

Section A

[60 marks]

Answer **all** questions from this section.

1 Figure 1 shows a part of the ileum structure.

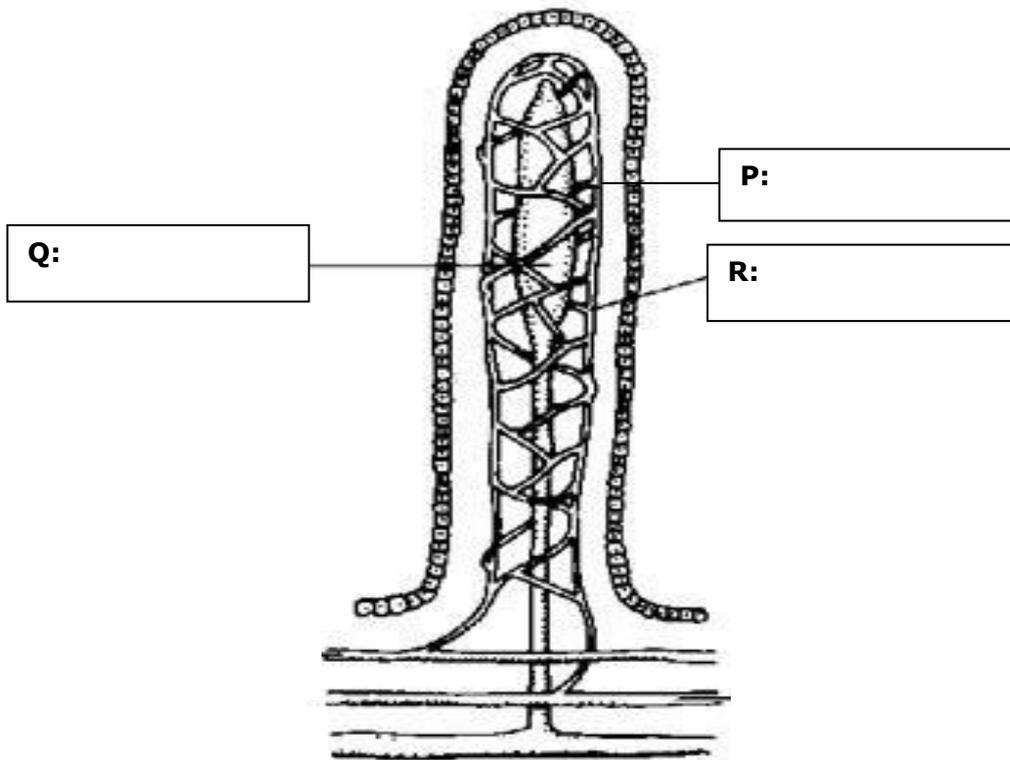


FIGURE 1

(a)(i) Name the structure shown in Figure 1.

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[1 mark]

(ii) State the function of the structure in a(i).

.....
.....
[1 mark]

(b) Label P, Q and R in Figure 1

[2 marks]

(c) State three structural features of the structure in Figure 1 which enable it to carry out its function efficiently.

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[3 marks]

(d) Explain how proteins and lipids are absorbed in the structure shown in figure 1.

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[3 marks]

(e) A teenager used to take an excessive amount of protein in his daily diet. Explain how a liver functions in the regulation of the excess protein.

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[3 marks]

- 2 Figure 2 shows different levels of cell organization in a woody plant. A specific examples for each level is shown in the figure 2.

