Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

BIOLOGY HIGHER LEVEL

8321/1

PAPER 1

1 hour 30 minutes

Marks 70

2020

Additional Materials: Ruler

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Candidates answer on the Question Paper in the spaces provided.
- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any rough work, diagrams or graphs.
- You may use a non-programmable calculator.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use.*
- Answer **all** questions.
- The number of marks is given in brackets [ ] at the end of each question or part question.

HIGHER LEVEL

For Examiner's Use	
1	
2	
3	
4	
5	
6	
Total	

Marker	
Checker	

This document consists of **17** printed pages and **3** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Bacteria and animals are found in many habitats on land and in the sea.

(a) State **two** ways in which the structure of a bacterial cell differs from the structure of an animal cell.

1 .....

.....

2 .....

..... [2]

(b) Some bacteria were grown in the laboratory. Fig. 1.1 shows the change in numbers of bacteria when grown in a closed flask containing nutrients and oxygen.

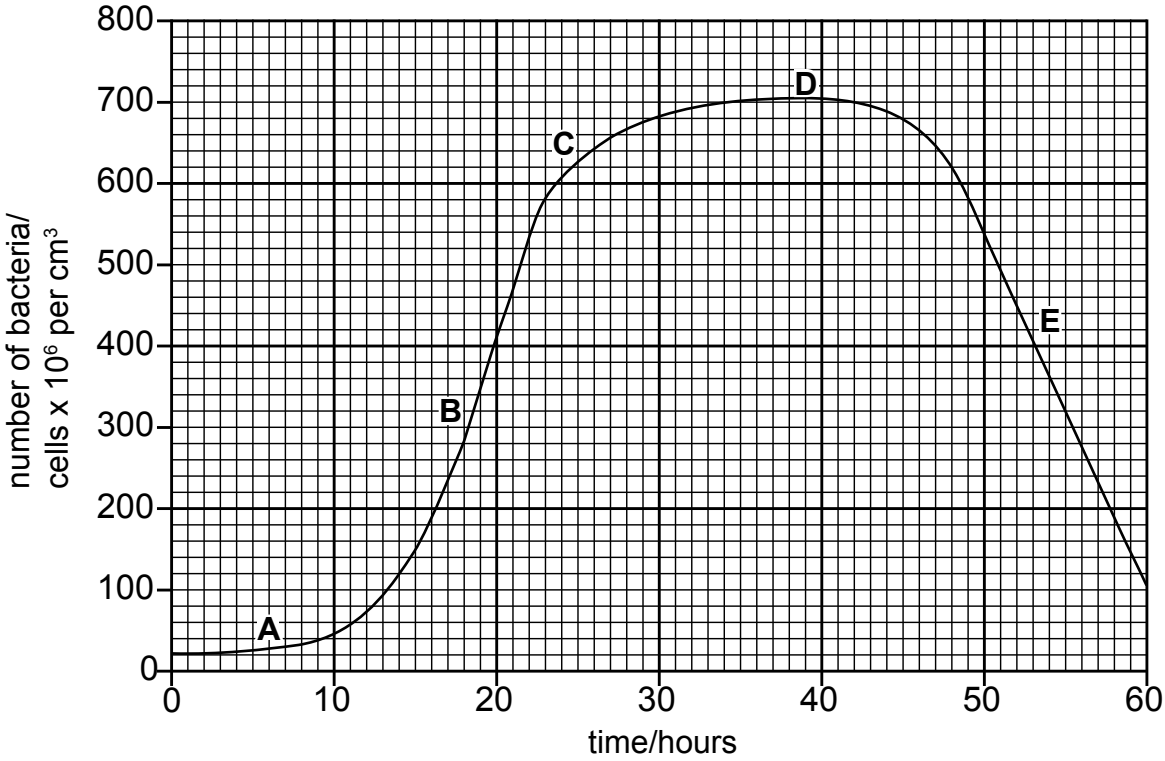

Fig. 1.1

(i) Name the phases of growth, **A** and **B**.

