OCR GCSE 21ST CENTURY BIOLOGY B · J257

BIOLOGY



EXAM QUESTION PACK

B5.1 HOW DO SUBSTANCES GET INTO, OUT OF AND AROUND OUR BODIES? (FOUNDATION)

SCORE	PERCENTAGE
/38	%

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1(a). A group of students are conducting an experiment on *Daphnia* (water fleas) to investigate the effect of temperature on living things.



Daphnia are very small organisms. The students viewed the *Daphnia* using a light microscope.

It is possible to observe the heart of the *Daphnia* beating while observing it using the microscope.

The group place the *Daphnia* in water set at different temperatures to see the effect on the heart rate of the *Daphnia.*

Their results are shown below.

Temperature (°C)	Heart rate of the *Daphnia* (beats per minute)				
	Group A	Group B	Group C	Group D	Mean
17	25	22	25	24	24
20	27	27	25	25	26
23	30	30	30	34	31
25	33	57	36	39	36

The students could see the *Daphnia's* heart beating. In humans the heart forms part of the circulatory system.

What role does the heart play in these systems?

---------- [1]

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(b). Which organ is responsible for maintaining the water balance of the blood?

Put a tick (✓) in the correct box.

Heart	☐
Kidneys	☐
Lungs	☐
Skin	☐

[1]

(c). The skin contains stem cells. Stem cells are unspecialised cells.

How does this make them useful to scientists?

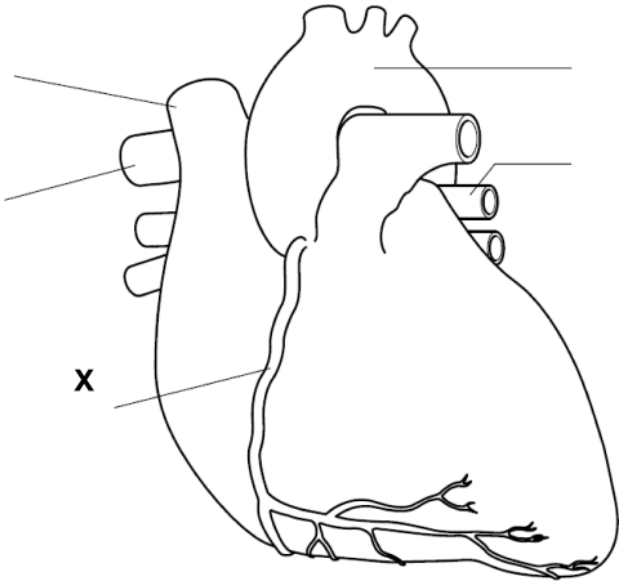
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[2]

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2(a). The diagram below shows a mammalian heart.



(i) Label **one** vessel on the heart diagram that carries deoxygenated blood.

[1]

(ii) A heart attack is caused by a blockage in the blood vessel labelled **X**.

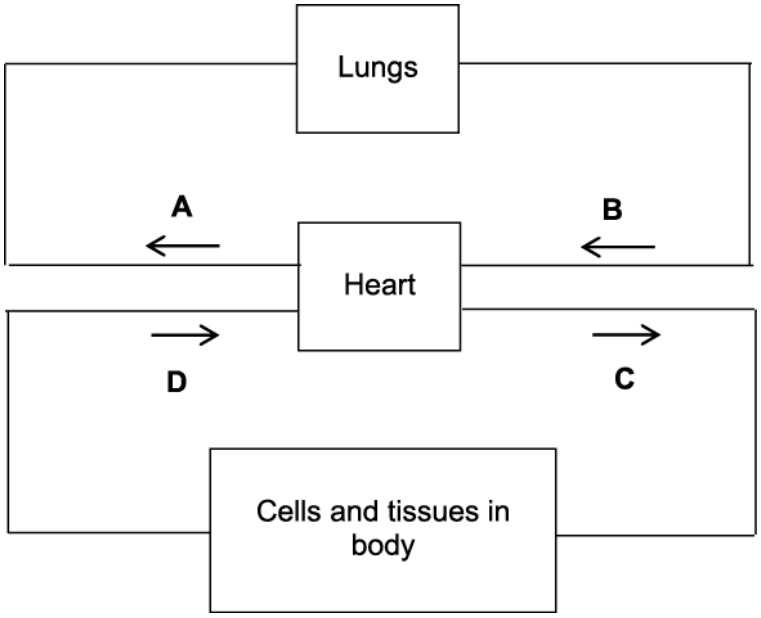
Name blood vessel **X**.

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[1]

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(b). The diagram below shows some of the blood vessels, **A**, **B**, **C** and **D**, going into and out of the heart and to other parts of the body.



