

education

Department of Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2007

BIOLOGY P2

STANDARD GRADE

FEBRUARY/MARCH 2007

306-2/2

BIOLOGY SG: Paper 2



306 2 2E

SG

MARKS: 150

TIME: 2 hours

This question paper consists of 16 pages.

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Please turn over

INSTRUCTIONS AND INFORMATION

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 for 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 The growth response of certain plant organs towards light is called ...

- A geotropism.
- B apical dominance.
- C phototropism.
- D leaf abscission.

1.1.2 On entering a dark room from the outside, the pupil will ...

- A first increase and then decrease in size.
- B first decrease and then increase in size.
- C remain unchanged.
- D increase and maintain the increased size.

1.1.3 Chemical co-ordination in humans is brought about by the ... system.

- A nervous
- B endocrine
- C urinary
- D lymphatic

1.1.4 Which ONE of the following hormones regulates the salt content of the human body?

- A Thyroxin
- B ADH
- C Aldosterone
- D Adrenalin

- 1.1.5 In multicellular organisms, cells are specialised to perform certain functions. Which combination of cells performs all of the following functions?
- (i) Support
 - (ii) Transport of water
 - (iii) Facilitates gaseous exchange
 - (iv) Protection
- A Cell wall, epidermis, phloem
 - B Phloem, xylem, epidermis
 - C Chloroplasts, phloem, epidermis
 - D Stomata, xylem, epidermis
- 1.1.6 The most important effect of auxins on plant cells is that they promote ...
- A cell elongation.
 - B ageing.
 - C metabolism.
 - D the absorption of water.
- 1.1.7 In comparison with the blood entering the kidney, the blood leaving the kidney contains ...
- A more water.
 - B less urea.
 - C more oxygen.
 - D less carbon dioxide.
- (7 x 2) (14)**

- 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 An organic chemical substance produced in small quantities and then transported to where it can control growth and development in a particular way
- 1.2.2 The layer of liquid that surrounds animal cells
- 1.2.3 The disease characterised by an enlarged thyroid gland, resulting from iodine deficiency
- 1.2.4 The tube connecting the middle ear with the throat cavity
- 1.2.5 The muscles in the iris that contract in dim light
- 1.2.6 The layer in the human eye that contains many blood vessels
- 1.2.7 The part of the renal tubule found between the proximal and distal convoluted tubules

(7)

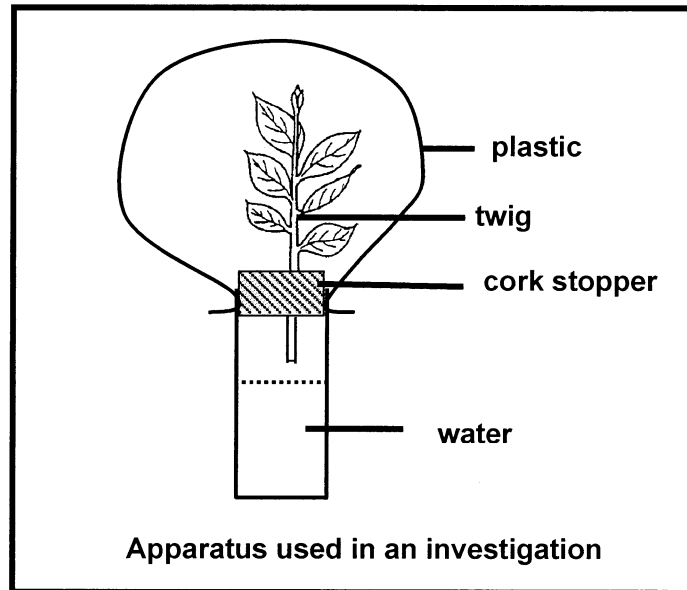
- 1.3 Match the information in COLUMN II with the items in COLUMN I by writing only the correct **letter** next to the relevant question number.