A .....

B ..... [2]

(ii) Suggest why the numbers of bacteria did not change in phase **D** and decreased in phase **E**.

phase **D** .....

.....

.....

.....

phase **E** .....

.....

.....

..... [4]

[8]

2 Fig. 2.1 shows the nematode, *Caenorhabditis elegans*.

Fig. 2.1

(a) (i) State the genus to which this nematode belongs.

..... [1]

(ii) Annelids and nematodes are both referred to as worms.

State **two** features that distinguish annelids from nematodes.

1 .....

2 ..... [2]

(b) Fig. 2.2 shows the life cycle of *C. elegans*.

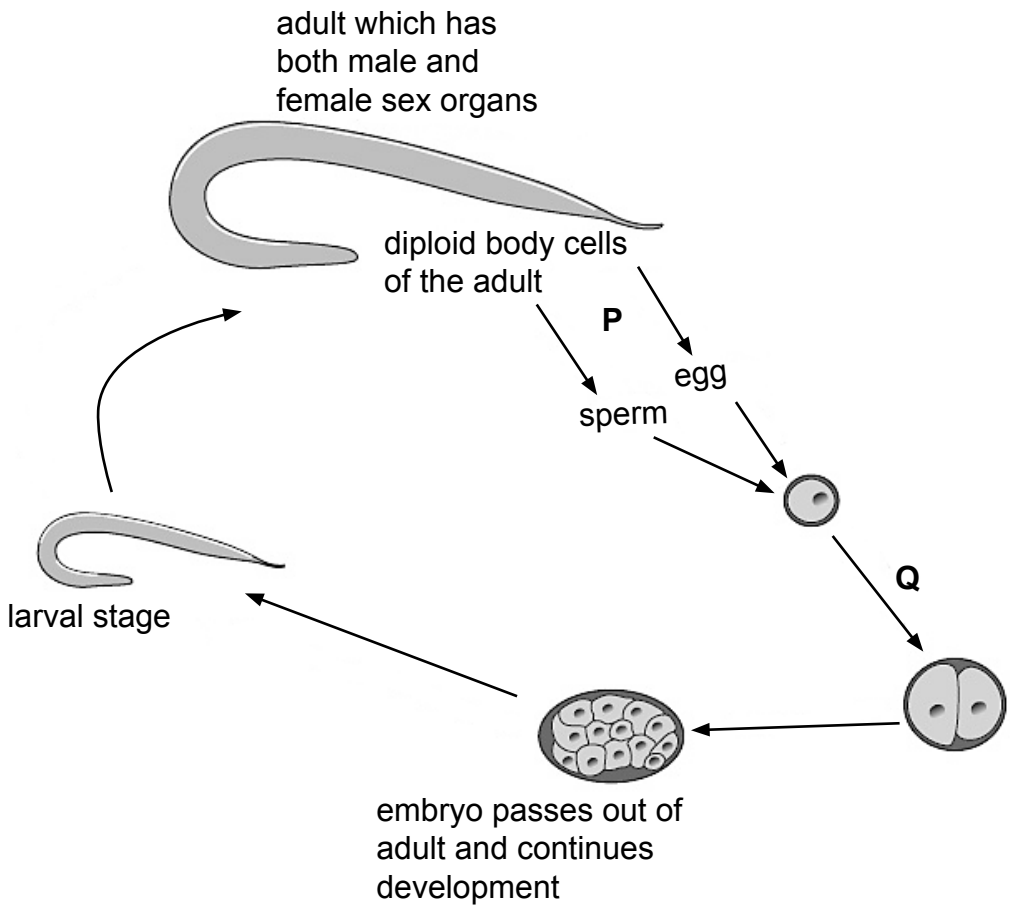

Fig. 2.2

Explain why **meiosis** occurs at **P** and **mitosis** occurs at **Q**.

meiosis at **P** .....

