cannot function in the dark.
- D inhibit cell division on the lighted side.

1.1.4 The diagram below illustrates what can happen to plant cells when submerged in solutions of different concentrations of solutes.

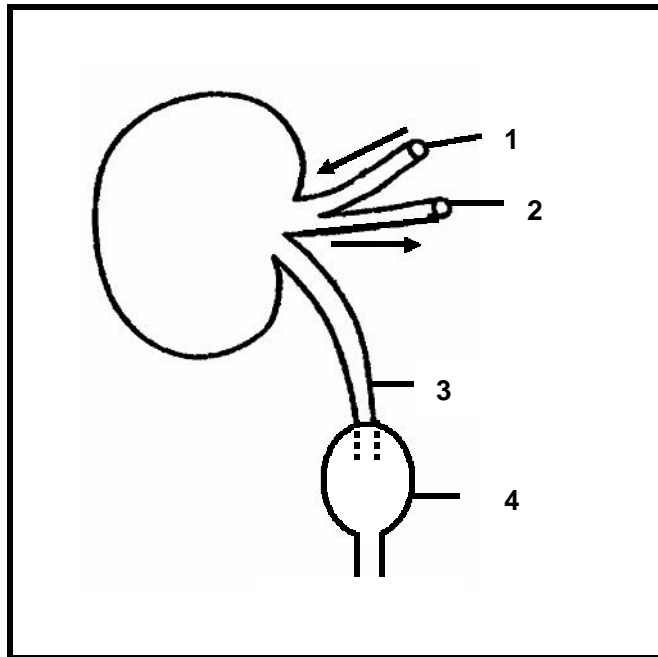


Which of the following are correct descriptions of solutions X, Y and Z when compared to the original cells solutions?

	Solution X	Solution Y	Solution Z
A	hypotonic	isotonic	hypertonic
B	hypertonic	isotonic	hypotonic
C	isotonic	hypotonic	hypertonic
D	isotonic	hypertonic	hypotonic



QUESTIONS 1.1.5 to 1.1.6 refer to the diagram below which shows a kidney and three tubes associated with it.



- 1.1.5 The transport of nitrogenous waste to the kidney occurs mainly through the structure numbered ...
- A 1.
 - B 2.
 - C 3.
 - D 4.
- 1.1.6 Where would you find urine?
- A 1 and 3 only
 - B 3 and 4 only
 - C 3 only
 - D 4 only
- 1.1.7 An extract from an adult monkey was injected into the bloodstream of a young monkey. It caused the young monkey to grow abnormally tall. From which one of the following glands was the extract obtained?
- A Adrenal gland
 - B Thyroid
 - C Pancreas
 - D Hypophysis / pituitary



- 1.1.8 Which of the following are voluntary actions?
- (i) Chewing
 - (ii) Pupil dilation
 - (iii) Walking
 - (iv) Heartbeat
 - (v) Speech
- A (i) and (ii)
B (ii) and (vi)
C (i), (iii) and (v)
D (iii), (vi) and (v) (8 x 2) **(16)**
- 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 The release of water in liquid form from the margins of leaves
- 1.2.2 The movement of blood plasma minus proteins from the glomerulus into the Bowman's capsule as a result of a pressure gradient
- 1.2.3 The part of the kidney in which the renal pyramids are found
- 1.2.4 The group of plants where the stomata are sunken into fleshy leaves
- 1.2.5 The part of the nephron where sodium ions are actively pumped from the filtrate into the tissue fluid of the renal medulla
- 1.2.6 The thin outer tough membrane or connective tissue that surrounds each kidney **(6)**



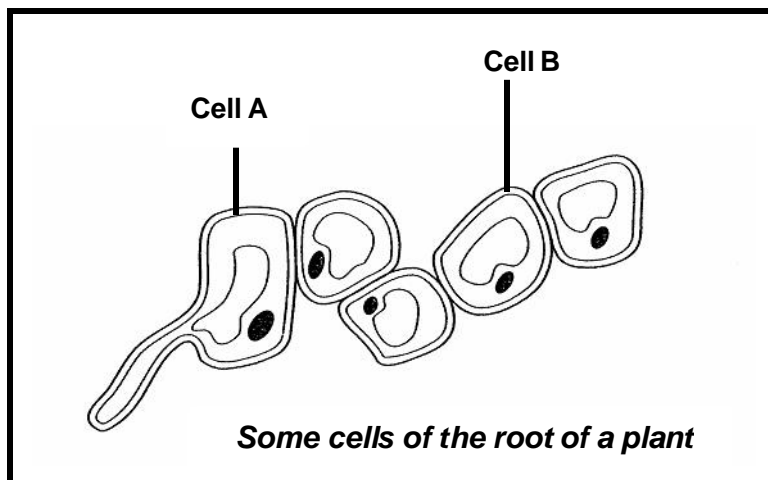
- 1.3 Match the statements in COLUMN II with the items in COLUMN I by writing only the correct **letter** next to the relevant question number.