COLUMN I		COLUMN II	
1.3.1	Ducts of Bellini	A	Stimulates the thyroid gland
1.3.2	Thyroxin	B	Open into the calyces of the kidney
1.3.3	Cytokinins	C	Walls contain podocytes
1.3.4	TSH	D	Structural unit of the kidney
1.3.5	Bladder	E	Influences metabolic rate
1.3.6	Bowman's capsule	F	Impermeable to water
		G	Plant growth substances
		H	Storage of urine
		I	Transports urine to the outside of the body

(6 x 2) (12)

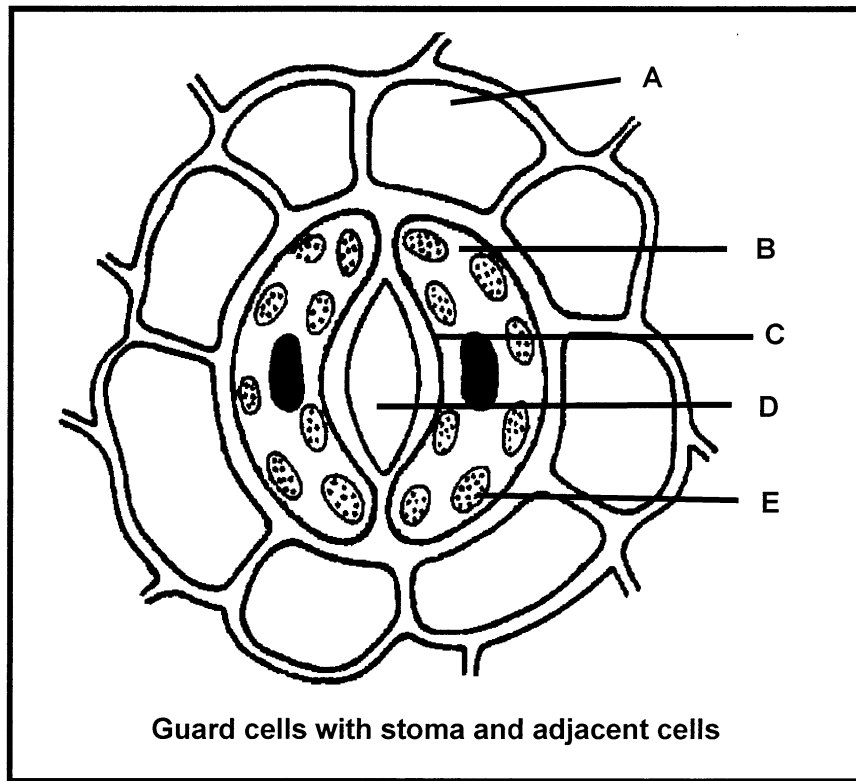


- 1.4 Study the apparatus below which was set up in an investigation and answer the questions that follow. It has been set up incorrectly.



- 1.4.1 If the apparatus were set up correctly, what would the learner be investigating? (1)
- 1.4.2 Explain TWO ways in which the learner could improve the accuracy of the apparatus. (4)
- 1.4.3 Give ONE advantage of the process being investigated. (1)
- (6)

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



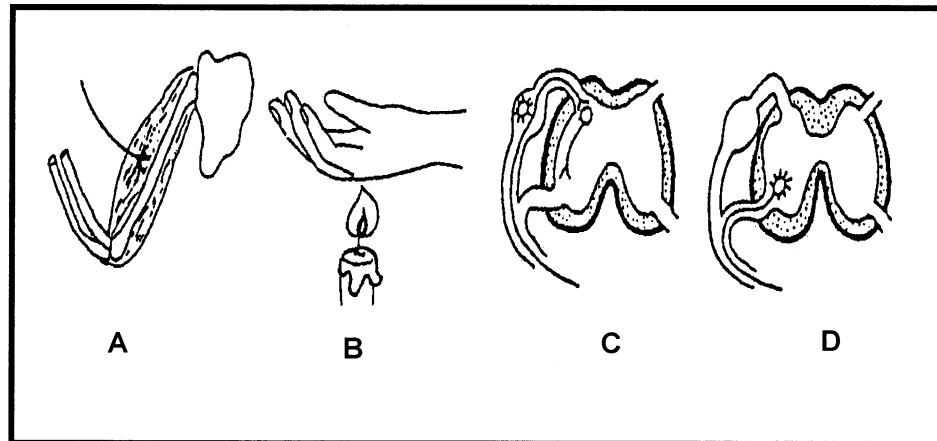
- 1.5.1 Label cells A and B. (2)
 - 1.5.2 Tabulate TWO structural differences between cell A and cell B. (5)
 - 1.5.3 Identify the structures labelled C and E and state the role that each part plays in the opening and closing of part D. (4)
- (11)**

TOTAL QUESTION 1: 50
TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Diagrams A, B, C and D show some of the processes and structures involved in a reflex action. Study the diagrams and answer the questions that follow:



During a reflex action, these processes and structures are involved in a particular sequence. Describe these events by completing the table below. Write only the question numbers 2.1.1 to 2.1.8 and next to each the correct answer.