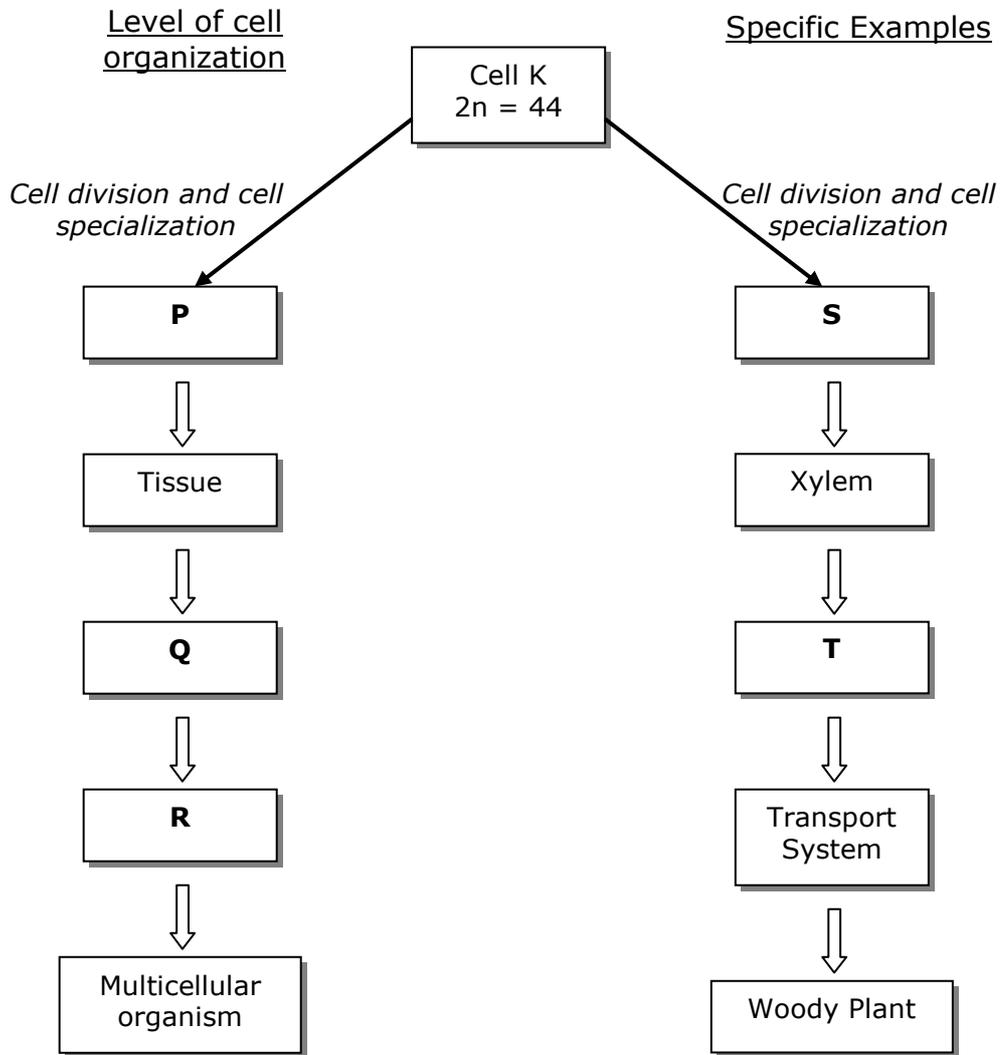


FIGURE 2

- (a) State the level of cell organization represented by P, Q and R

P :

Q :

R :

[3 marks]

(b) Give **one** example of S and T

S :

T :

[2 marks]

(c) Name the type of cell division that occurs in the cell K to form S

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[1 marks]

(d) What is the chromosomal number of a somatic cell in the woody plant.

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[1 marks]

(e) Explain why is S different from cell K ?

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[2 marks]

(f)(i) State the specific function of the xylem ?

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[1 marks]

(ii) Give two structural adaptations of xylem to enable it to function effectively.

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[2 marks]

3. Figure 3(i) shows a colonisation and succession processes in a pond. R, S and T are representatives of the plant type normally found in a pond community.

