



education

Department of Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION – 2008

BIOLOGY P2

STANDARD GRADE

MAY/JUNE 2008

MARKS: 150

TIME: 2 hours

This question paper consists of 14 pages.

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

SECTION A**QUESTION 1**

- 1.1 Various possible options are provided as answers to the following questions. Choose the answer by writing only the letter (A – D) next to the question number (1.1.1 – 1.1.7) in the ANSWER BOOK.
- 1.1.1 Which of the following is a function of the choroid?
- A Reflects light
 - B Changes the shape of the eyeball
 - C Supplies the retina with food
 - D Responsible for vision in sighted persons under bright light
- 1.1.2 Nerve impulses for balance arise from the ...
- A tympanum.
 - B Eustachian tube.
 - C semi-circular canals.
 - D ossicles.
- 1.1.3 Which of the following functions as an effector in the human eye?
- A Iris
 - B Retina
 - C Yellow spot
 - D Suspensory ligament
- 1.1.4 The trunk of a pine tree, which would normally be single, may be divided into branches because ...
- A of the removal of the terminal/apical bud earlier in the tree's life.
 - B it received light only from one side.
 - C it received light from all sides.
 - D of apical dominance.
- 1.1.5 When the body temperature of a reptile increases too much, it may ...
- A arrange its body at right angles to the sun's rays.
 - B flatten its body and spread its legs.
 - C cause its skin to become lighter.
 - D increase its metabolic rate.

1.1.6 ONE difference between the renal artery and the renal vein is that the renal artery contains ...

- A less glucose.
- B more urea.
- C less water.
- D more carbon dioxide.

1.1.7 Under which conditions will guttation occur in plants?

- A High atmospheric pressure and high rate of transpiration
- B High root pressure and high humidity of the air
- C Low atmospheric pressure and low humidity of the air
- D High root pressure and high rate of transpiration (7 x 2) (14)

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 – 1.2.6) in the ANSWER BOOK.

1.2.1 The growth reaction of plants as a result of a unilateral light stimulus

1.2.2 The protective membrane situated over the cornea of the eye

1.2.3 The substance which is secreted in the auditory canal of the human ear

1.2.4 The fluid found between animal cells

1.2.5 Plant hormones that move away from or are destroyed by light

1.2.6 A neuron that conducts impulses from a receptor to the spinal cord (6)

- 1.3 Choose a description from COLUMN II that matches a word/words in COLUMN I. Write only the letter (A – H) next to the question number (1.3.1 – 1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Xerophytes	A Rapid, automatic response to a stimulus
1.3.2 Negative feedback	B Plant hormone that promotes cell elongation in plants
1.3.3 Pits	C Plants that are adapted to survive in dry conditions
1.3.4 Reflex action	D Plants that are adapted to survive in humid conditions
1.3.5 Abscisic acid	E Allows lateral movement of water in xylem vessels
	F Plant hormones involved in causing the leaves of plants to fall off
	G The connection of all the systems in the body to ensure integrated functioning
	H A homeostatic reaction that counteracts any changes in the metabolic activities in the human body

(5 x 2) (10)

1.4 An investigation was conducted by two learners.

Cobalt chloride paper was used as an indicator of the presence of water. It is blue when dry and turns pink when wet.

The two learners attached cobalt chloride paper to the upper and lower surfaces of the leaves of the same plant. They then measured the time it took for the cobalt chloride paper to change colour. This process was carried out on 5 leaves. The results of the investigation are shown in the table below.

Surface of the leaf	Time taken for the cobalt chloride paper to turn pink for each leaf (seconds)				
	Leaf 1	Leaf 2	Leaf 3	Leaf 4	Leaf 5
Upper surface	80	85	93	90	101
Lower surface	6	15	9	17	10