(8)

Order	Correct sequence of processes and structures involved (A, B, C or D)	Description of what is happening
1st	2.1.1	2.1.5
2nd	2.1.2	2.1.6
3rd	2.1.3	2.1.7
4th	2.1.4	2.1.8

2.1.9 Name the space between two neurons across which impulses are transmitted.

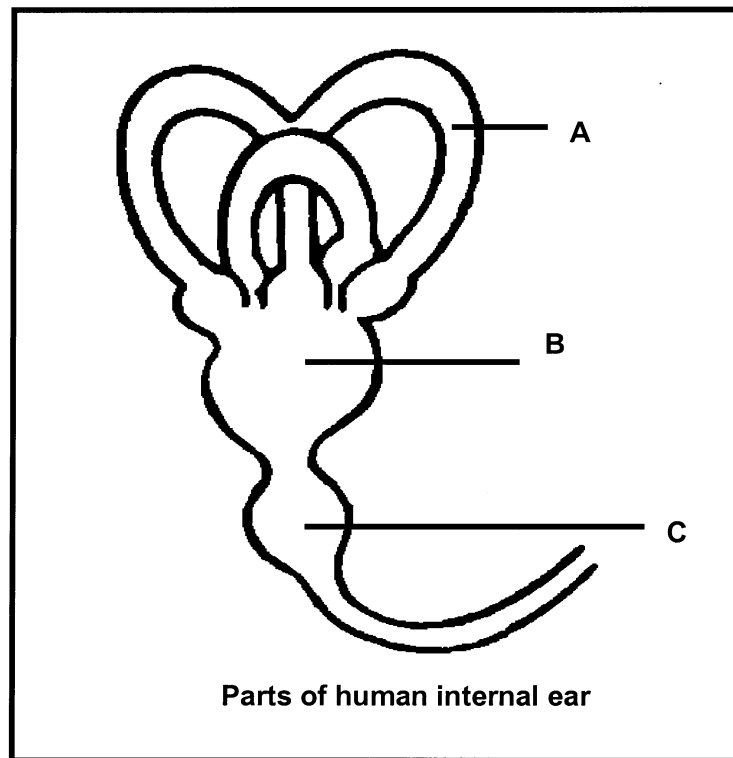
(1)

2.1.10 Name TWO receptors other than touch receptors which will be stimulated in diagram B.

(2)

(11)

2.2 Study the diagram below and answer the questions that follow:



- 2.2.1 Label parts A, B and C. (3)
- 2.2.2 Name the fluid which fills this structure. (1)
- 2.2.3 Explain TWO ways in which this part of the ear is protected. (4)
- 2.2.4 Give the function of each of the parts labelled A and B. (2)
- 2.2.5 Name TWO other receptors which are involved in balance that are not part of the structures represented in the diagram. (2)
- (12)**

2.3 Explain why a baby can recognise its mother a few days after birth without looking at her features. (2)

TOTAL QUESTION 2: 25

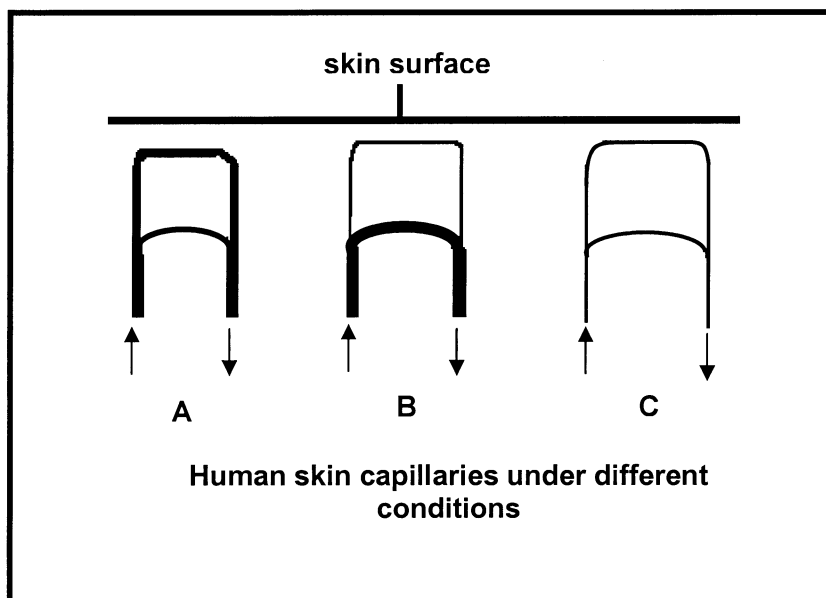
QUESTION 3

3.1 The human baby does not have the ability to shiver, nor to increase its metabolic rate by hormonal changes, for the first six weeks of life.