COLUMN I	COLUMN II
1.3.1 Turgor	A The part where maculae are found
1.3.2 Hibernation	B Inactive during long periods of drought or heat
1.3.3 Semicircular canal	C A solution with a lower concentration of salts than that in the cell sap
1.3.4 Plasmolysis	D The ability of a solution to do work by osmosis
1.3.5 Water potential	E Brought about by exosmosis
	F The part of the inner ear responsible for picking up forward movements of the head.
	G A solution with a higher concentration of salts than that in the cell sap
	H Sets up wave movements in the perilymph of the inner ear
	I Inactive during winter
	J Brought about by endosmosis

(5 x 2) **(10)**



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



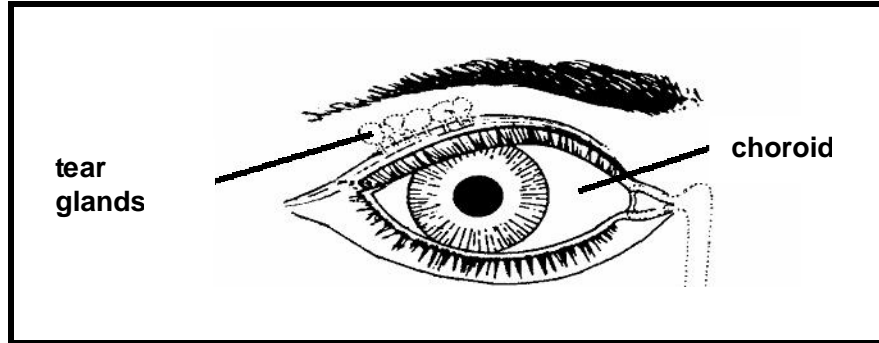
- 1.4.1 Identify cell A and cell B. (2)
- 1.4.2 State THREE adaptations of cell A that will enable it to absorb water. (3)
- 1.4.3 Give TWO pathways along which water moves from cell A to cell B. (2)
- 1.4.4 (i) Name the tissue not shown in the diagram which will transport water to all parts of the plant. (1)
- (ii) Explain TWO ways in which the tissue mentioned in QUESTION 1.4.4(i) is adapted for its function. (4)

(12)

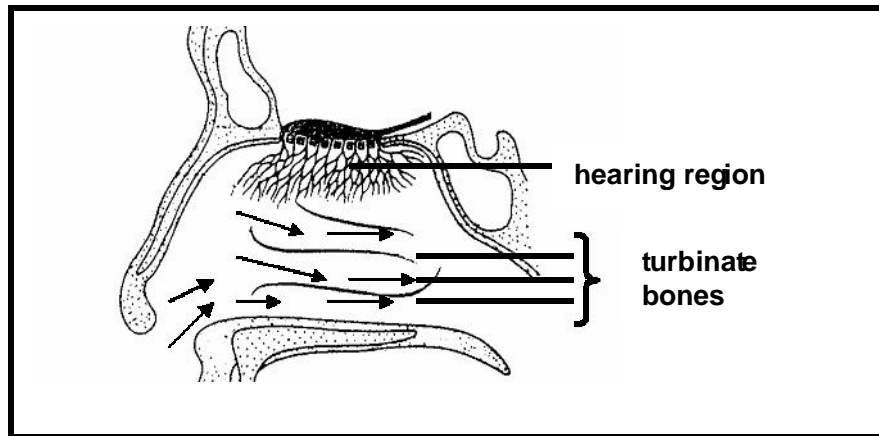


1.5 Study the diagrams below. In each one of them there is an incorrect label. For each diagram write down the **incorrect** label as well as the **correct** label next to the relevant question number.