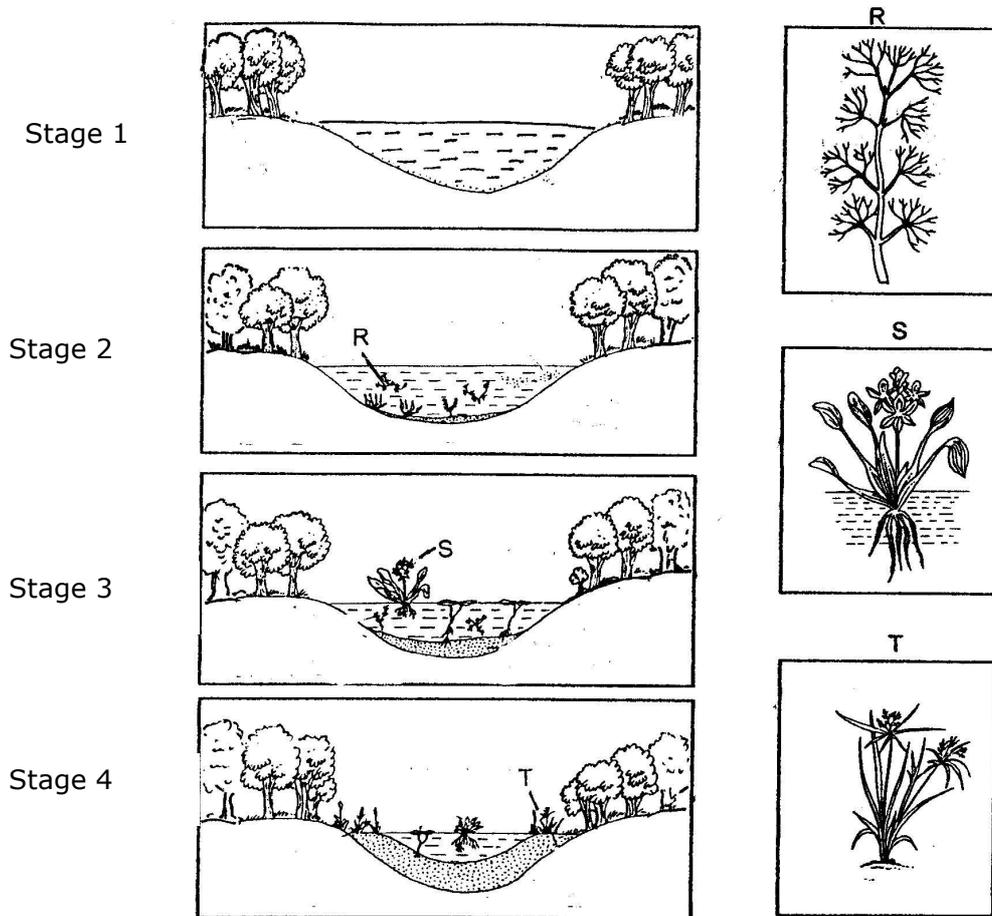


FIGURE 3(i)

(a) (i) Based on Figure 3(i), state the type of plant which is represented by R, S and T

R:

S:

T:

[3 marks]

(ii) State the structural features of the plant R and S that make them very well adapted and become dominant at the particular stage of the succession.

R:

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S:

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[2 marks]

(b) The successor species brings about several changes in the pond environment. Explain one of the changes that lead to the continued succession in the pond.