.....

mitosis at **Q** .....

..... [2]

(c) Some students studied a population of 40 worms. They measured the length of 35 worms. These measurements are shown in Table 2.1.

(i) Complete Table 2.1 by measuring the length of the five worms 1-5 shown in Fig. 2.3.

Use a ruler to measure them.

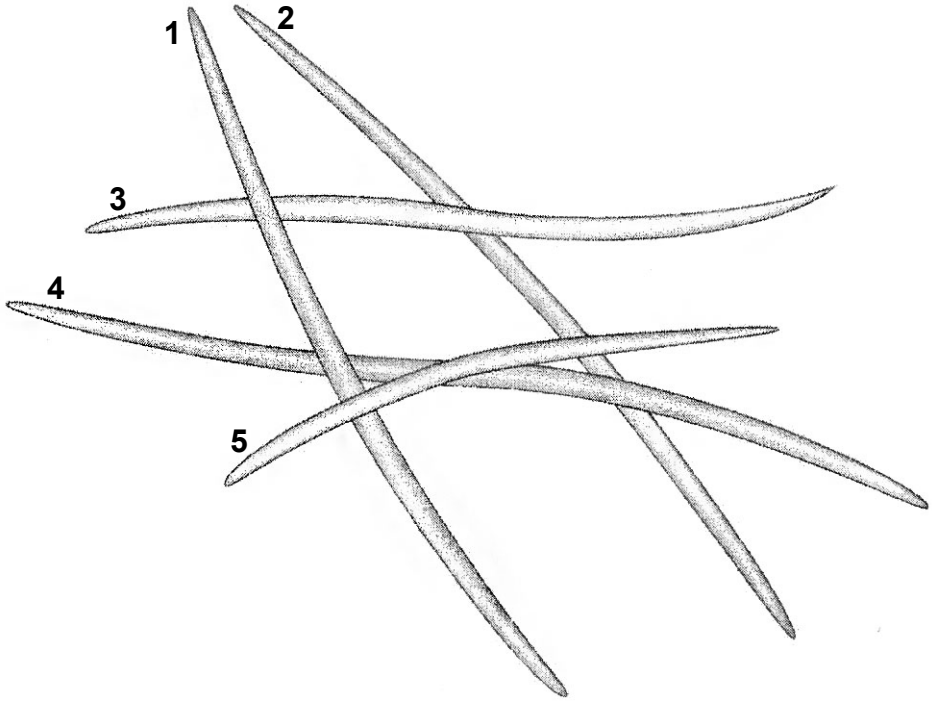

Fig. 2.3

Table 2.1

length/cm	7.0	8.1	10.8	6.2	11.4	9.0	10.3	12.1	13.5	5.6
length/cm	11.3	7.9	12.9	7.4	13.1	13.7	15.5	8.8	14.1	15.2
length/cm	9.6	8.4	14.7	16.0	7.2	10.5	9.2	12.4	6.7	13.3
length/cm	14.0	11.6	12.6	12.2	8.3	**1**	**2**	**3**	**4**	**5**

Record the length of each worm in Table 2.1 [2]