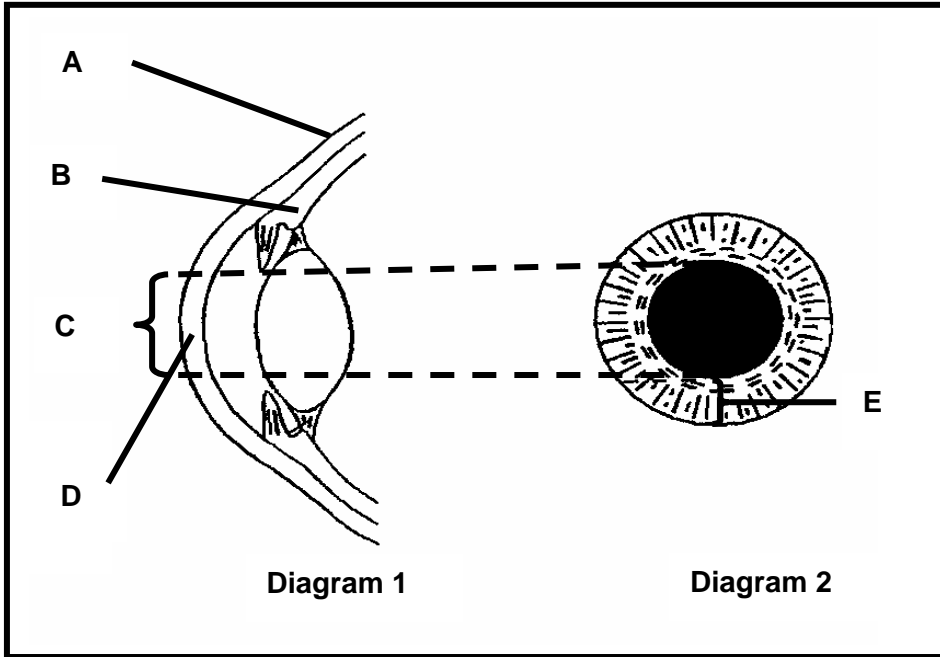
- 1.4.1 What was the purpose of this investigation? (2)
- 1.4.2 Calculate the average time it took for the cobalt chloride paper to turn pink on the lower surface of the leaves. Show your calculation. (4)
- 1.4.3 What conclusion can you draw from the data in the table? (2)
- 1.4.4 Describe TWO ways, other than using the same plant, by which learners could have ensured reliable results. (2)
- 1.4.5 Name TWO processes that are responsible for the upward movement of water in plants. (2)
- 1.4.6 Explain ONE structural adaptation of the leaves of xerophytes to reduce transpiration. (2)
- (14)**

- 1.5 Answer the following questions on the Malpighian body.
- 1.5.1 Name the process that takes place in the Malpighian body during urine formation. (1)
- 1.5.2 Name the specialised cells in the Bowman's capsule that make the process named in QUESTION 1.5.1 possible. (1)
- 1.5.3 Name the liquid found in each of the following:
- (a) Glomerulus (1)
 - (b) Space inside Bowman's capsule (1)
- 1.5.4 What causes the hydrostatic pressure inside the glomerulus? (2)
(6)
- TOTAL QUESTION 1: 50**
TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Diagram 1 shows a more convex lens and Diagram 2 a larger pupil of the human eye under the same environmental conditions. Study the diagrams and answer the questions that follow.



- 2.1.1 Identify the parts labelled A, B and D. (3)
 - 2.1.2 Name the condition that will lead to each of the following:
 - (a) The increased size of the pupil shown in Diagram 2 (2)
 - (b) The more convex lens shown in Diagram 1 (2)
 - 2.1.3 Describe the changes that took place in part E that resulted in the larger pupil size in Diagram 2. (4)
 - 2.1.4 Explain how vision would be affected if the part labelled B stopped functioning. (3)
 - 2.1.5 State TWO ways in which the brain is protected. (2)
- (16)**

