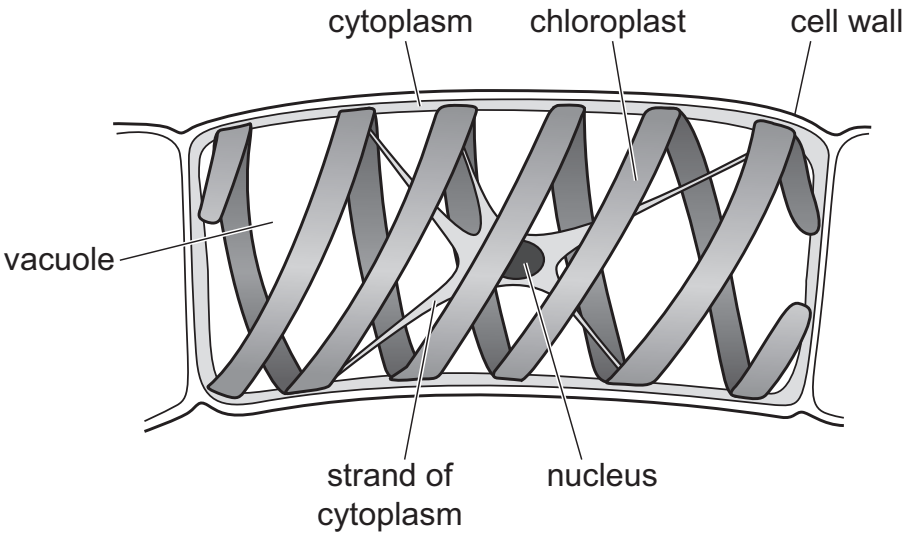
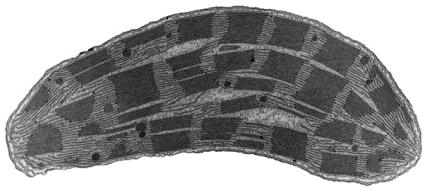
3 The diagram shows a single cell from an organism called *Spirogyra*.



Which features does *Spirogyra* share with plant cells?

	cell wall	chloroplast	cytoplasm	nucleus	vacuole
A	yes	yes	yes	yes	yes
B	yes	yes	no	no	yes
C	yes	no	yes	yes	no
D	no	yes	yes	no	yes

4 The diagram shows an image of a chloroplast. The image is 5 cm long.



The actual length of the chloroplast is 5 μm.

What is the magnification of the image?

A ×10 **B** ×1000 **C** ×10 000 **D** ×100 000

4 Which term describes each structure?

	structure		
	brain	liver	neurone
A	organ	organ	cell
B	organ	tissue	cell
C	tissue	organ	tissue
D	tissue	cell	organ

3 A palisade cell and a neurone are observed under a light microscope.

Which cell component is found only in the palisade cell?

A cell membrane

B cell wall

C cytoplasm

D nucleus

4 In a human, the diameter of the aorta as it leaves the heart is 36 mm.

The thickness of the wall of the aorta at this point is 9 mm.

What is the diameter of the lumen of the aorta at this point?

A 1800 m **B** 2700 μm **C** 18 000 μm **D** 27 000 μm

1 **(a)** Fig. 1.1 shows drawings of seven species of bacteria.