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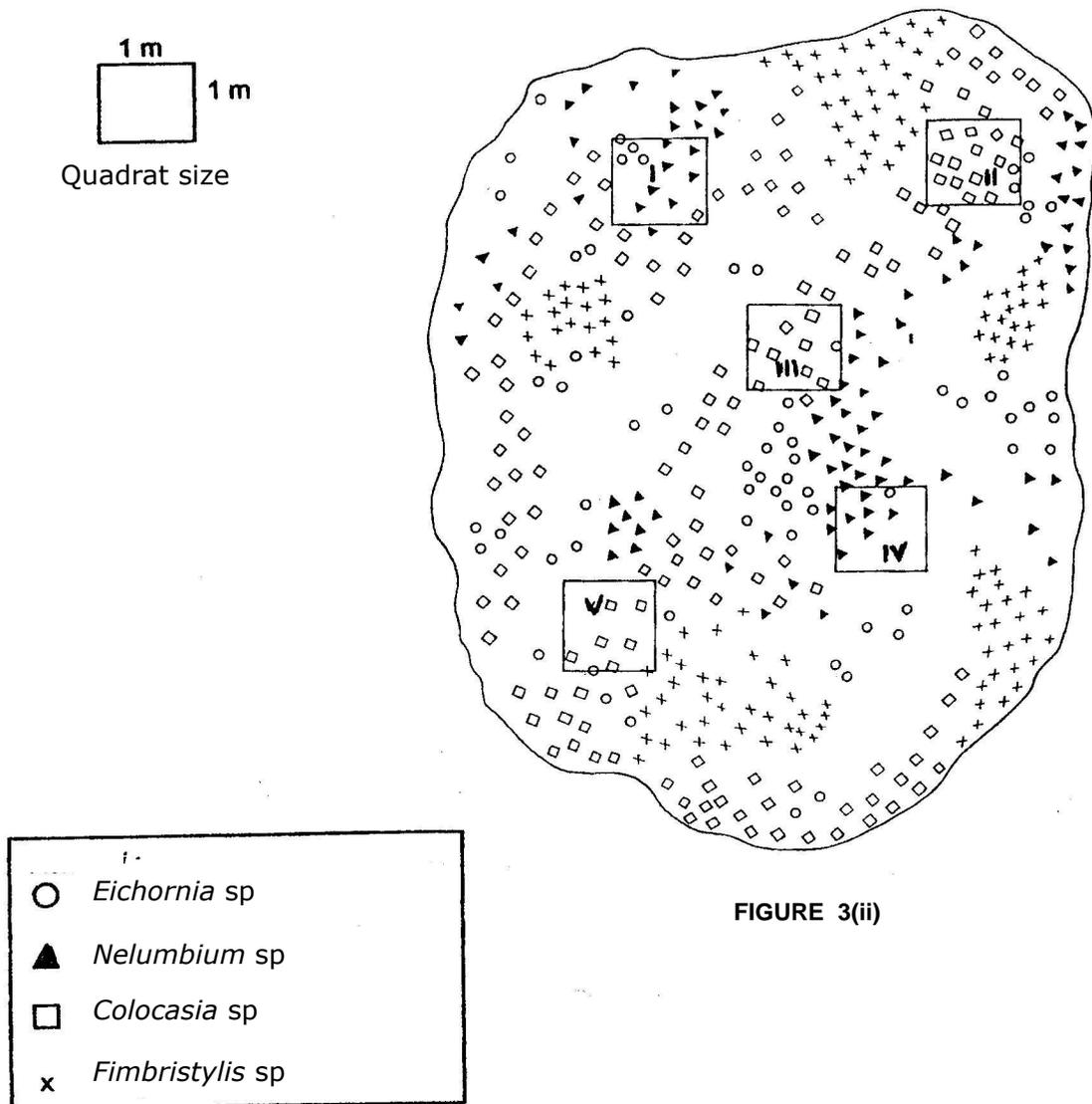
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[2 marks]

(c) Figure 3(ii) shows a population study carried out on the pond at stage 4 in the Figure 3(i). Five quadrat samplings were taken at random.



(i) Calculate the density of *Colocasia* sp. in the pond ecosystem?

[2 Marks]

(ii) The area surrounding the pond has been developed for vegetables farming and animal husbandry. Explain the effect of the farming activities on the pond ecosystem.

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[3 marks]