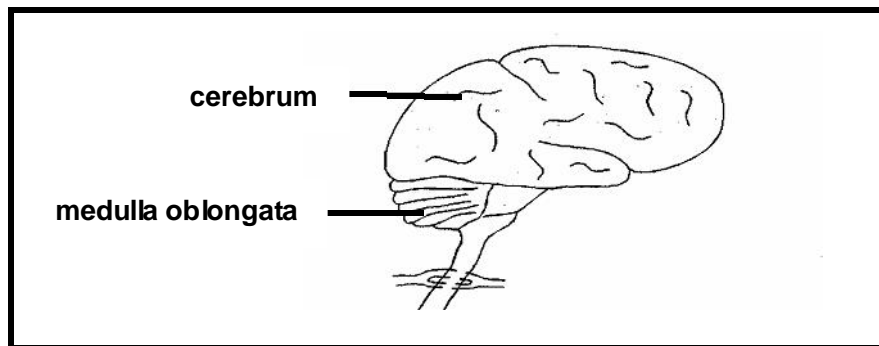
1.5.1



1.5.2



1.5.3



(3 x 2)

(6)

TOTAL QUESTION 1:
TOTAL SECTION A:

50
50

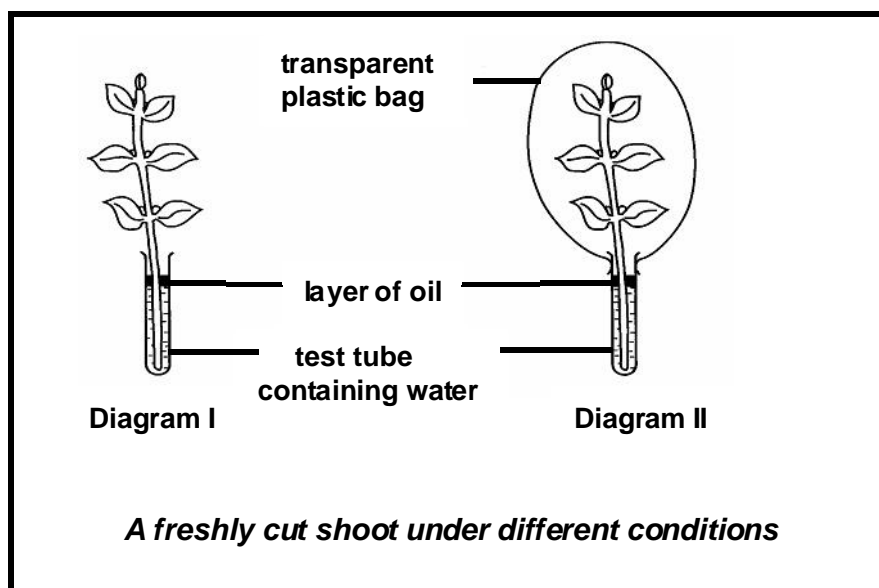


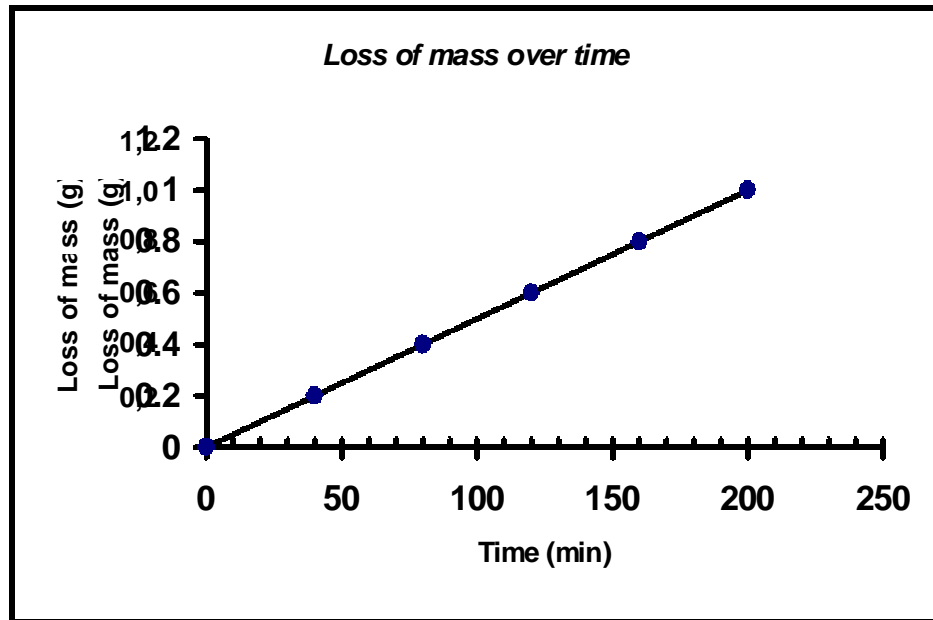
SECTION B**QUESTION 2**

- 2.1 A freshly cut shoot was placed in a tube containing water, as shown in Diagram I below. The surface of the water was covered with a layer of oil. The mass of the apparatus was recorded at intervals for 200 minutes and the loss in mass of the apparatus over time was determined. The results of this investigation are shown in the graph on the next page.

The same shoot was covered with a plastic bag (as seen in Diagram II) and the experiment was repeated for the same period of time.

Study the diagrams and the graph and answer the questions that follow.





- 2.1.1 Use the graph to calculate the water loss per minute, of the uncovered shoot, in the 200 minute period. Show your working. (3)
- 2.1.2 Why would there be no loss in mass from the covered shoot? (1)
- 2.1.3 What should be done with the apparatus before the experiment is repeated under different environmental conditions? (1)
- 2.1.4 What is the purpose of the oil layer in the experiment? (1)
- 2.1.5 Give TWO advantages of transpiration for plants. (2)