→ direction of blood flow

(i) Give the letter of a blood vessel that is an artery. _____

[1]

(ii) Give the letter of a blood vessel that is a vein. _____

[1]

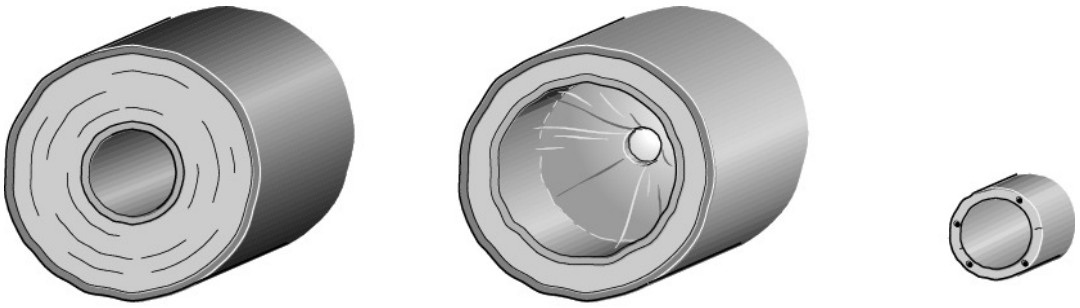
(c). The table below shows some data about the elasticity of arteries and veins when masses are attached to rings of the tissue.

Mass (g)	Length of artery (mm)		Length of vein (mm)	
	Artery with mass attached	Vein with mass attached	Vein once mass removed	Artery once mass removed
0 (original length)	20	21	21	20
10	45	36	36	25
20	53	38	37	27

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30	58	40	39	28
40	63	41	39	33
50	65	41	41	33



Artery Vein Capillary

Explain how arteries, veins and capillaries are adapted to their functions.

Use the diagrams, draw conclusions from the data and use your own knowledge in your explanation.

[6]

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3. Helene is a deep sea diver.

She reads these two articles in a magazine.



The deeper you dive, the greater the pressure of the water.

The longer you stay under water, the more air dissolves in your blood.

Air bubbles in the blood can block blood flow to organs causing pain and damage.

Fizzy drinks



Fizzy drinks get their fizz from a gas that is dissolved in the drink under great pressure.

When the bottle is opened the pressure is released and bubbles of gas appear in the drink.

If the bottle is opened slowly fewer bubbles appear in the drink.

Helene plans to dive with a supply of air.

Predict what might happen in Helene's body as she returns to the surface.
Explain any possible problems and how she might avoid them.

Use information from the articles in your answer.

The quality of written communication will be assessed in your answer.

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[6]

4(a). Red blood cells contain haemoglobin.

Suggest a reason why red blood cells do not have a nucleus.

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[1]

(b). Faulty gas fires can release carbon monoxide.
Haemoglobin combines with carbon monoxide more quickly than haemoglobin combines with oxygen.
Explain why carbon monoxide is poisonous to humans.

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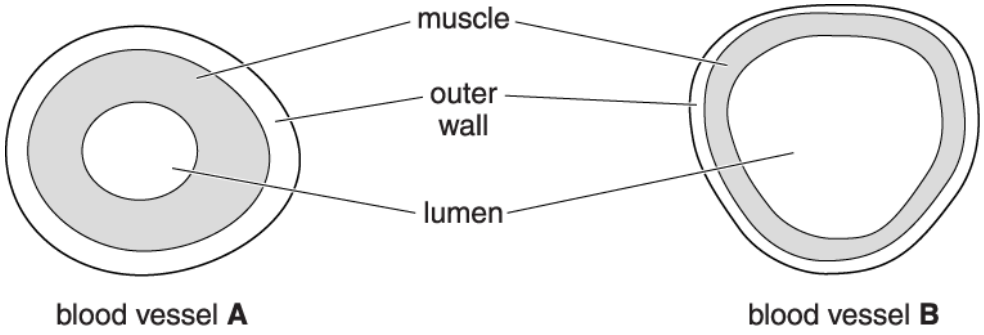
[3]

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5. Blood vessels are the tubes that carry blood around the body.

The diagram shows cross-sections of blood vessels **A** and **B**.



Not to scale

(i) Fred thinks that **A** is an artery and **B** is a vein.

Is Fred correct? Describe the evidence **shown in the diagram** that supports your decision.

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[2]

(ii) Suggest another feature **not shown** in the diagram that would be found in a vein.

