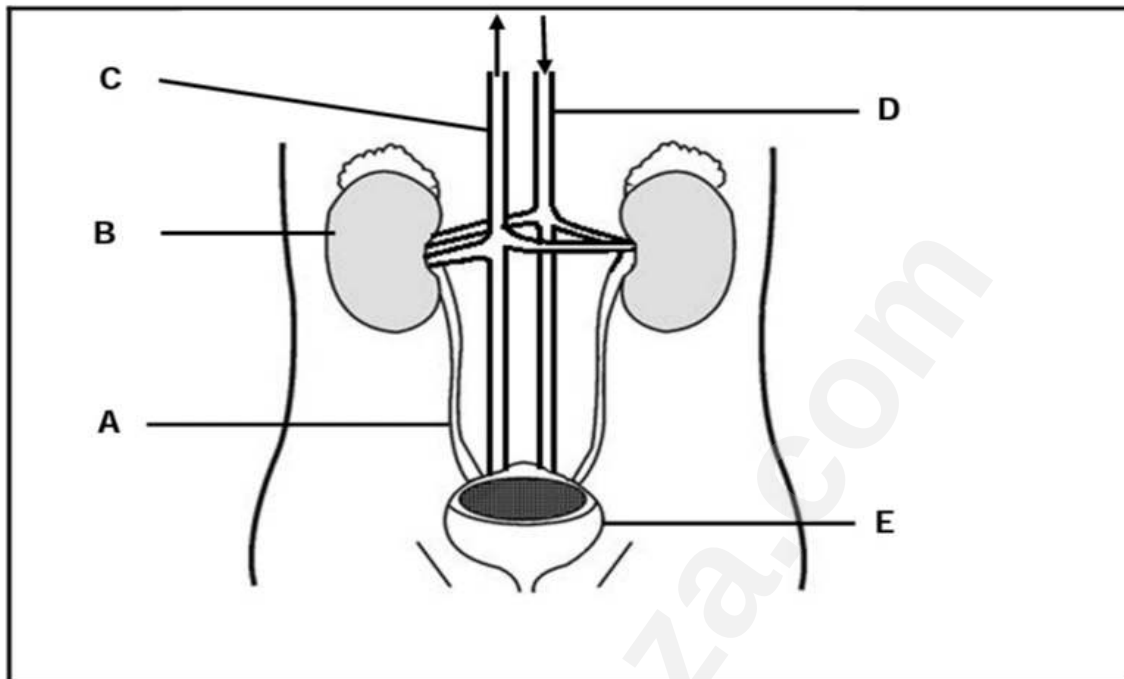




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2.2 The diagram below shows the structure of the human urinary system.



2.2.1 Give labels for the following parts:

- (a) **A** (1)
- (b) **B** (1)
- (c) **E** (1)

2.2.2 Give ONE difference between the composition of blood in **C** and **D**. (2)

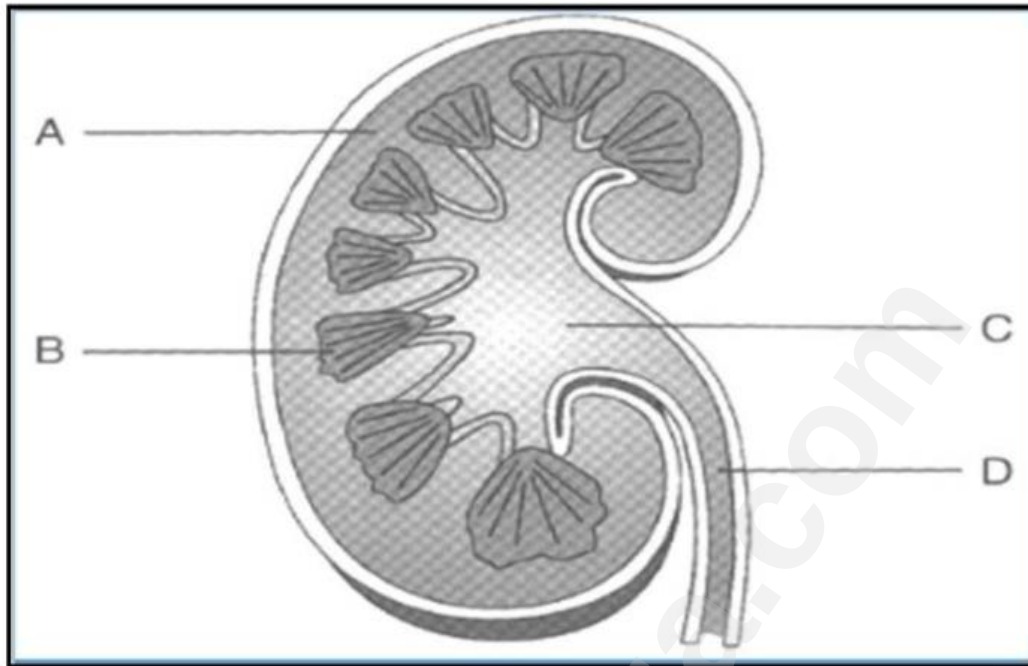
2.2.3 The part labelled **B** consists of millions of micro-tubules called nephrons where blood is being filtered and purified. A part of the nephron is the Malpighian corpuscle/body.