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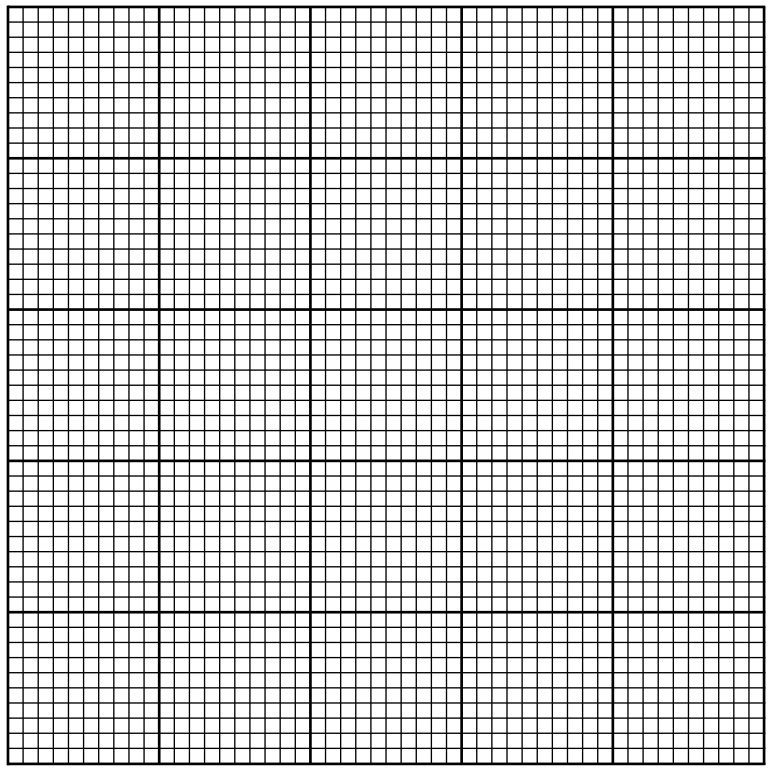
(ii) Table 2.2 is a tally chart for the results recorded in Table 2.1. Complete the tally chart, in Table 2.2, to show the number of worms in each range of lengths. The first one has been done for you.

Table 2.2

range of lengths / cm	tally	frequency
5.0 - 6.9	III	3
7.0 - 8.9		
9.0 – 10.9		
11.0 – 12.9		
13.0 – 14.9		
15.0 – 16.9		

[3]

(iii) Use the data from Table 2.2 to plot a histogram showing the frequency of each range of lengths.



[5]

[15]

3 Table 3.1 shows the relative amounts of fatty acids and amino acids in the alimentary canal of a person, as food passes through it after a meal is eaten.

Table 3.1

region of alimentary canal	fatty acids	amino acids
oesophagus	low	low
stomach	low	increasing
duodenum	increasing	increasing
ileum	decreasing	decreasing
colon	low	low

(a) Name the process that causes food to move through the alimentary canal.

..... [1]

(b) Explain why the changes in the amounts of fatty acids occur

(i) in the duodenum,

.....

.....

.....

.....

.....

..... [3]

(ii) in the ileum.

.....

.....

.....

..... [2]

(c) **(i)** Suggest why the amount of amino acids continue to increase in the duodenum.

.....

.....

.....

..... [2]

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(ii) Suggest why the amount of amino acids begin to decrease in the ileum.

.....

.....

.....

..... [2]

[10]

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4 Crop production in many areas of the world needs the application of large volumes of water.
However, when the water evaporates from the soil, traces of salts are left behind. After several years, the soil becomes too salty for most plants to grow in it.

(a) (i) State **three** functions of water in plants.

1 .....

2 .....

3 ..... [3]

(ii) Suggest why plants may die when placed in salty soil.

.....

.....

.....

.....

.....

..... [3]

(b) (i) Some plants are able to pump salts out of their roots using active transport.

Suggest how this process could affect the rate of growth of the plants if the process was operating all the time.

.....

.....

.....

.....

.....

..... [3]

(ii) Plants need mineral salts for normal, healthy growth.

Complete the table by naming **three** minerals that plants need and stating **one** function for each mineral.

mineral	name	function
1	.....	....
2	.....	....
3	.....	....

[6]

[15]

For Examiner's Use

5 Fig. 5.1 shows models which demonstrate the actions of two different sets of muscles used during breathing in a mammal.