2.2 Answer the following questions on the human ear.

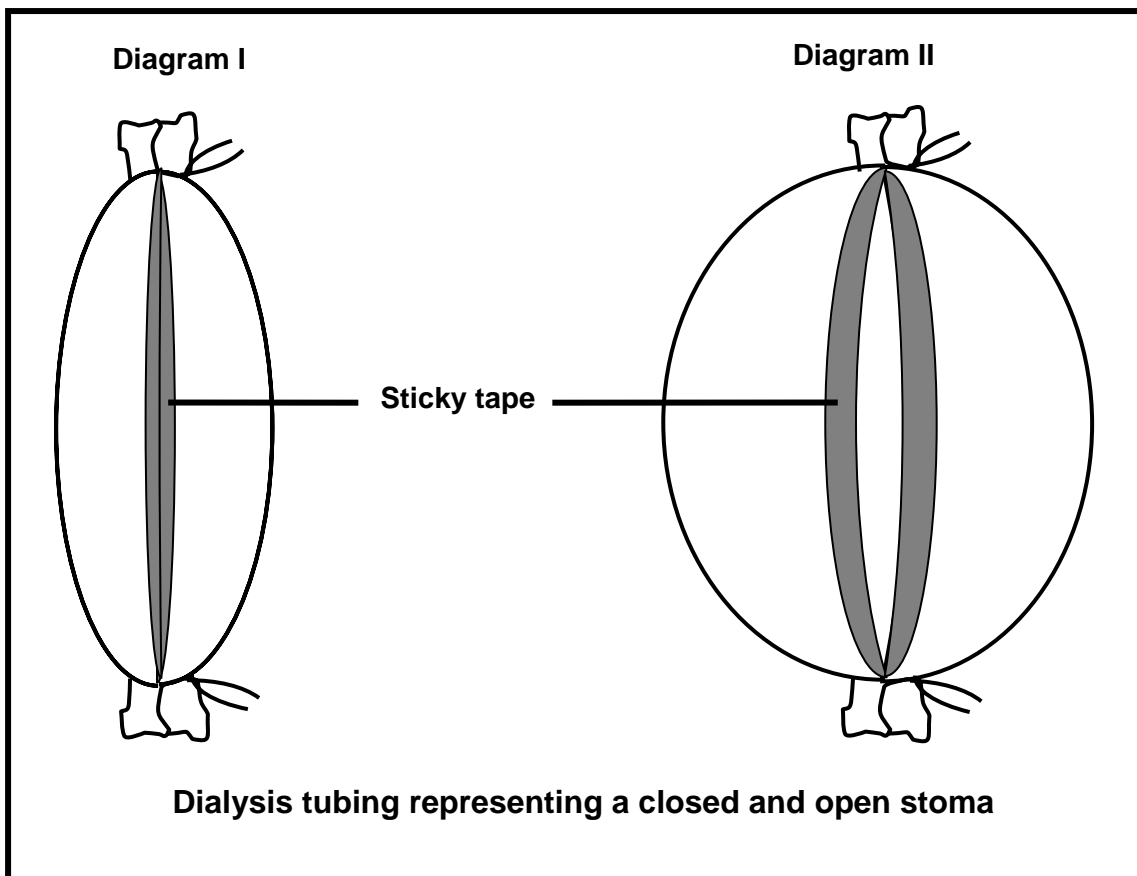
- 2.2.1 Make a labelled diagram of a section through the air-filled regions of the human ear. (6)
 - 2.2.2 Explain why hearing will be impaired in a person who has a cold. (3)
- (9)**

TOTAL QUESTION 2: 25

QUESTION 3

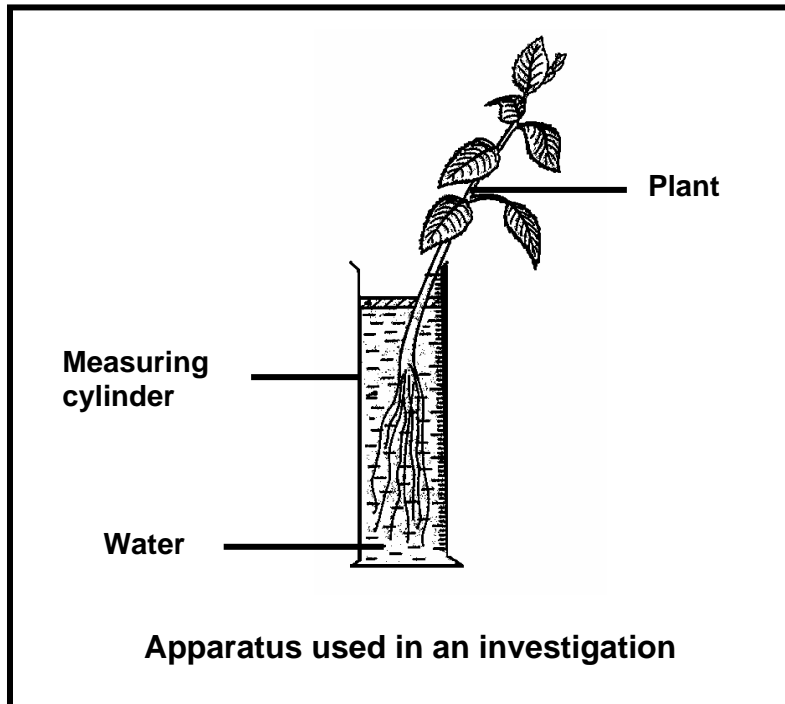
3.1 An investigation was carried out using dialysis tubing to illustrate how the stoma of a plant opens. Dialysis tubing is selectively permeable.