Draw a labelled diagram of a Malpighian corpuscle/body. (4)

2.2.4 The flow of urine into the urinary bladder can be blocked at the part labelled **A**. The blockage causes severe pain and possible infection.

- (a) What is the possible cause of blockage of urine in the part labelled **A**? (1)
- (b) Give a possible preventative measure to avoid such blockages in the urinary system. (1)

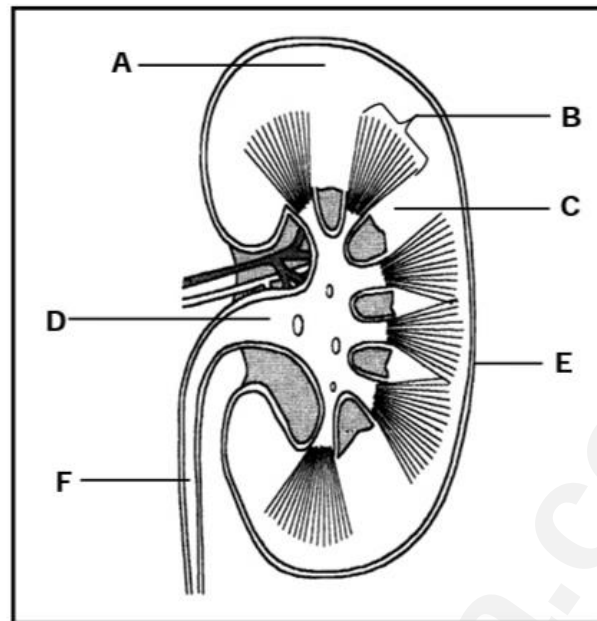
2.1 The diagram below shows a longitudinal section through a human kidney



- 2.1.1 Provide labels for **A**, **B** and **C**. (3)
- 2.1.2 Give the LETTER and NAME of the part where filtration of blood occurs. (2)
- 2.1.3 State the function of part numbered **D**. (2)
- 2.1.4 Explain how the functioning of the kidney will be affected if part **D** is blocked by a large kidney stone. (2)
- (9)

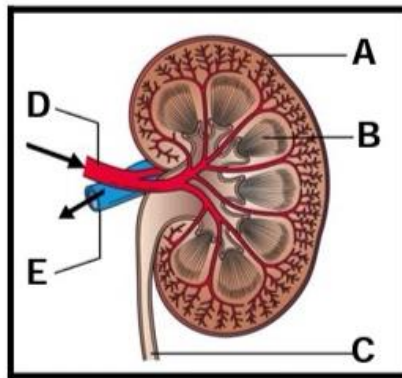
3.1

Study the diagram below and answer the questions that follow.



- 3.1.1 Name the organ represented in the diagram. (1)
- 3.1.2 Identify region **A** and parts **B** and **D**. (3)
- 3.1.3 Give the function of each of the following parts:
- (a) E (1)
- (b) F (1)
- 3.1.4 Give THREE functions of the organ named in QUESTION 3.1.1. (3)
- (9)**