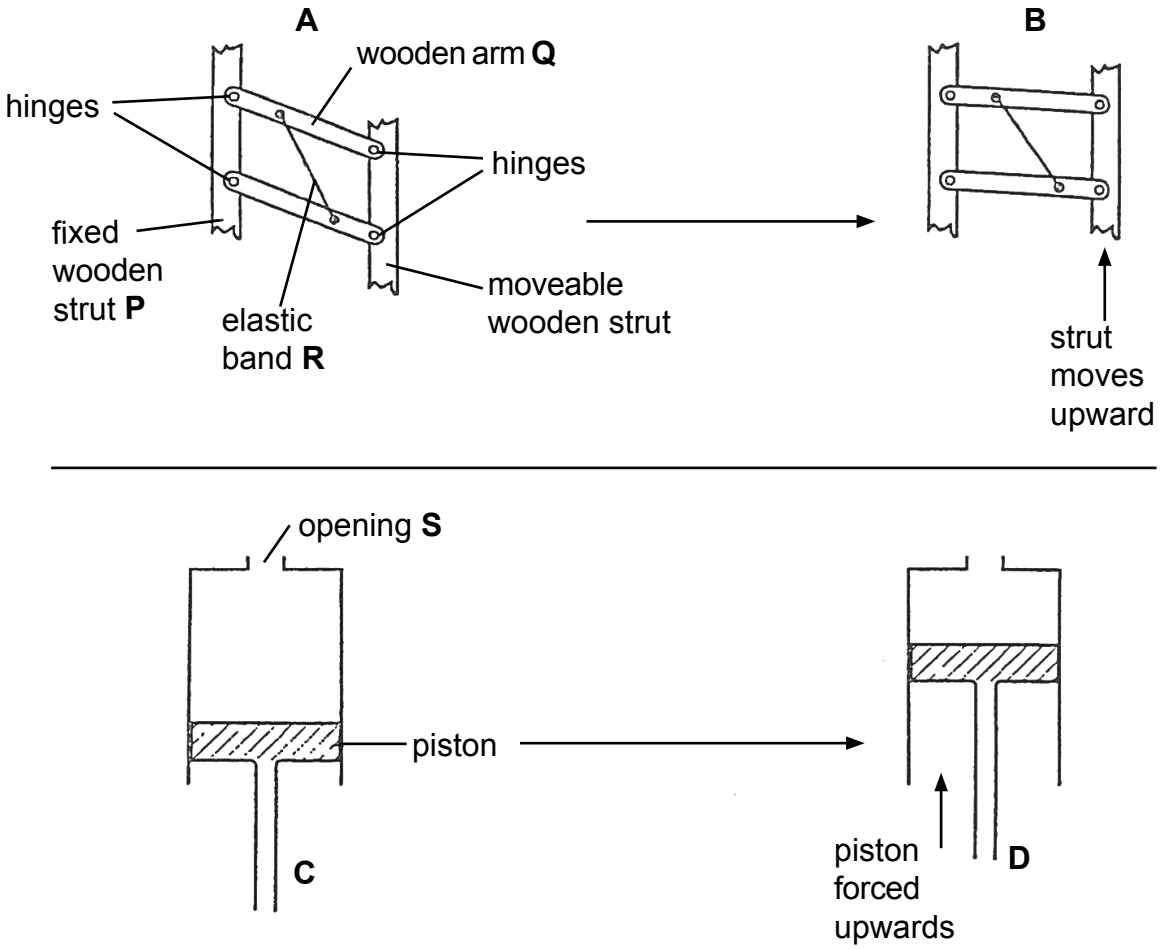

Fig. 5.1

(a) State the thoracic muscles responsible for the actions represented by

A and **B**, ...

C and **D**. ..... [2]

(b) Which two diagrams represent the thorax after breathing in?

.....and..... [1]

(c) Which structures in the human thorax are represented by the following parts labelled on the models?

P .....

Q .....

R .....

S ..... [4]

(d) Describe **two** ways in which the model shown in **C** or **D** does not accurately represent the process of breathing in a mammal.

1 .....

.....

2 .....