3.1.1 How can a four-week-old baby be assisted to prevent excessive heat loss to the environment? (1)

3.1.2 Explain why a four-week-old baby will tend to lose more heat to the environment than a four-year-old child under the same environmental conditions. (3)
(4)

3.2 Study the following diagrams and answer the questions that follow:



3.2.1 When the body is faced with an emergency, will the skin look like A, B or C? (1)

3.2.2 Explain your answer to QUESTION 3.2.1. (2)

3.2.3 Which of the capillaries (A, B or C) can most closely be associated with the following:

- (a) Relaxation of the erector muscles (1)
(b) Less active sweat glands (1)

- 3.2.4 Which of the capillaries (A, B or C) will be similar to the capillaries in the tongue of a panting dog? (1)
- 3.2.5 Explain your answer to QUESTION 3.2.4. (4)
(10)
- 3.3 Read the following passage and answer the questions that follow:

During the childhood years, the long bones of the body can grow in length, causing the person to become taller. At some point, the long bones do not increase in length, but the flat bones (for example, the bones of the skull) still grow.

Growth hormone (GH) is not only primarily responsible for the lengthening of the bones, but also for the thickening thereof. If very high concentrations of GH are secreted during the growth period, the long bones become very long and the person becomes a giant. Very low GH concentrations during the growth period cause the person to become a dwarf.

Adapted from: *PRINCIPLES OF ANATOMY AND PHYSIOLOGY*
Gerard J. Torta *et al.*

- 3.3.1 Name the endocrine gland that secretes the GH. (1)
- 3.3.2 Why do we refer to this gland named in QUESTION 3.3.1 as an endocrine gland? (2)
- 3.3.3 Exactly where in the human body is this gland named in QUESTION 3.3.1 found? (1)
- 3.3.4 Name TWO target organs of the GH in the human body. (2)
- 3.3.5 The head of an adult dwarf is proportionally large in contrast to the body. Give a possible explanation for this. (2)
- 3.3.6 Is it possible to prevent dwarfism if detected early enough? (1)
- 3.3.7 Explain your answer to QUESTION 3.3.6. (2)
(11)

TOTAL QUESTION 3: 25

QUESTION 4

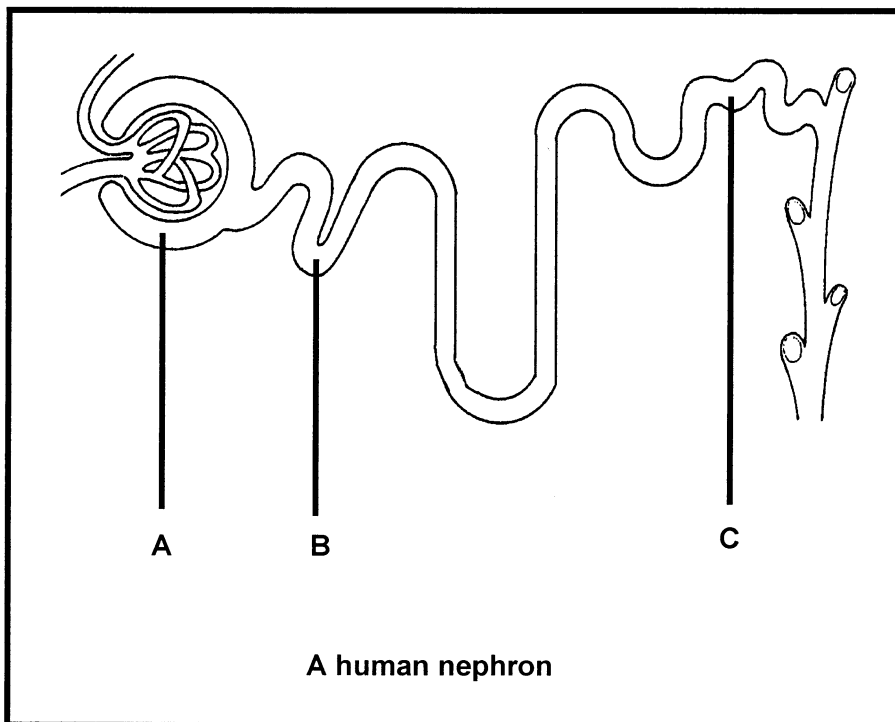
4.1 State why the kidney is regarded as an organ of :