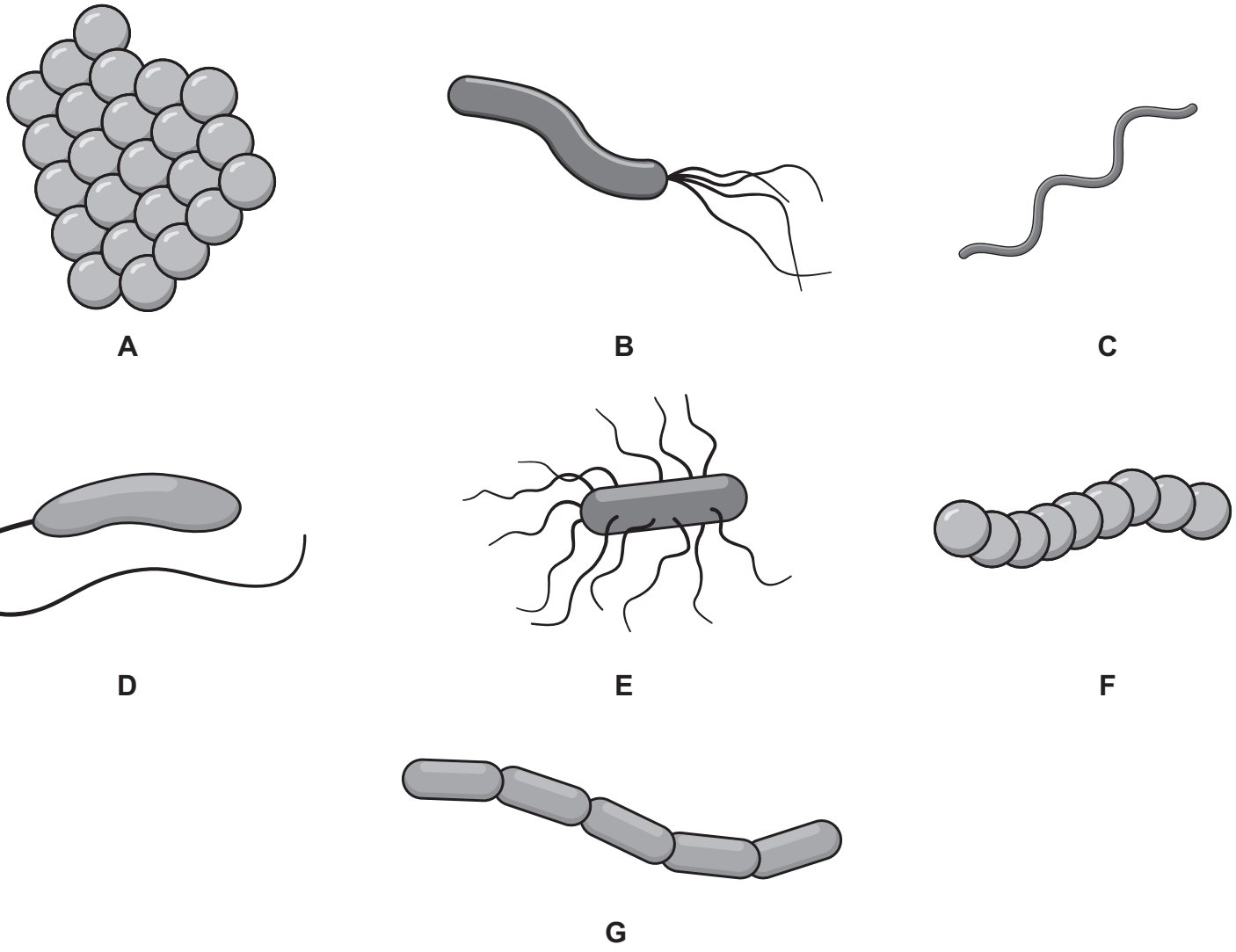


Fig. 1.1

Use the key to identify each species of bacteria in Fig. 1.1.

Write the letter of each species (**A** to **G**) in the correct box beside the key.

One has been done for you.

key

1	(a)	hair-like structure or structures visible	go to 2	
	(b)	no hair-like structures visible	go to 4	
2	(a)	more than one hair-like structure	go to 3	
	(b)	one hair-like structure only	*Vibrio cholerae*	
3	(a)	hair-like structures attached at one end only	*Helicobacter pylori*	
	(b)	hair-like structures attached all over	*Salmonella typhi*	
4	(a)	bacteria have a spiral shape	*Treponema pallidum*	
	(b)	bacteria do **not** have a spiral shape	go to 5	
5	(a)	bacteria are grouped to form a chain	go to 6	
	(b)	bacteria do **not** form a chain	*Staphylococcus aureus*	
6	(a)	bacteria in the chain are cylindrical in shape	*Streptobacillus moniliformis*	
	(b)	bacteria in the chain are circular in shape	*Streptococcus pyogenes*	**F**

[3]

(b) (i) A cylinder-shaped bacterium has a length of 2 μm and a diameter of 0.5 μm.

Calculate:

- the radius of this bacterium
- the volume of this bacterium.

Include the units in your answers.

Space for working.

radius .....

volume .....