..... [2]

[9]

6 Fig. 6.1 shows an incomplete diagram of the urinary system.

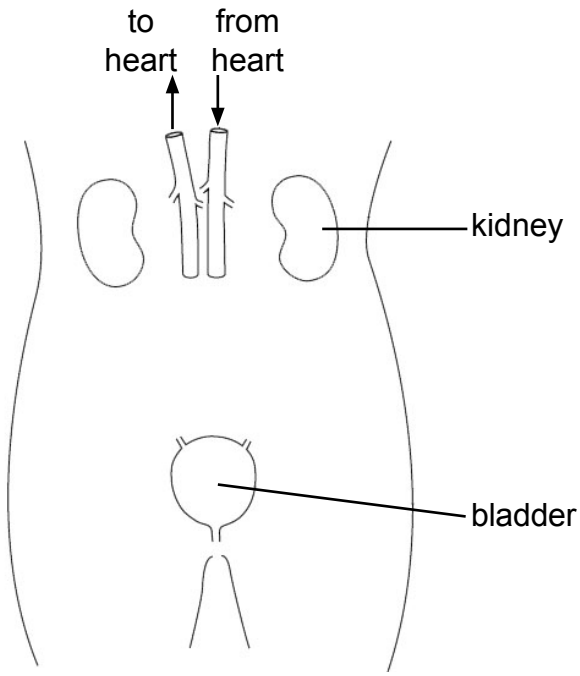

Fig. 6.1

(a) On Fig. 6.1, draw and label the following parts:

(i) renal artery,

(ii) ureter. [2]

(b) Protein is one nutrient present in a balanced diet. The body cannot store protein, so any excess amino acids are broken down in the process of deamination, as shown in Fig. 6.2.

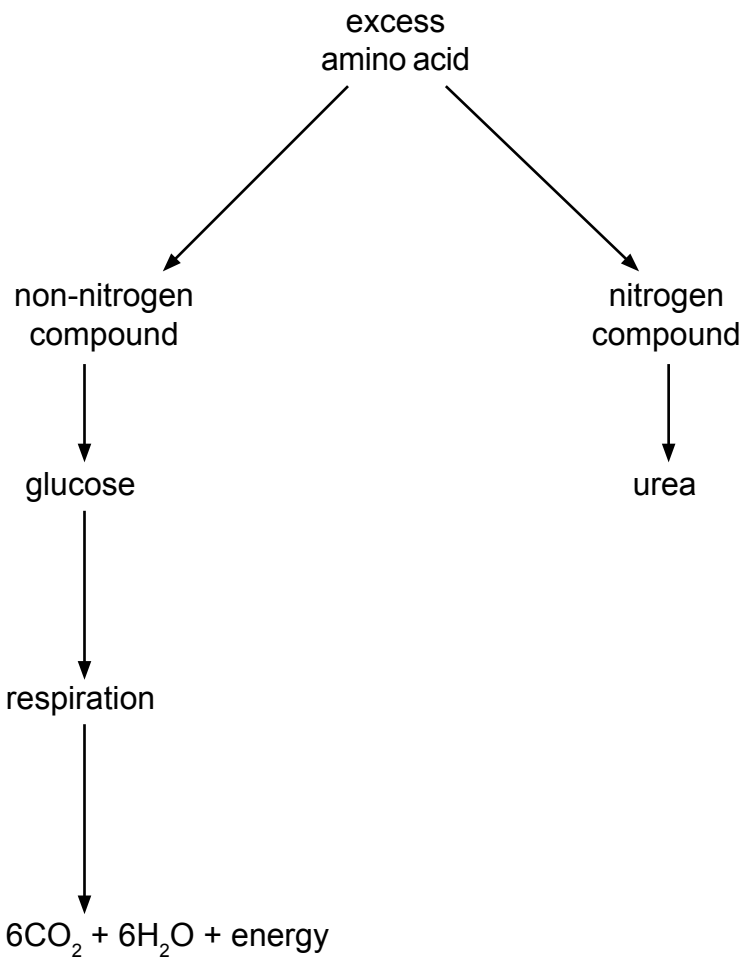

Fig. 6.2

(i) Name the organ where deamination takes place.