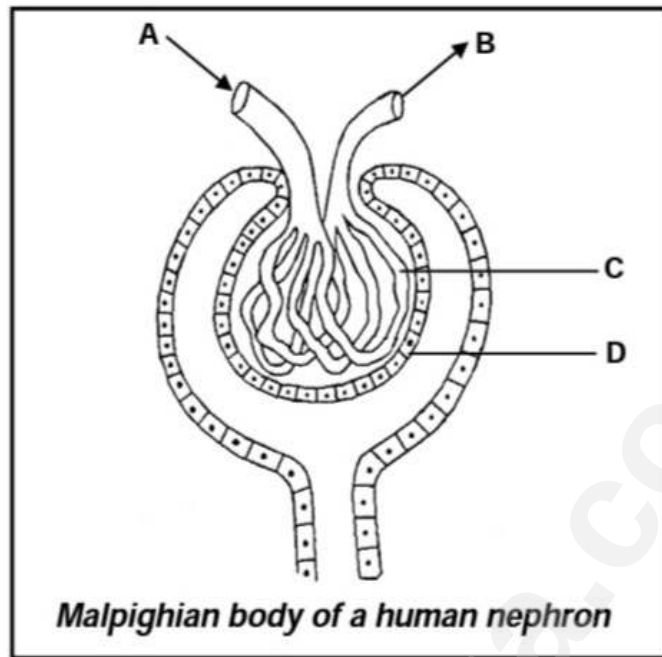
- 1.4 Study the longitudinal section through the human kidney and answer the questions that follow.



- 1.4.1 Label parts A, B and C. (3)
- 1.4.2 Which labelled part becomes a site of obstruction to the flow of urine when a pellet of renal stone is dislodged? (1)
- 1.4.3 State the NAME and LETTER of the blood vessel that contain higher percentage of waste products. (2)
- 1.4.4 Which one of the labelled blood vessels has the lowest blood pressure? (1)

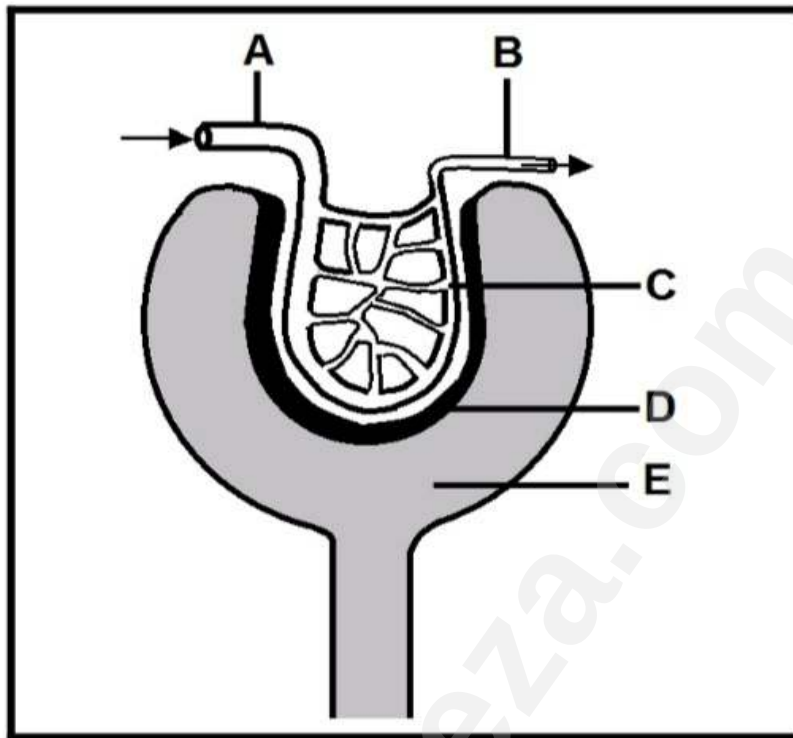
3.2

Study the diagram below and answer the questions that follow.