4.1.1 Excretion (2)

4.1.2 Osmoregulation (2)

(4)

4.2 Study the diagram and table below and answer the questions that follow:



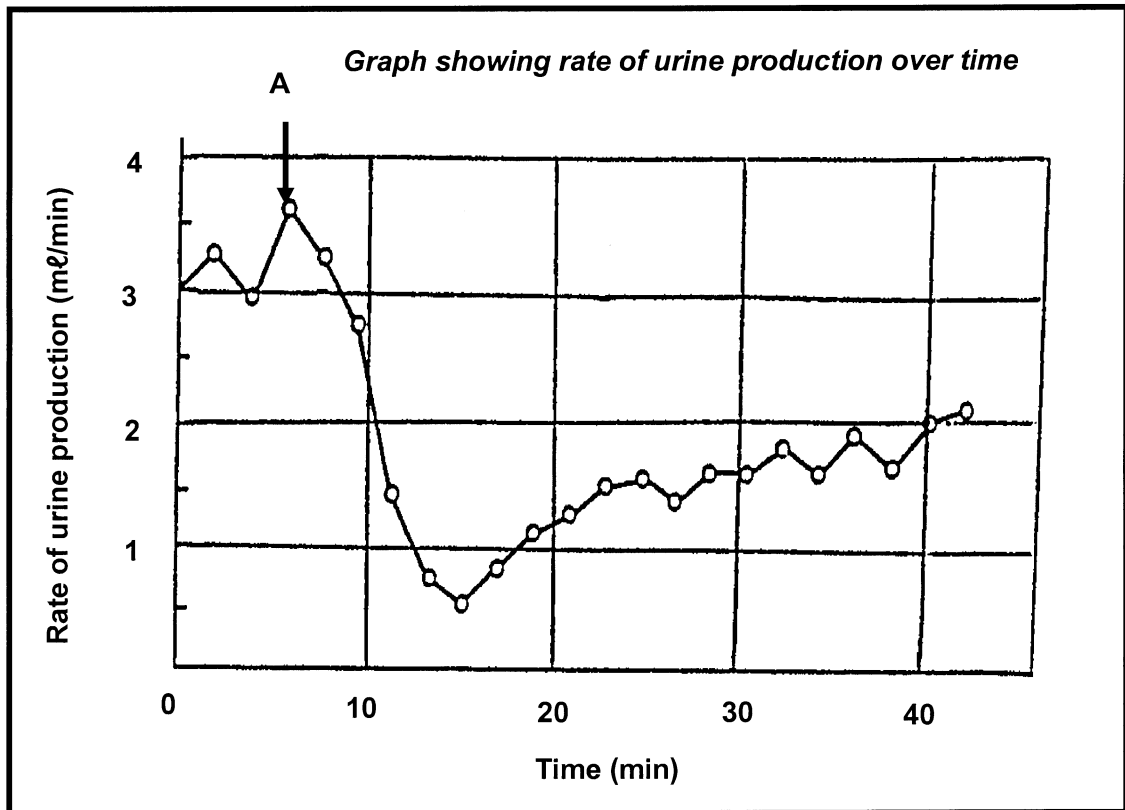
Filtrate samples were removed from parts A, B and C. A sample of blood was also taken from the renal artery. The samples were analysed to determine the amount of proteins, urea, glucose and ammonia present. The table shows the results in g/100 cm³.

COMPONENT	BLOOD SAMPLE	1	2	3
Protein	12,0	0	0	0
Urea	0,05	0,05	0,05	2,0
Glucose	0,25	0,25	0	0
Ammonium ions	0,004	0,004	0,004	0,75

4.2.1 What is the main difference in composition between the blood sample and sample 1? (1)

Senior Certificate Examination

- 4.2.2 Explain the reason for this difference given in QUESTION 4.2.1. (2)
- 4.2.3 Calculate the difference in urea concentration between the blood sample and sample 3. Show ALL calculations. (3)
- 4.2.4 A dye (substance used to change the colour of things) is introduced at point A and its passage is monitored under normal conditions. The colour may be briefly observed as it passes from A to B. It disappears for a short while before reappearing at C. Explain its temporary disappearance. (3)
- 4.2.5 Explain TWO ways in which part B is adapted to perform its function of re-absorption. (4)
- (13)
- 4.3 Study the following graph and answer the questions that follow. At point A the person was injected with a strong sodium chloride (salt) solution.