- 2.1.6 Make a labelled diagram showing the structure and appearance of the guard cells while water is being lost. (7)
- (15)**
- 2.2 A learner investigated the effect of solutions with four different water potentials on the length of four pieces of apple of the same size. She cut all the pieces of apple to a length of 5 cm, and placed them in the solutions for five hours. She then measured them again, and their final lengths are tabulated below.

Solution number	Length before (cm)	Length after (cm)
1	5,0	4,9
2	5,0	3,8
3	5,0	6,6
4	5,0	5,2



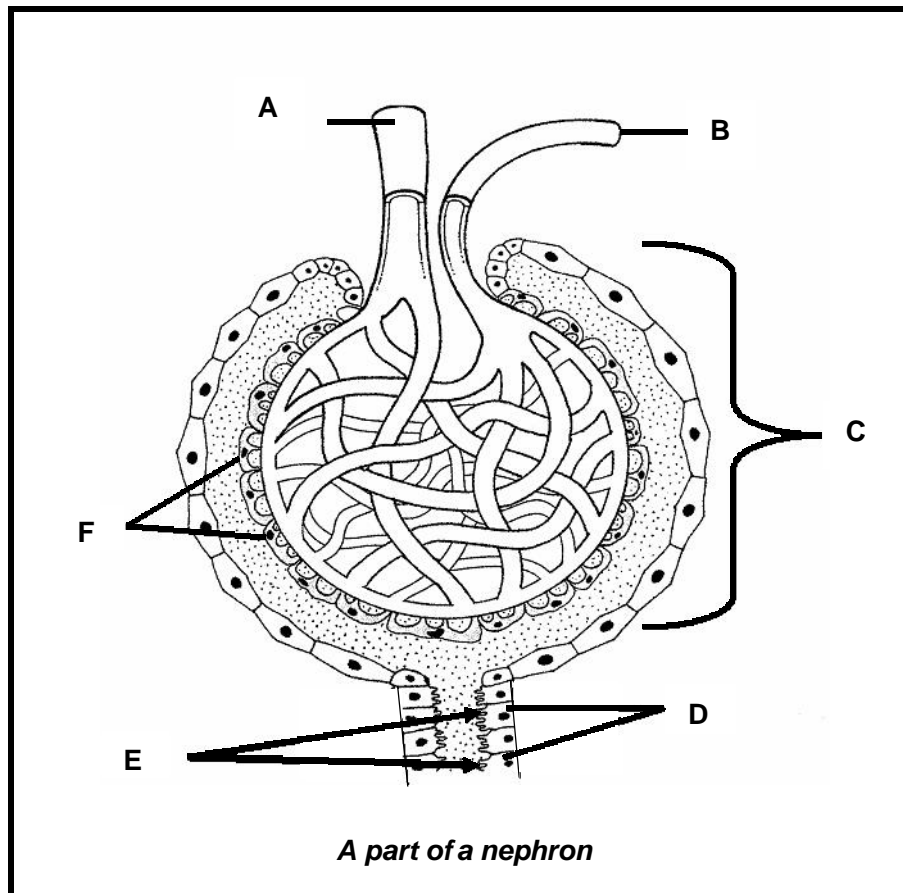
- 2.2.1 Which process was responsible for the decrease in length of the apple piece in solution number 2? (1)
- 2.2.2 (i) Which solution has a water potential closest to that of the apple cells? (1)
(ii) Give ONE reason for your answer in QUESTION 2.2.2(i). (1)
- 2.2.3 State TWO ways in which the accuracy of this investigation could be increased. (2)
- 2.2.4 How will the cells of the apple piece in solution 2 differ from those in solution 3? (2)
- 2.2.5 Explain how the results of this investigation would differ if the apple pieces were boiled before placing them in each solution? (3)
(Assume that they did not fall apart when they were boiled.) (10)