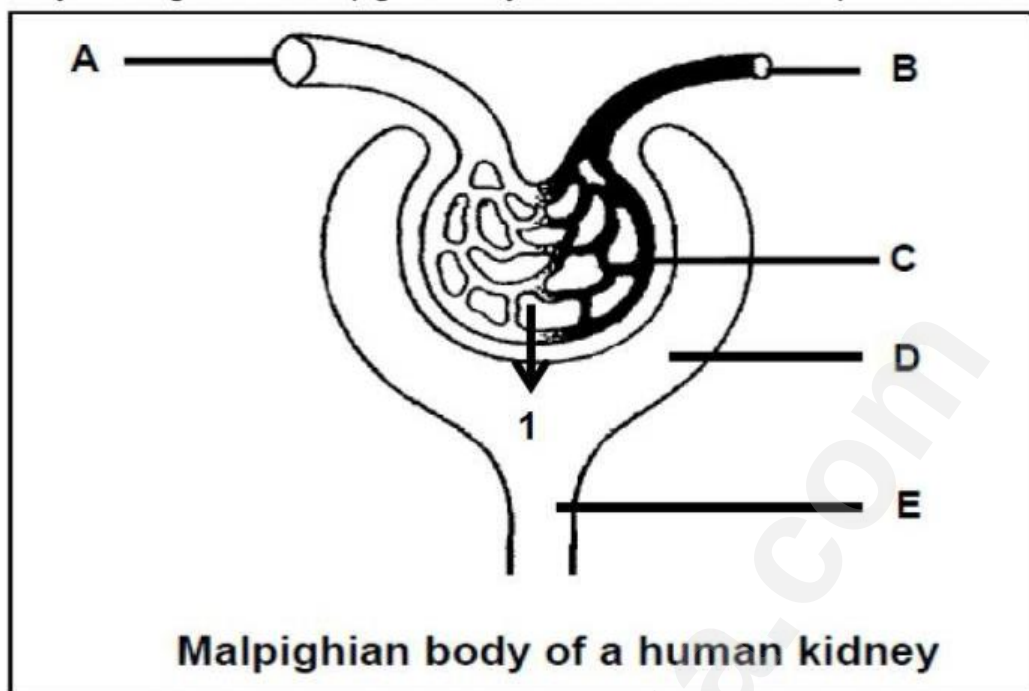
- 3.2.1 In which region of the kidney would you find this structure? (1)
- 3.2.2 Name the process in urine formation that occurs in this structure. (1)
- 3.2.3 Identify part **C**. (1)
- 3.2.4 Describe TWO structural adaptations of part **C** for the process in QUESTION 3.2.2 above. (4)
- 3.2.5 Part **A** is wider than part **B**. What is the importance of this? (2)
- 3.2.6 Name the hormone secreted when there is a shortage of water in **A**. (1)
- 3.2.7 Describe how the hormone named in QUESTION 3.2.6 plays its role under such conditions. (3)
- (13)**

- 3.3 The diagram below shows the structure of a malpighian corpuscle. Study the diagram and answer the questions that follow.



- 3.3.1 Name parts labelled A, B and C. (3)
- 3.3.2 Which physiological process takes place in the diagram shown in the above diagram? (1)
- 3.3.3 Explain how the difference in diameter of the parts labelled A and B is responsible for the process that occurs in the malpighian body. (6)
- 3.3.4 Name the specialised cells found at D. (1)
- 3.3.5 Describe how these cells mentioned in QUESTION 3.3.4 are structurally suited for their function. (2)