Two pieces of dialysis tube, each about 15 cm long, were filled with 30% sucrose solution and both ends were tightly tied. A strip of sticky tape was stuck on the inner side of each dialysis tube as indicated in the diagrams. They represent a closed stoma as illustrated in Diagram I below. They were then placed in a dish containing distilled water, and were left for about 12 hours. At the end of 12 hours they appeared like the ones illustrated in Diagram II below.



- 3.1.1 State ONE function of stomata. (1)
 - 3.1.2 Tabulate TWO structural differences between the *dialysis tubes* and the *guard cells*. (5)
 - 3.1.3 Explain what led to the change in the appearance of the dialysis tubings from Diagram I to Diagram II. (4)
 - 3.1.4 Explain how the change from Diagram I to Diagram II comes about in plants. (4)
- (14)**

3.2 The apparatus containing the plant shown in the diagram below was used in an investigation to show water loss from plants. The volume of water in the measuring cylinder before and after a 24-hour period was recorded.



The results of the investigation are shown in the table below:

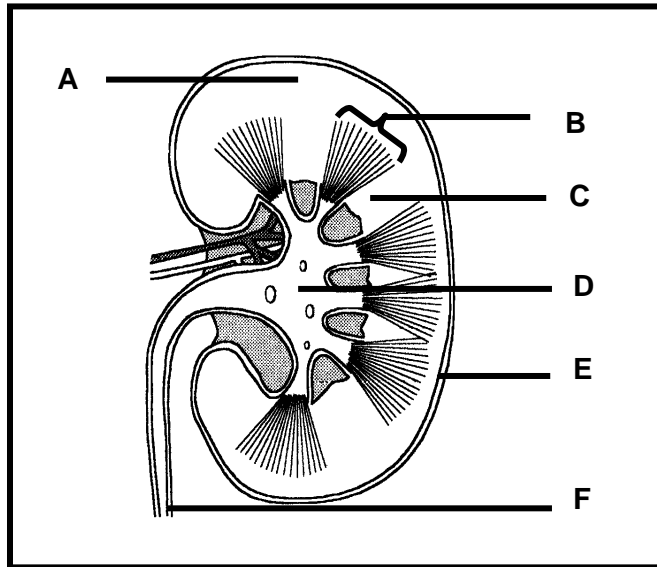
	Volume of water in measuring cylinder (cm ³)
Start of investigation	100
24 hours later	87

- 3.2.1 What name is given to the loss of water vapour from the leaves? (1)
- 3.2.2 Calculate the volume of water that was absorbed by the roots of the plant during the 24-hour period. Show your calculation. (3)
- 3.2.3 State ONE precaution you would take when setting up this investigation. (1)
- 3.2.4 Explain THREE ways in which movement of water through the roots, stems and leaves is important to plants. (3)
- 3.2.5 Give THREE ways in which the design of the investigation could be altered to obtain a greater change in the volume of water in the same period of time. (3)

TOTAL QUESTION 3: 25

QUESTION 4

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



- 4.1.1 Name the organ represented in the diagram. (1)
 - 4.1.2 Identify parts A, B, C and D. (4)
 - 4.1.3 Give the function of each of the following parts:
 - (a) E (1)
 - (b) F (1)
 - 4.1.4 Give THREE functions of the organ named in QUESTION 4.1.1. (3)
- (10)**