TOTAL QUESTION 2: 25



QUESTION 3

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



- 3.1.1 Name each of the following:
- (i) The part of the nephron represented by C (1)
 - (ii) The tubule containing cells D (1)
- 3.1.2 Name the type of epithelial cells labelled D. (1)
- 3.1.3 Explain TWO differences between the processes by which water enters the blood capillaries around cells D and that by which glucose and sodium leave cells D. (4)
- 3.1.4 Explain the importance of the structures labelled E. (2)
- 3.1.5 (i) Identify the epithelial cells labelled F. (1)
(ii) Describe TWO adaptations of structure F. (4)
- 3.1.6 Give ONE advantage of the difference in diameter between the structures labelled A and B. (1)
- (15)**



3.2 Read the following passage and answer the questions that follow.

Martin was very drunk. He had been drinking with friends all afternoon and evening. He staggered home late at night, and as he rounded the corner, he saw a rival gang waiting for him.

They repeatedly kicked him on the lower back and dumped him in the veld. Children playing in the veld discovered him in a battered condition the next afternoon. He was alive. He was taken to hospital, very bruised and dehydrated. He was given a lot of liquid and began to feel better. He passed a few drops of dark urine.

Martin was kept in hospital for observation. The next day his body started to swell, and he couldn't pass urine.

Adapted from: FOCUS ON BIOLOGY, L. Buckley et al.

Note:

- When the muscles are badly bruised, protein in the muscles breaks down. The products enter the kidney tubules and can block them.
- When a person drinks alcohol, it is absorbed into the blood, then transported to the hypothalamus, where it inhibits the release of ADH.

- 3.2.1 Explain why Martin was very dehydrated. (4)
- 3.2.2 Account for the presence of a few drops of dark urine after being given a lot of liquid. (3)
- 3.2.3 Explain why Martin's body started to swell the next day. (3)
- (10)**

TOTAL QUESTION 3: 25

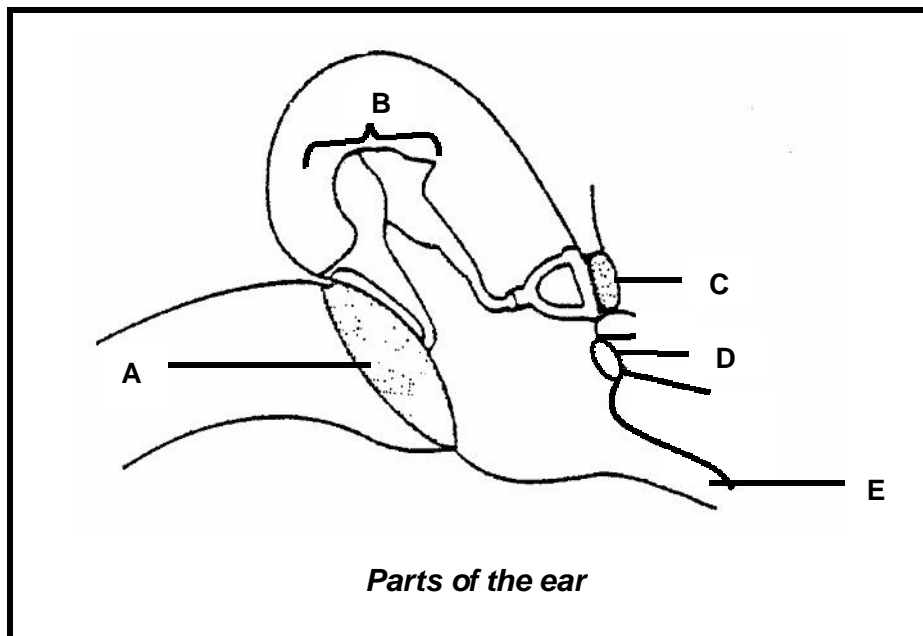


QUESTION 4

- 4.1 Study the passage and the diagram below and answer the questions that follow.