2.2. Study the diagram of a Malpighian body below and answer the questions that follow.

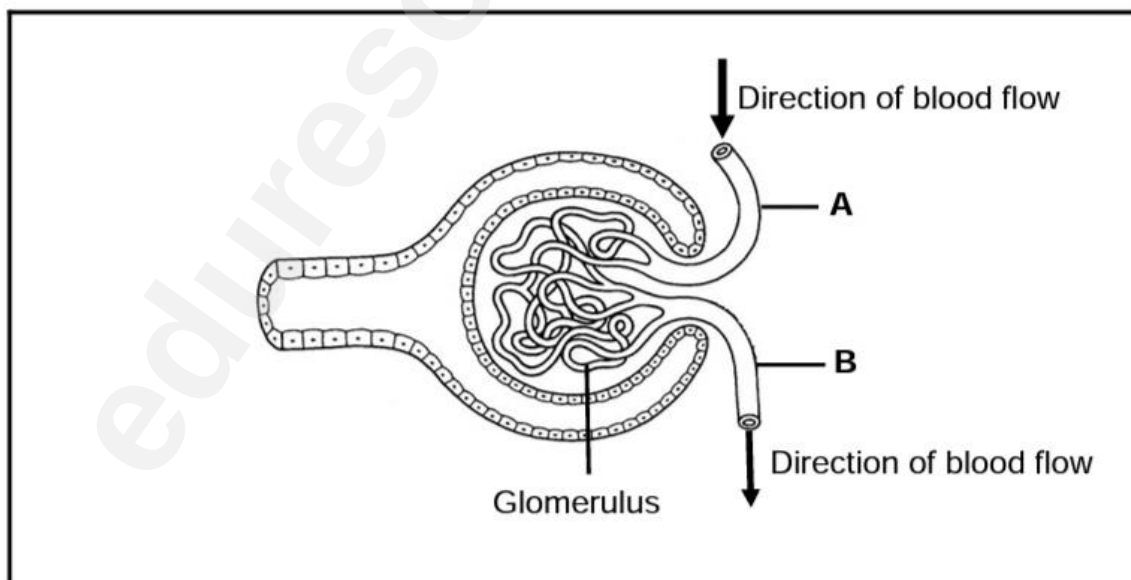


2.2.1 Identify the parts labelled C, D and E. (3)

2.2.2 Explain the significance of part B having a smaller diameter than part A. (2)

2.2.3 Name and describe the process taking place in part 1. (4)
(9)

2.3 Study the representation of a Malpighian corpuscle of the nephron.

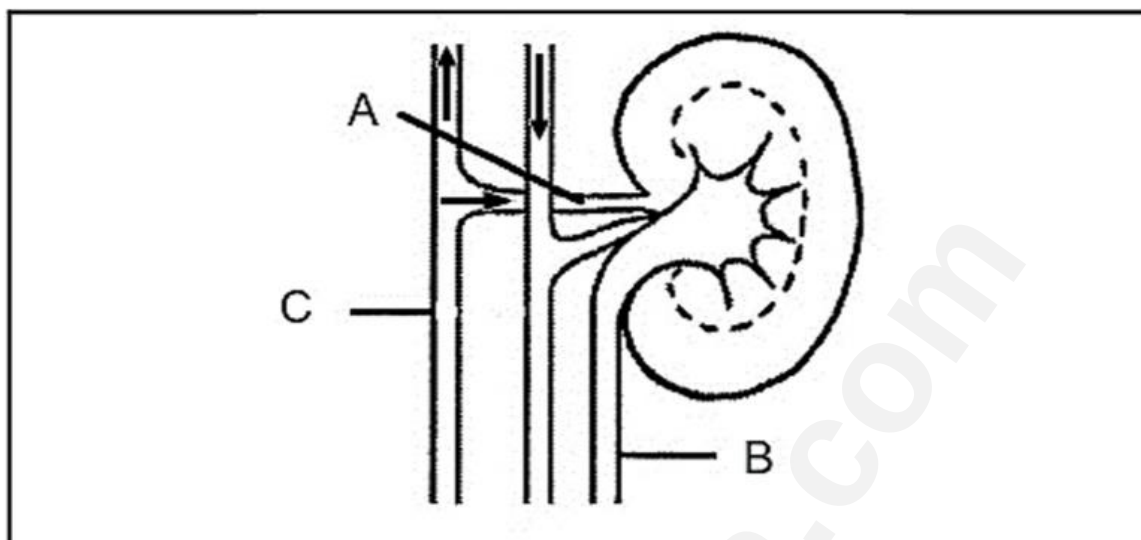


2.3.1 Identify the represented part of the nephron shown. (1)

2.3.2 Name the parts labelled A and B. (2)

2.3.3 Explain why the above diagram does not accurately represent one of the structural adaptations for the process taking place in it. (3)

- 3.2 The accompanying diagram shows part of the excretory system of the human body. Study the diagram and the table below before answering the questions that follow.