4 Figure 4(i) shows a human skeleton and figure 4(ii) shows a section of the human arm.

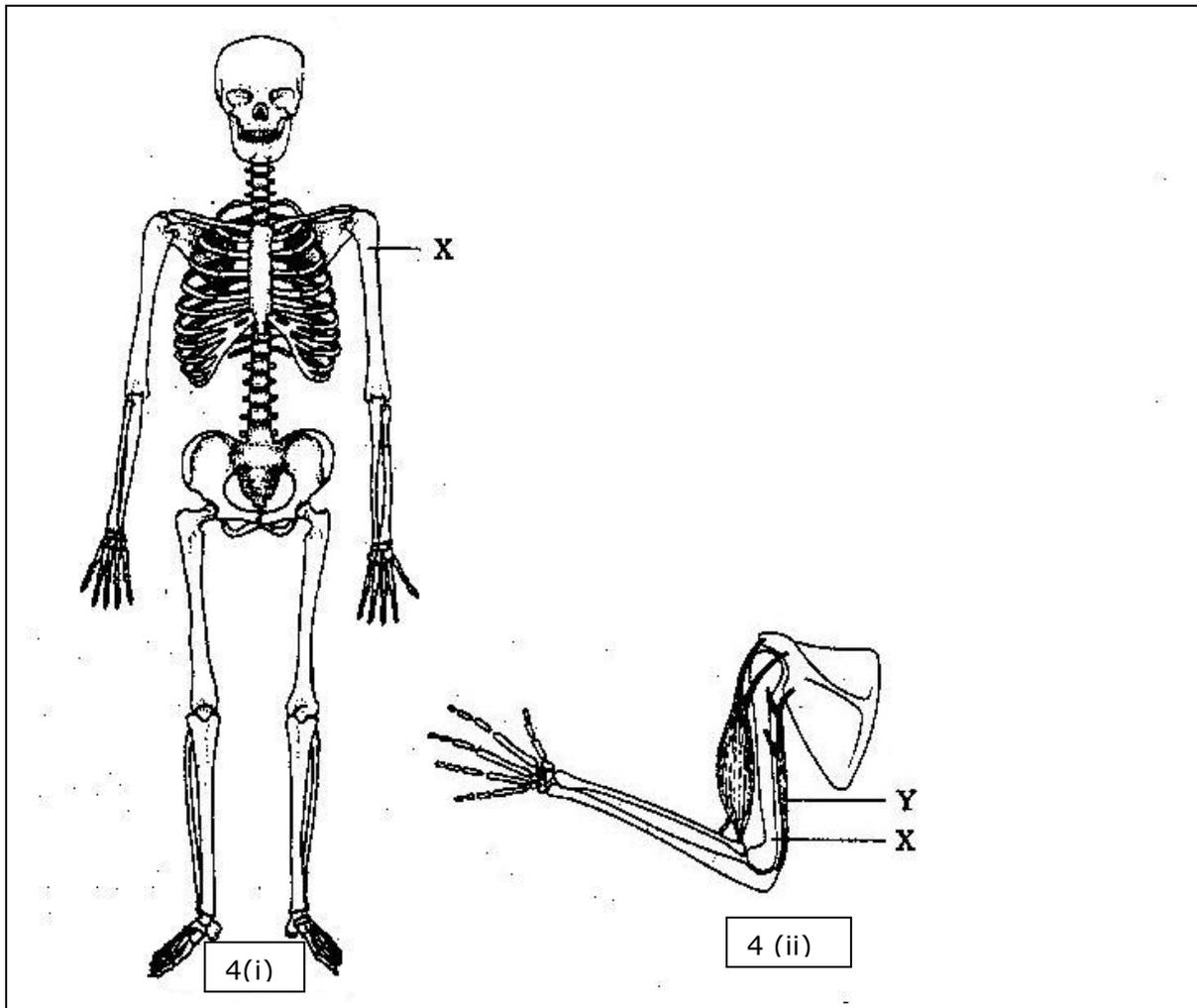


FIGURE 4

(a) Name the main tissue that forms

(i) structure X :

(ii) structure Y :

[2 marks]

(b) Through cell organization, the tissues named in a(i) and a(ii) are able to form complex functional structures in the human body. Explain how these different types of tissues are suited to their functions respectively.

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[4 marks]

(c) On figure 4(i) , circle the joint which only allows movement in one plane.

[1 marks]

(d) *Bones, joints ,muscles, ligaments and tendons make up the musculoskeletal system in humans.*

(i) Name the condition experienced by most athletes that occur suddenly to their muscles which caused intense pain and inability to move their limbs.

.....

[1 marks]

(ii) Explain how muscular dystrophy and arthritis can impair movements.

Muscular dystrophy :

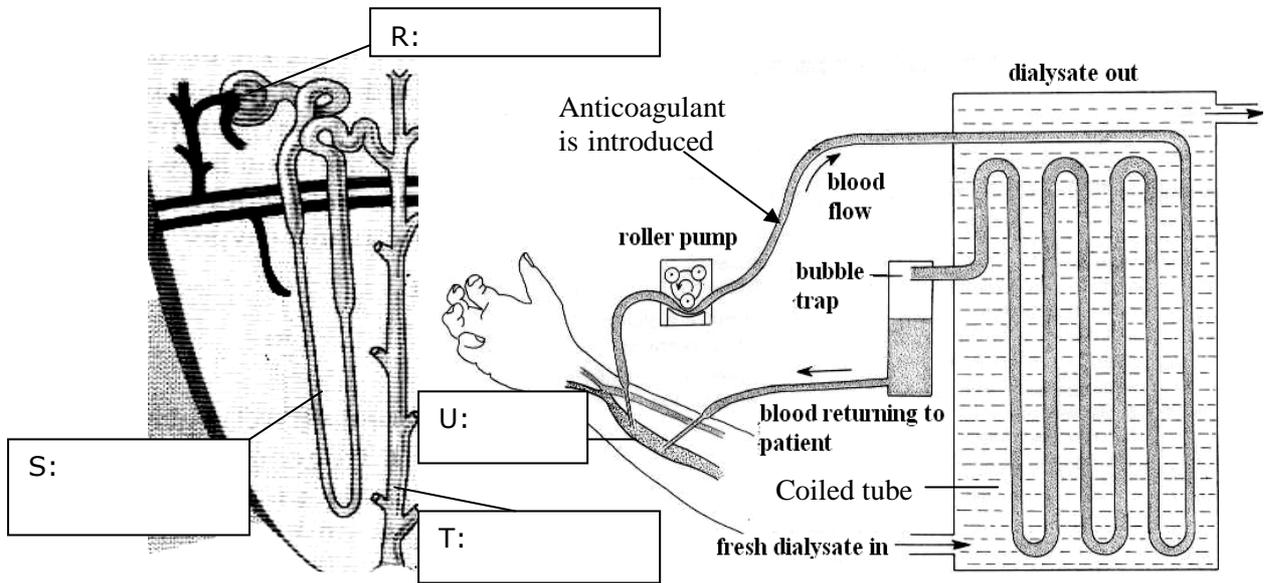
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Arthritis