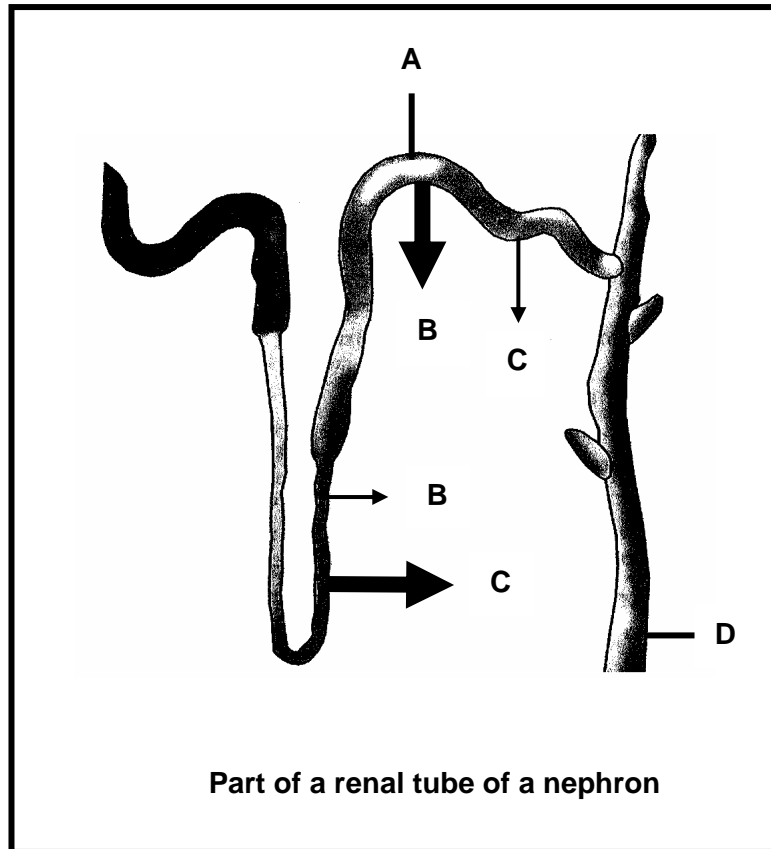
4.2 The table below shows the daily loss of water in various forms from a person's body over a two-day period. Study the table and answer the questions that follow.

Days	Amount of water lost (%)			
	Urine	Sweat	Exhaled air	Faeces
Day 1	60	20	?	5
Day 2	50	30	16	4

- 4.2.1 What percentage of water was lost from the person's body as exhaled air during day 1? Show your calculation. (3)
 - 4.2.2 The percentage of water lost in the urine decreased from day 1 to day 2. Give TWO possible reasons for this. (2)
- (5)**

4.3 The diagram below shows part of the renal tube of a nephron. Study the diagram and answer the questions that follow.

NOTE: Arrows B and C in the diagram indicate the direction in which sodium ions or water move. The thicker arrows indicate larger amounts of the particular substance than the thinner arrows.

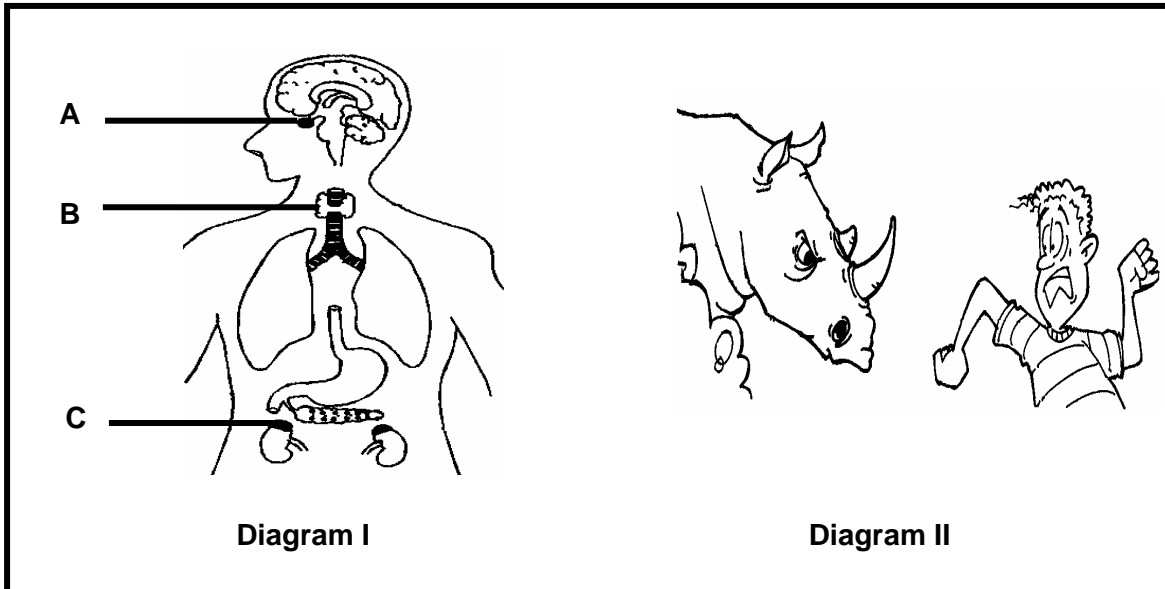


- 4.3.1 Identify each of the substances, sodium ions or water, whose movement is represented by the arrows B and C respectively. (2)
 - 4.3.2 Name the physical process according to which each of substances B and C moves. (2)
 - 4.3.3 Describe the process which takes place at A that plays a role in the regulation of blood pH. (5)
 - 4.3.4 Name the substance formed at D. (1)
- (10)**