Under certain abnormal conditions, the middle ear can become filled with a thick, sticky mucus. This condition is known as 'glue ear'. It affects mainly children.

To treat this condition, surgeons are required to drain the mucus and reduce the pressure in the middle ear. They do that by placing a very small tube called a 'grommet' in membrane A.



- 4.1.1 Identify parts A, B, C and E. (4)
- 4.1.2 State ONE consequence of a build-up of pressure in the middle ear. (1)
- 4.1.3 Explain the effect on the functioning of part B should mucus be left to accumulate in the child's middle ear. (2)
- 4.1.4 Once a 'grommet' is in place, the child should not go swimming. Give a reason for this precaution. (2)
- (9)**



- 4.2 A person took part in an experiment on the eye's response to light. A lamp was placed at seven different positions from the person's face. The diameter of the person's pupil was measured at each position.

The table below shows the diameter of the person's pupil when the light was placed at various distances from the person's face.

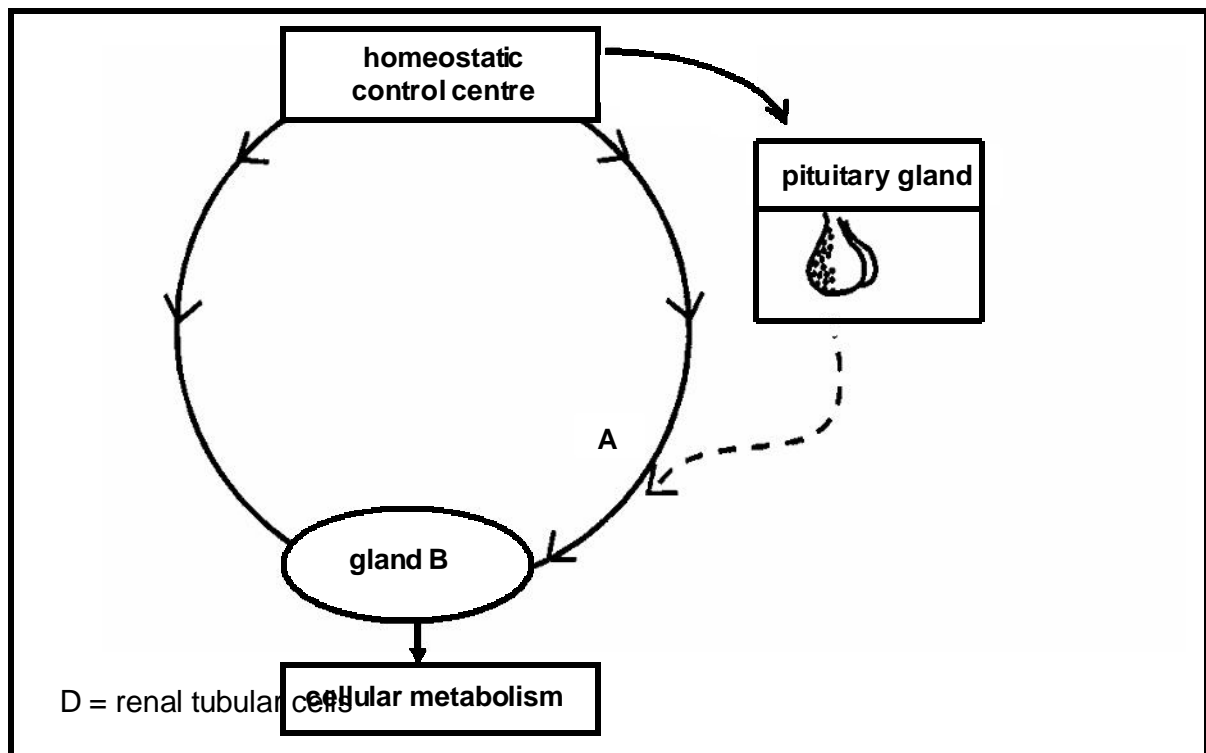
Position of the lamp	Diameter of the pupil(mm)
1	1,2
2	1,8
3	2,4
4	3,0
5	3,6
6	4,2
7	4,8

- 4.2.1 (i) At which position was the lamp furthest from the eye? (1)
(ii) Explain your answer in QUESTION 4.2.1(i). (2)
- 4.2.2 The lamp was moved from position 1 to position 2. What happened to the muscles in the iris of the eye that caused the change in the diameter of the pupil? (4)

(7)



- 4.3 Study the flow diagram below which shows a feedback system in the body. The big circle represents the blood system.