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.....
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[1 marks]

5 Figure 5(A) shows a human excretory unit and Figure 5(B) shows a sketch of haemodialysis unit.



Nephron unit

Haemodialysis machine

FIGURE 5(A)

FIGURE 5(B)

Study the comparison between the nephron (filtration) unit in a kidney and the dialysis (filtration) unit in a haemodialysis machine. Fresh dialysate (dialysis fluid) contains water and nutrients such as glucose. Filtration unit in the haemodialysis machine consists of coiled tube made of cellophane membrane which is semi-permeable.

a) Name the parts labelled R, S,T and U in the Figure 5(A) and 5(B).

[2 marks]

b) Describe the processes that occur in R and S.

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[3 marks]

- c) Name two substances in the blood (plasma) circulated through the coiled tube of the haemodialysis unit which are unable to diffuse out into the dialysate.

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[2 marks]

- d) Explain how an excretory substance like urea is eliminated by the haemodialysis machine.

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[2 marks]

- e) The kidney also functions in regulating the osmotic pressure of the body fluid in a normal person. Explain how the haemodialysis machine may perform this function in a person suffering from kidney failure.

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[2 marks]

- f) Why an anticoagulant is introduced into the blood entering the haemodialysis unit.

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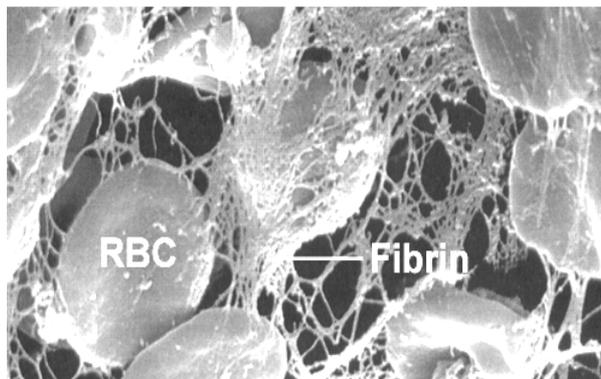
[1 mark]

Section B

[20 marks]

Answer any **one** question from this section.

- 6(a) (i) What is meant by double circulatory system and single circulatory system ?
[3 marks]
- (ii) Explain the advantages of double circulatory system over single circulatory system.
[2 marks]
- (b) Compare and contrast between the open circulatory system and the close circulatory system.
[5 marks]
- (c) (i) Figure 6 is an electron micrograph showing red blood cells trapped in a mesh of fibrin network.

**FIGURE 6**

Describe the process shown in the Figure 6.

[8 marks]

- (ii) Explain why blood of a haemophiliac is unable to clot

[2 marks]