..... [1]

(ii) State the type of respiration shown in Fig. 6.2.

Give a reason for your answer.

type of respiration .....

reason .....

..... [2]

Fig. 6.3 shows a kidney tubule (nephron) and its associated blood vessels.

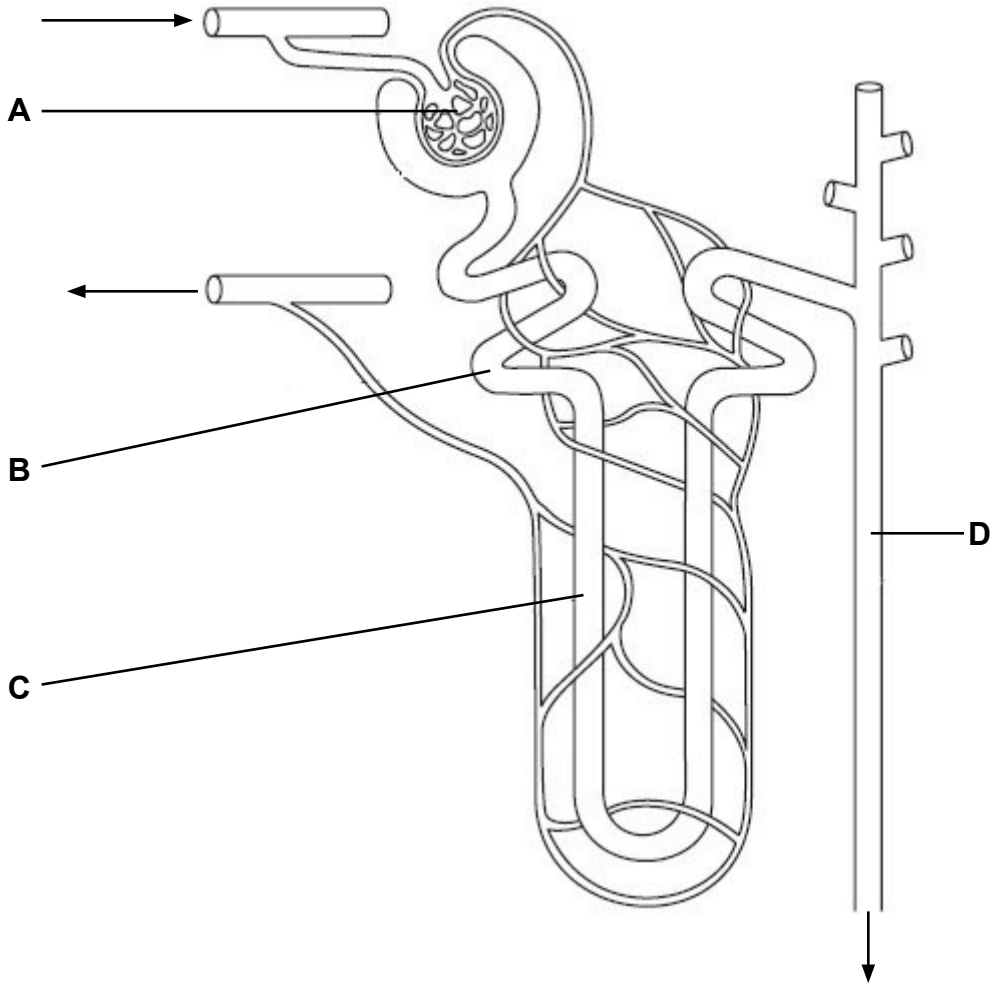

Fig. 6.3

(c) Complete the table by naming the parts labelled **A** to **D** and stating **one** function for each.

	name of part	function
A	.....	....
B	.....	....
C	.....	....
D	.....	....

[4]

(d) If the kidneys fail, the patient may be put on a kidney dialysis machine.

Explain how a kidney dialysis machine works.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[13]

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