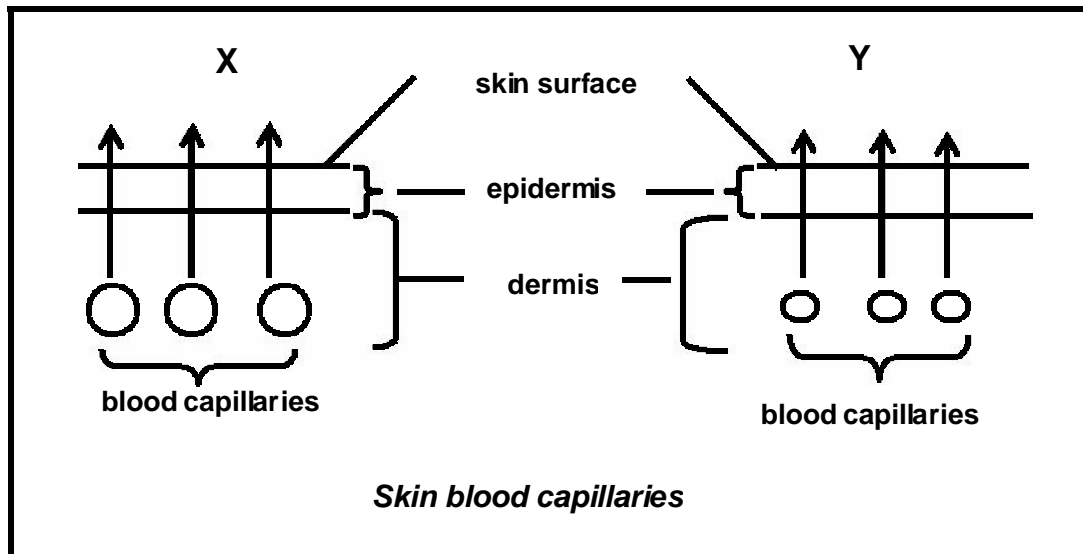
- 4.3.1 What is homeostasis? (2)
- 4.3.2 State ONE difference between the effect of a hormone on its target and the effect of an impulse. (2)
- 4.3.3 Which hormone will be added to the blood at A? (1)
- 4.3.4 (i) Identify gland B. (1)
(ii) Name the hormone secreted by gland B. (1)
(iii) State the effect of the hormone named in QUESTION 4.3.3 on gland B. (1)
(iv) State ONE function (other than cell metabolism) of the hormone mentioned in QUESTION 4.3.4 (ii). (1)
- (9)**

TOTAL QUESTION 4: 25



QUESTION 5

5.1 Study the diagrams below and answer the questions that follow.



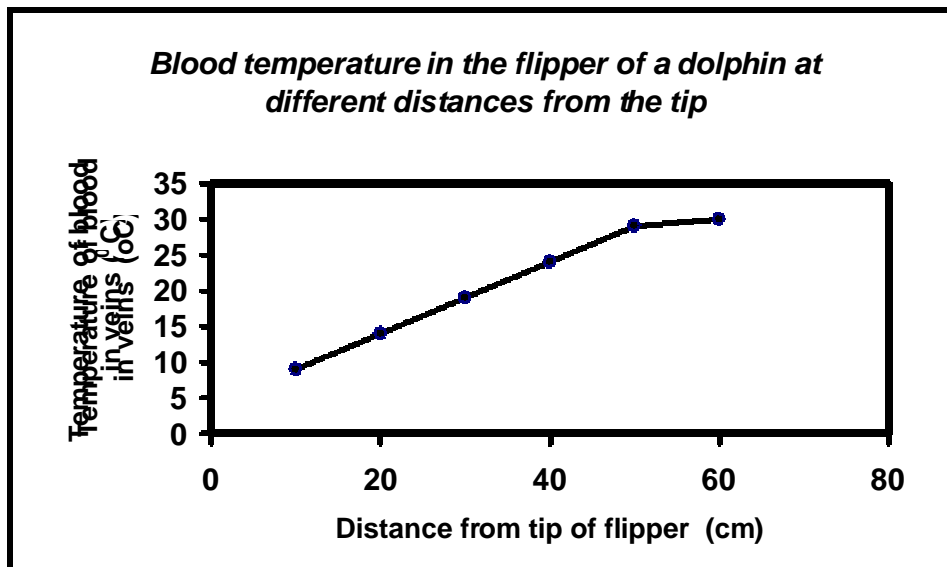
- 5.1.1 (i) Under what type of environmental conditions will the skin appear as illustrated in Y? (1)
- (ii) Give a reason for your answer in QUESTION 5.1.1(i) (2)