7 Figure 7 shows how impulse is generated and transmitted in a human nervous system.

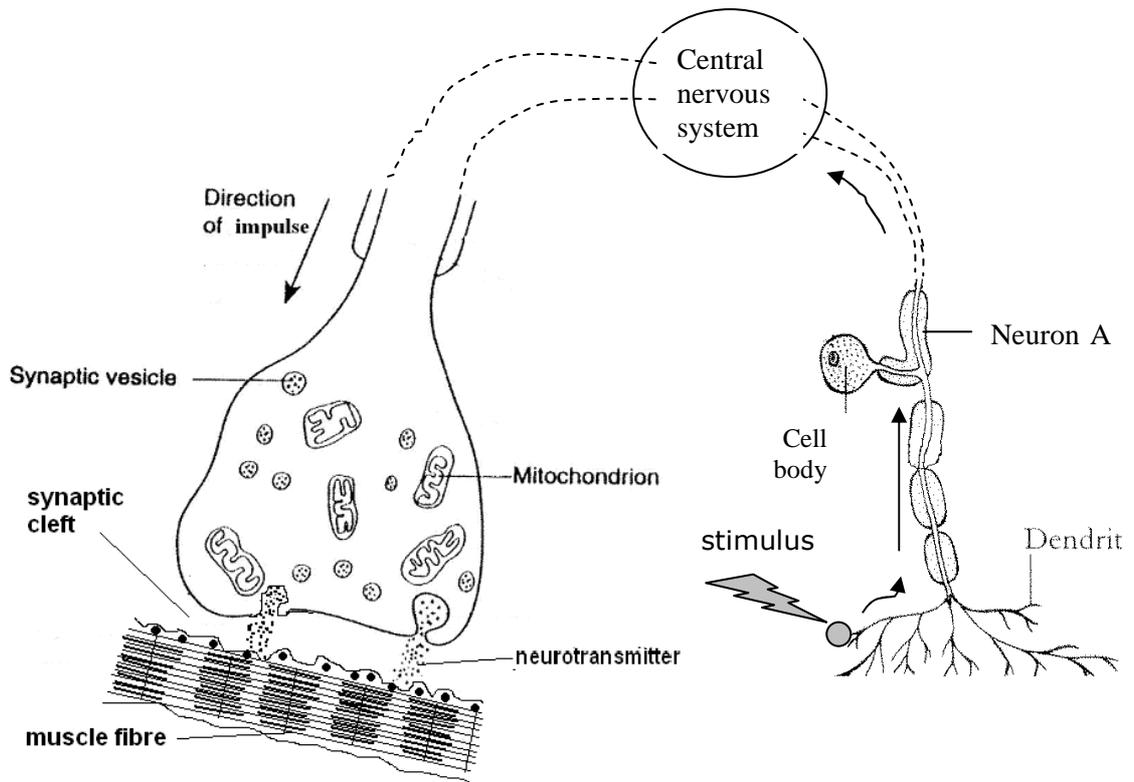


FIGURE 7

- (a) Describe briefly what happens in the central nervous system. [4 marks]

- (b) Based on Figure 7, explain the transmission of the nervous impulse in neurone A to the muscle fibre and the mode of muscle action when the impulse has reached the muscle fibre. [6 marks]

- (c) Explain the role of the **endocrine system** and the **nervous system** in the regulation of body temperature in humans. [10 marks]