[4]

(ii) State the name of the kingdom that bacteria belong to.

..... [1]

(c) Fig. 1.2 is a diagram of a virus.

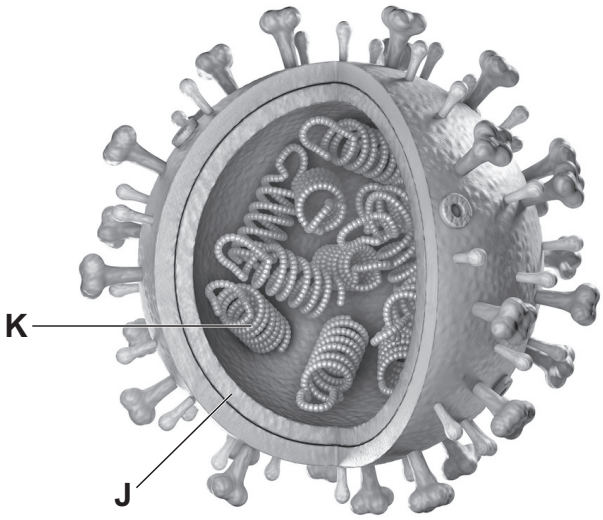


Fig. 1.2

(i) State the name of the parts labelled **J** and **K** in Fig. 1.2.

J .....

K .....

[2]

(ii) State **two** structures present in bacteria that are absent in viruses.

1 .....

2 .....

[2]

[Total:12]

2 **(a)** Fig. 2.1 is a diagram of part of the human circulatory system.

The arrows show the direction of blood flow.

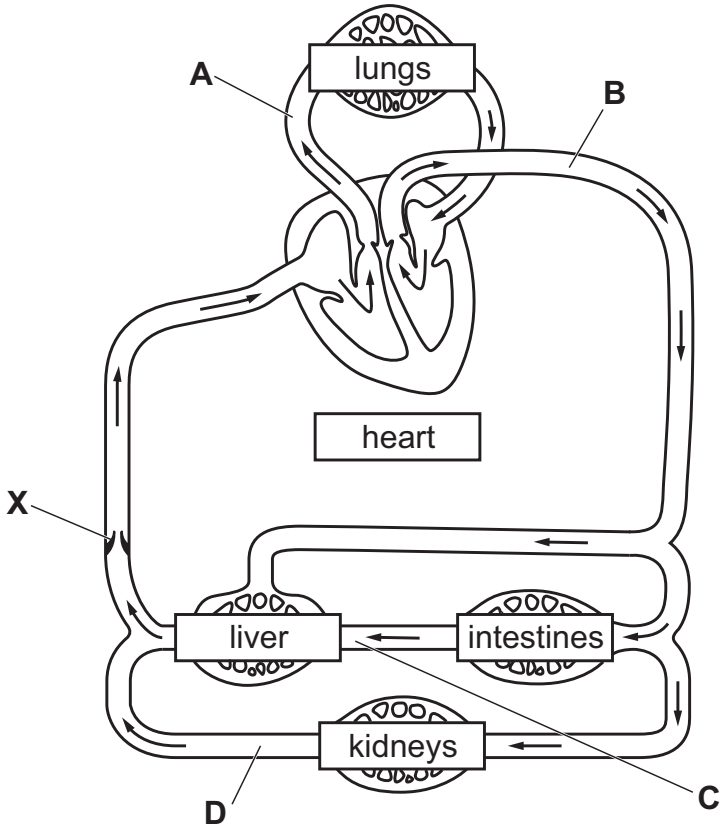


Fig. 2.1

(i) Complete Table 2.1 by naming the blood vessels in Fig. 2.1 and stating whether the blood in each vessel is oxygenated.

Table 2.1

letter in Fig. 2.1	name of the blood vessel	carries oxygenated blood (yes / no)
A		
B		
C		
D		

[4]

(ii) State the name of structure **X** in Fig. 2.1 and outline its function.

name .....

function .....

.....

[2]

(b) Fig. 2.2 is a diagram of part of a fish circulatory system.

The arrows show the direction of blood flow.