- 4.3.1 What was the rate of urine production 34 minutes after the injection? (2)

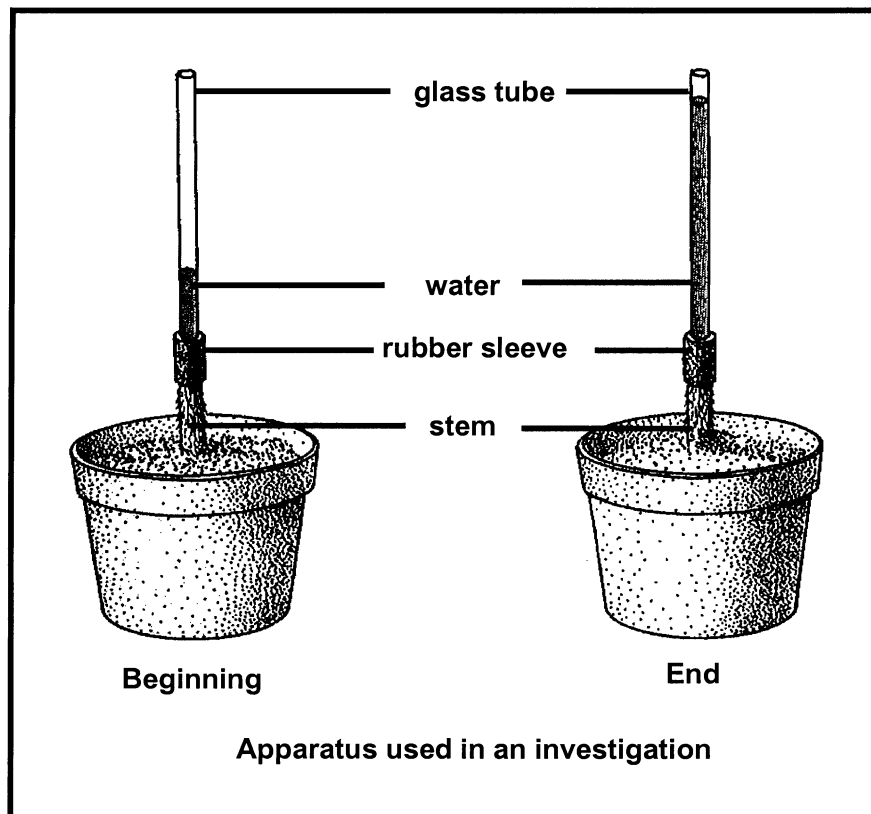


- 4.3.2 Did the sodium chloride injection increase or decrease the urine production? (1)
- 4.3.3 In hot weather one urinates less frequently and the urine is usually dark yellow in colour. Explain these observations. (5)

(8)

TOTAL QUESTION 4: 25**QUESTION 5**

- 5.1 Study the following diagrams and answer the questions that follow:



- 5.1.1 What is the aim of this investigation? (1)
- 5.1.2 Explain ONE reason for using a stem without leaves in this investigation. (2)

- 5.1.3 State ONE way in which this experimental set-up can be improved to give a more reliable result. (1)
- 5.1.4 Explain why water had moved up the tube by the end of the investigation. (3)
- 5.1.5 Explain the relationship between guttation and the process illustrated by the diagram. (4)
- 5.1.6 State TWO environmental factors that favour guttation. (2)
- 5.2 Study the following table and answer the questions that follow: (13)

Table showing the rates of water intake and transpiration over a 24-hour period in a woody plant

TIME	RATE OF WATER INTAKE (mℓ per hour)	RATE OF TRANSPIRATION (mℓ per hour)
00:00	1,5	4,9
03:00	1,5	5,0
06:00	1,5	5,3
09:00	12,1	10,0
12:00	22,5	17,2
15:00	24,4	18,8
18:00	14,8	18,0
21:00	3,3	15,0
24:00	1,5	4,9

- 5.2.1 Between which two time intervals was the change in the transpiration rate the smallest? (2)
- 5.2.2 State the relationship between water intake and transpiration in plants. (2)

- 5.2.3 Explain the difference in the rate of water between intake 15:00 and 18:00. (5)
- 5.2.4 Except for leaf structure, what other structures of a plant may restrict the intake of water in plants? (1)
- 5.2.5 Give an explanation for the water loss by transpiration during the hours of darkness. (2)

TOTAL QUESTION 5: 25
TOTAL SECTION B: 100
GRAND TOTAL: 150