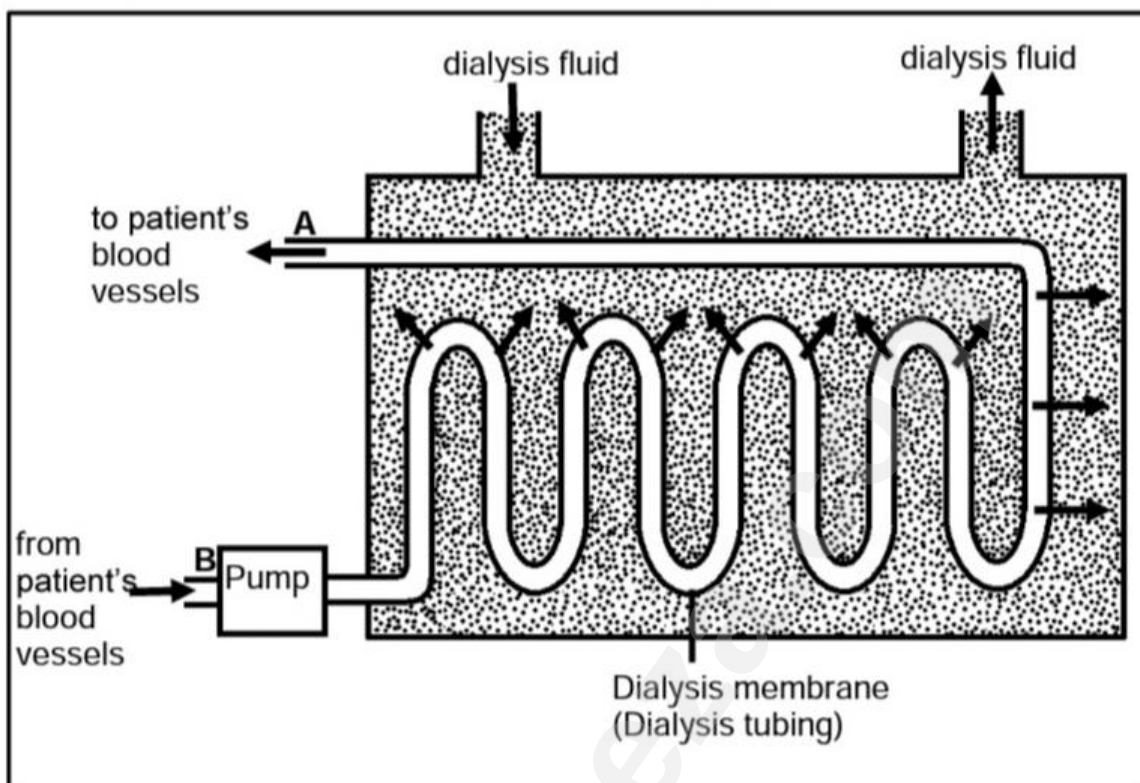
- 3.2.1 Identify the labels marked **A**, **B** and **C**. (3)

The table below shows the composition of fluid in **Structure A** and **Structure B** of the diagram.

Component	Structure A	Structure B
	Concentration (%)	Concentration (%)
urea	3	200
glucose	10	0
amino acids	5	0
salts	72	150
proteins	800	0

- 3.2.2 By comparing the contents of structure **A** and **B**, what conclusion can be drawn regarding the functions of the kidney? (1)
- 3.2.3 Would you consider that the person with the medical report shown above suffers from diabetes mellitus? Explain your answer. (4)
- 3.2.4 Which organic substances in the table are considered to be useful? Give a reason for your answer. (4)

- 3.2 An extract on renal failure and its treatment is given below. (The diagram below represents a dialysis machine, used to treat patients with renal failure.)



Kidneys can become so damaged that they no longer function properly, and we say that the person has renal failure. People with severe renal failure can be treated by dialysis, using a dialysis machine, to purify the blood. Dialysis is the separation of molecules by size, the smaller molecules diffusing through a dialysis tubing (selectively permeable membrane). The process takes between three and six hours and needs to be done two or three times a week.

- 3.2.1 Describe what *renal failure* is. (2)
- 3.2.2 Which process is illustrated in the diagram above? (1)
- 3.2.3 At what point in the diagram (**A** or **B**) would you expect the highest concentration of urea? (1)
- 3.2.4 Describe how the purification of blood takes place in the dialysis machine. (3)
- 3.2.5 Explain why dialysis tubing needs to be selectively-permeable. (2)
- 3.2.6 Renal failure affects the osmoregulatory function of the kidney, so that it no longer excretes water efficiently. Explain the effect of renal failure on the patient's blood pressure. (3)

ESSAYS**QUESTION 4**

The kidney is mainly responsible for maintaining the balance of water and useful substances in the human body rather than getting rid of it. Write an essay to explain the above mentioned statement with reference to the following:

Glomerular filtration

Tubular reabsorption

Diseases affecting kidney function

(17)

Synthesis (3)

TOTAL QUESTION 4: [20]

QUESTION 4

Describe how the human body maintains carbon dioxide concentration in the blood when it rises above normal levels during strenuous exercise and also describe how salt balance is maintained in the body if it drops below normal level.

Content: (17)

Synthesis: (3)

QUESTION 4

Write a short essay describing the homeostatic functioning of the nephron if a person consumes excessive amounts of water in a short period of time.

(17)

Synthesis (3)

TOTAL SECTION C: 20

QUESTION 4

Describe how the salt and water levels are maintained in a dehydrated person who consumed high concentrations of salt.

Content: (17)

Synthesis: (3)