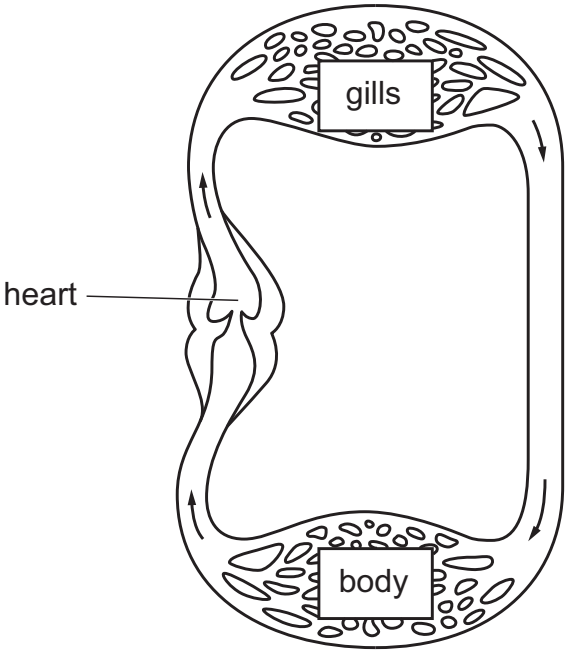


Fig. 2.2

(i) Describe how the structure of the fish heart in Fig. 2.2 differs from a human heart.

.....

.....

.....

.....

..... [2]

(ii) Explain the advantages of the type of circulatory system found in humans, compared with the circulatory system shown in Fig. 2.2.

.....

.....

.....

.....

.....

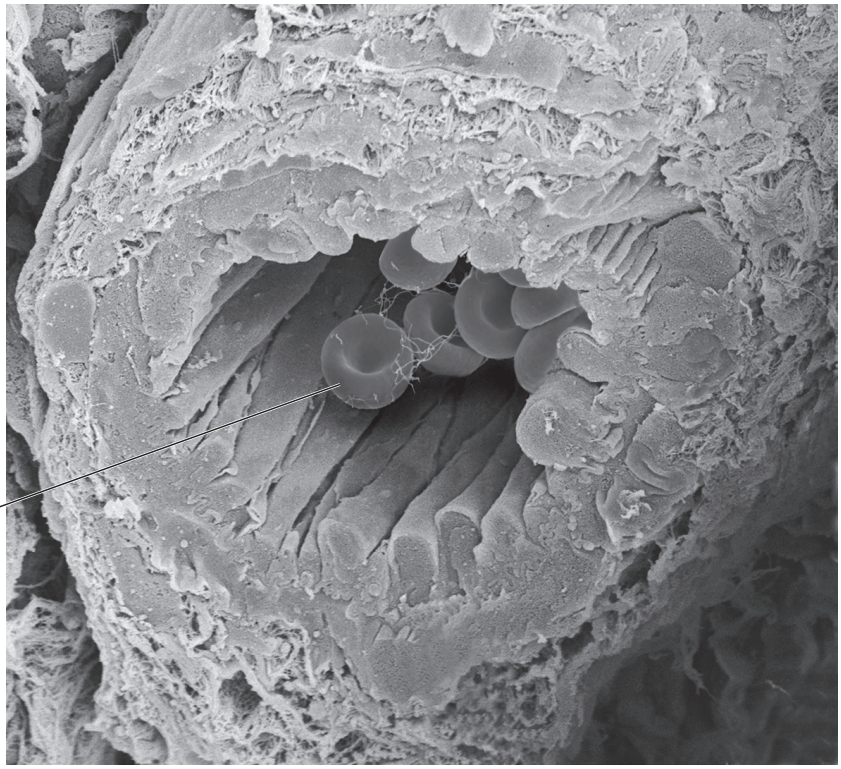
.....

.....

.....

..... [4]

(c) Fig. 2.3 is a photomicrograph of an arteriole.



magnification ×1430

Fig. 2.3

(i) Identify the structure labelled **P** in Fig. 2.3.

..... [1]

(ii) The magnification of the image is provided. Write the formula that would be used to calculate the actual diameter of the lumen of the arteriole in Fig. 2.3.

..... [1]

(iii) The actual diameter of the lumen of the arteriole shown in Fig. 2.3 is 0.0315 mm.

Convert 0.0315 mm to micrometres (μm).

..... μm [1]

[Total:15]