Section C

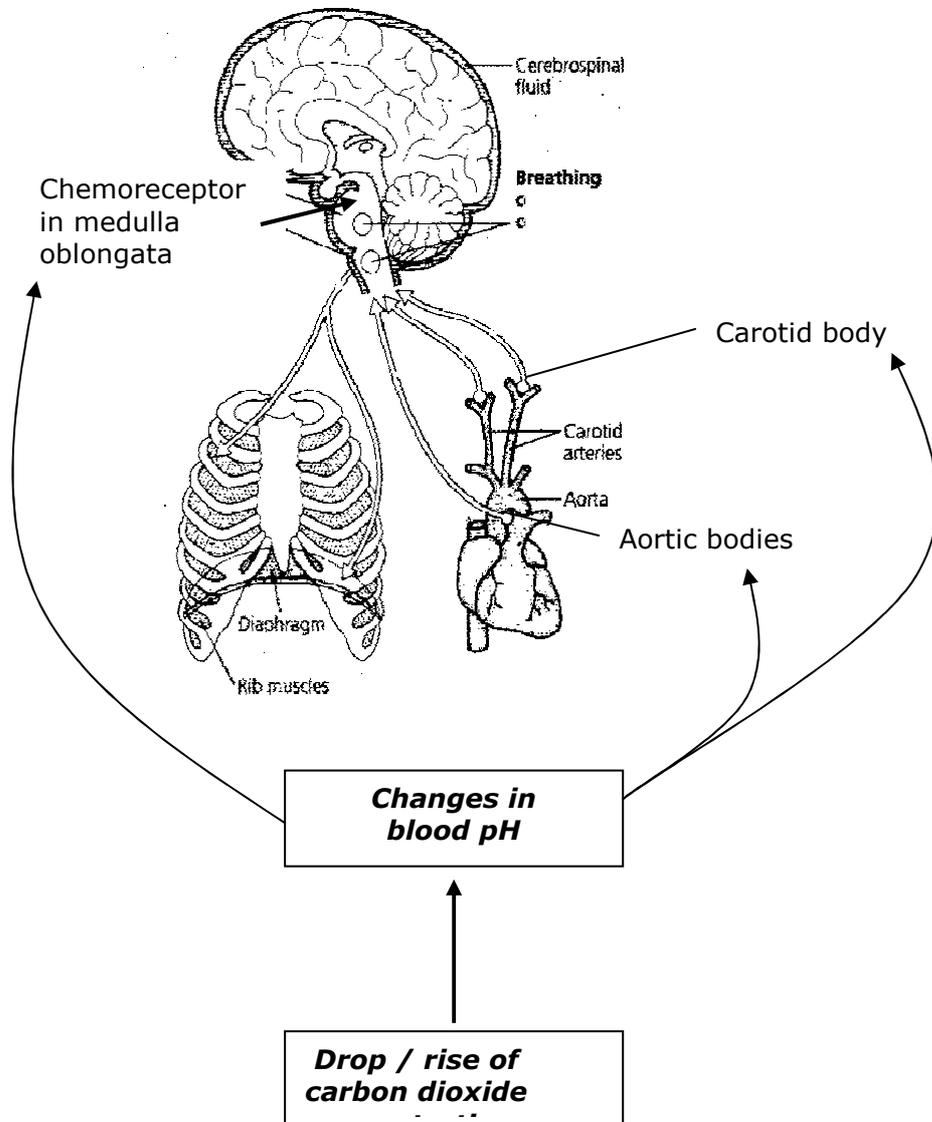
[20 marks]

Answer any **one** question from this section

- 8 (a) Explain, with the help of a labelled diagram, how gaseous exchange between human alveolus and blood capillaries in the lungs occur. How is the respiratory surface adapted for this process?

[12 marks]

- (b) Figure 8 shows the various structures involved in the regulation of the carbon dioxide in the body fluid.



Describe the regulation of carbon dioxide in the blood during a vigorous exercise

[8 marks]

9. Figure 9 shows sources of greenhouse gases from human activities and natural processes

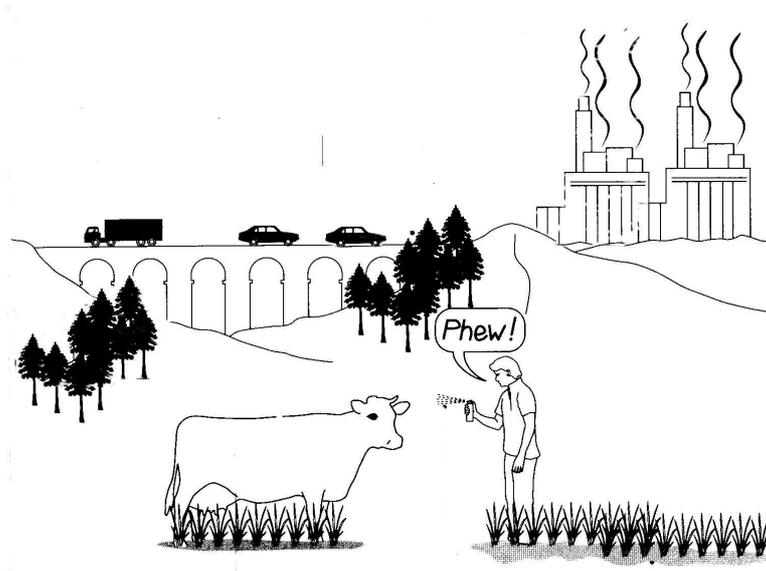


FIGURE 9

a) Explain the sources of greenhouse gases in Figure 9

[10 marks]

b)(i) Describe the formation of greenhouse effect.

[5 marks]

(ii) Explain the effect of the phenomenon in (b)(i) to living things and ecosystem.

[5 marks]

END OF QUESTION PAPER