- 5.1.2 Which process is shown by the arrows? (1)

- 5.1.3 In which skin (X or Y) will the erector muscle be contracted? (1)

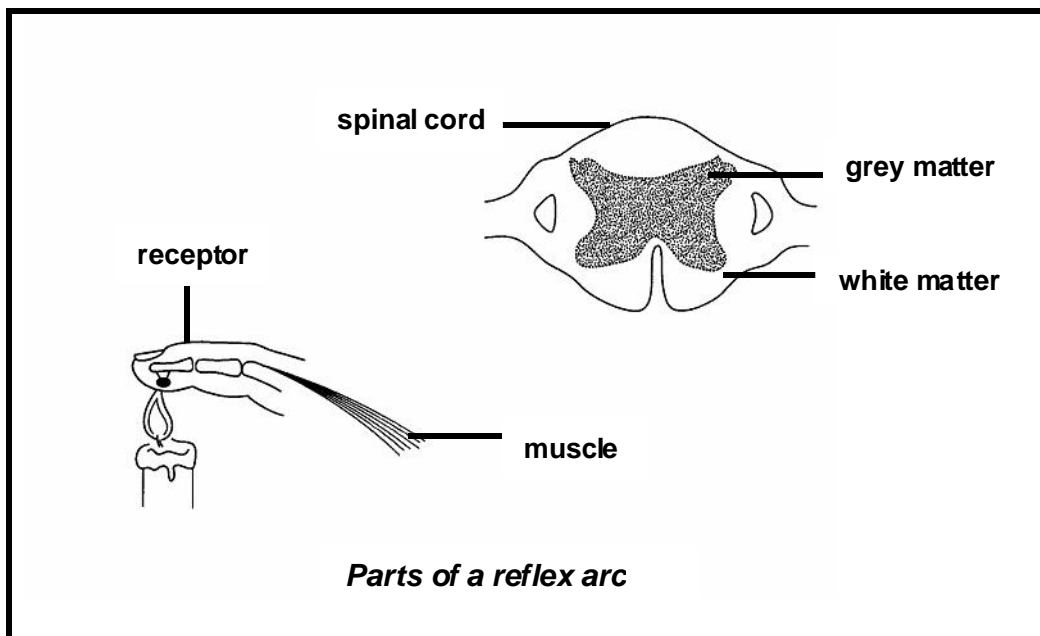
(5)

5.2 Dolphins are endothermic animals that live in very cold water. The blood temperature in their veins was measured at different distances from the tip of the flipper. The results are shown on the graph below.



- 5.2.1 What is meant by the term endothermic? (2)
- 5.2.2 What is the temperature at a distance of 15 cm from the tip of the flipper? (2)
- 5.2.3 Give the difference in temperature between the tip of the flipper and that given in QUESTION 5.2.2. (1)
- 5.2.4 (i) What causes the temperature in the veins of the flipper to increase as the blood flows away from the tip of the flipper? (2)
- (ii) Name the mechanism by which the temperature is regulated. (1)
- (iii) What is the advantage of this mechanism? (2)
- (10)**

5.3 Study the diagram below and answer the questions that follow.



- 5.3.1 What is meant by the term reflex action? (2)
- 5.3.2 Give a reason why reflex actions are of importance to the human body. (2)
- 5.3.3 Name the structures, that are missing on the diagram in their correct order, that will ensure that an individual does not burn his/her fingers. (3)
- 5.3.4 Name a microscopic gap that will transmit impulses between the structures named in QUESTION 5.3.3. (1)



5.3.5 In this reflex action, name the

- (i) stimulus. (1)
 - (ii) effector. (1)
- (10)**

TOTAL QUESTION 5: 25
TOTAL SECTION B: 100

GRAND TOTAL: 150

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