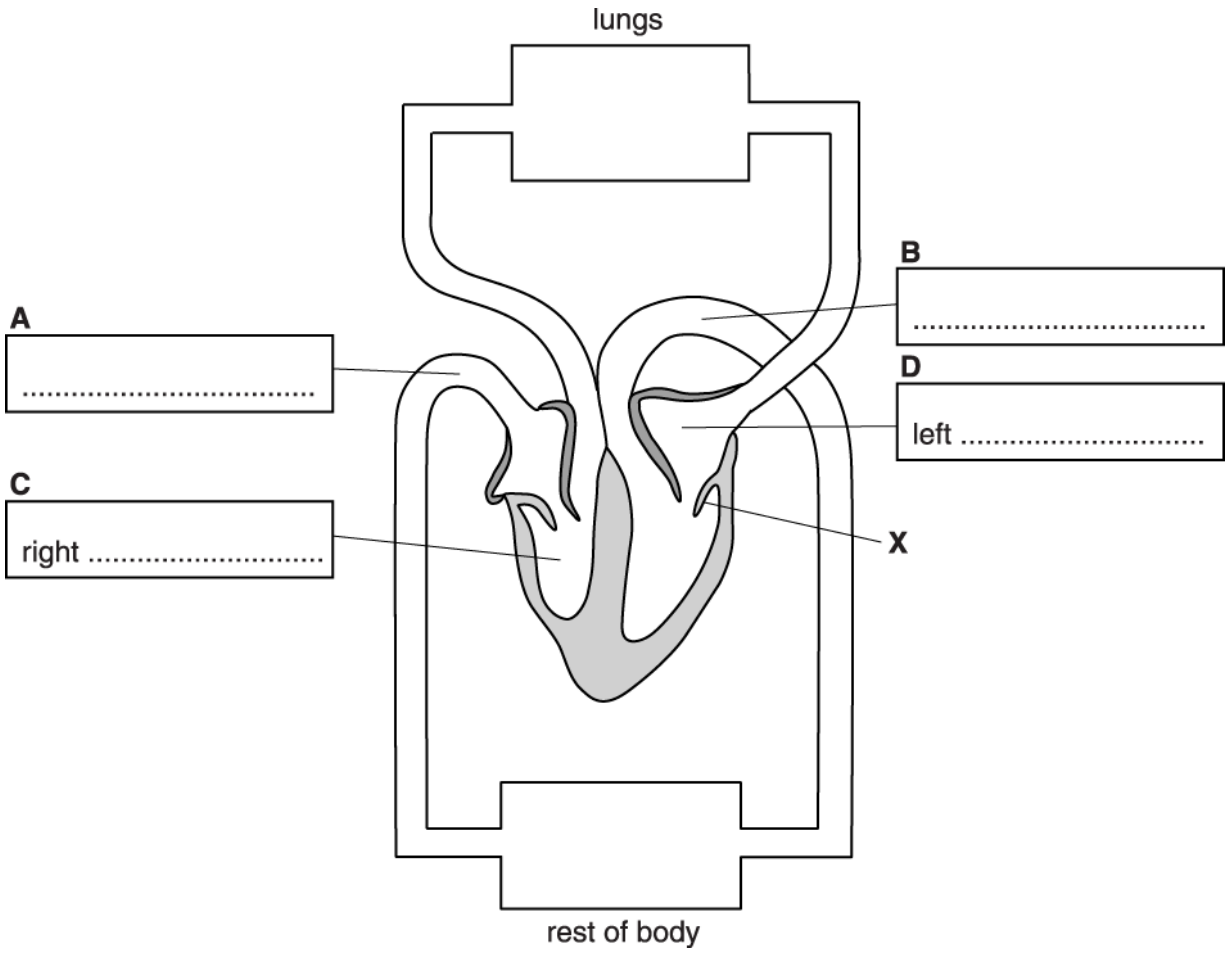
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[1]

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6(a). The heart and blood vessels are adapted to the job that they do.

Complete the diagram of the blood system by writing the correct labels in the boxes **A**, **B**, **C** and **D**.



[2]

(b). Draw an arrow in the box labelled **lungs** and the box labelled **rest of body** to show the direction of blood flow.

[1]

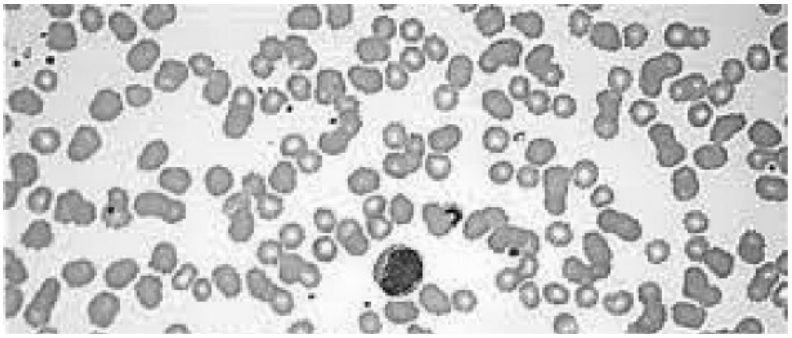
(c). What type of structure is **X** and what is its job?

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[2]

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7. Blood consists of many different components.



sample of human blood

Name these components and describe their jobs in the human body.

The quality of written communication will be assessed in your answer.

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[6]

END OF QUESTION PAPER

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