TOTAL QUESTION 4: 25

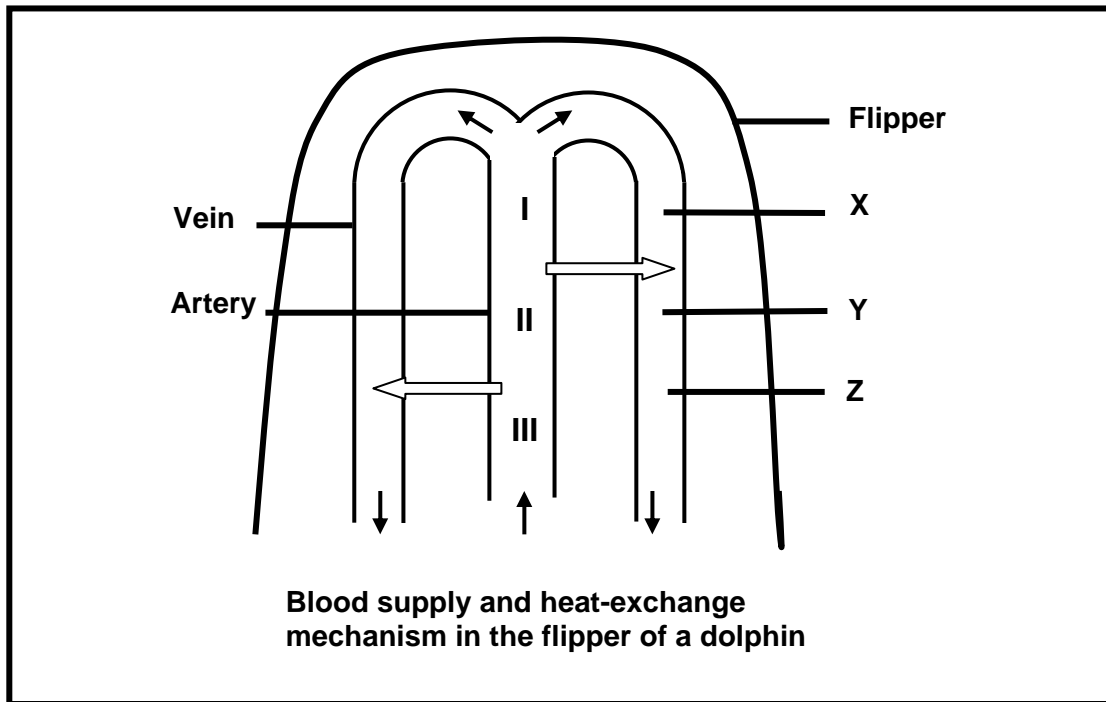
QUESTION 5

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



- 5.1.1 Identify glands B and C. (2)
 - 5.1.2 A study of all three glands in Diagram I showed that they each have a large number of blood capillaries close to the cells. Give an explanation for this feature. (2)
 - 5.1.3 All three glands in Diagram I were stimulated in the person shown in Diagram II. Which ONE of the glands, A or B, was stimulated first? (1)
 - 5.1.4 Explain your answer to QUESTION 5.1.3. (5)
 - 5.1.5 What happens to each of the following in the person in Diagram II?
 - (a) Blood supply to the gut (1)
 - (b) Breathing rate (1)
 - (c) Hair-erector muscles of the skin (1)
- (13)**

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



NOTE: The temperature of the body of the dolphin is 37 °C, while the temperature of the surrounding water is 7 °C.

5.2.1 Compare the blood temperatures as indicated at the following points in the blood vessels:

- (a) II and III (2)
- (b) II and X (2)

5.2.2 Describe THREE essential features that will allow for heat exchange to take place between two blood vessels. (3)

5.2.3 Explain the advantage of each of the following:

- (a) Heat-exchange mechanism (2)
 - (b) Shivering in humans (3)
- (12)**

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