

# Transport in Mammals

## Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Transport in Mammals
Sub Topic	
Booklet	Multiple Choice
Paper Type	Question Paper 1

Time Allowed : **33 minutes**

Score : **/ 27**

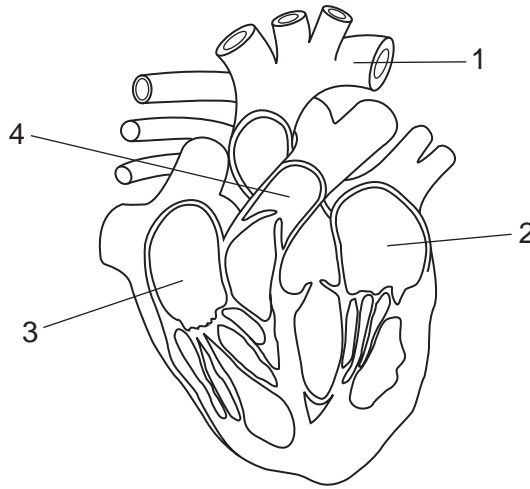
Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 The diagram shows a section through the heart and the associated blood vessels.

What is correct for the flow of blood through the heart?

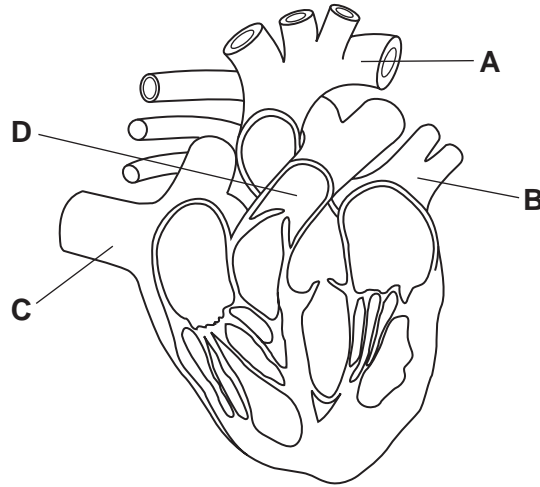


- A** 1 → 2 → 3 → 4
- B** 2 → 1 → 3 → 4
- C** 3 → 4 → 1 → 2
- D** 4 → 3 → 2 → 1

2 What is a feature of coronary bypass surgery?

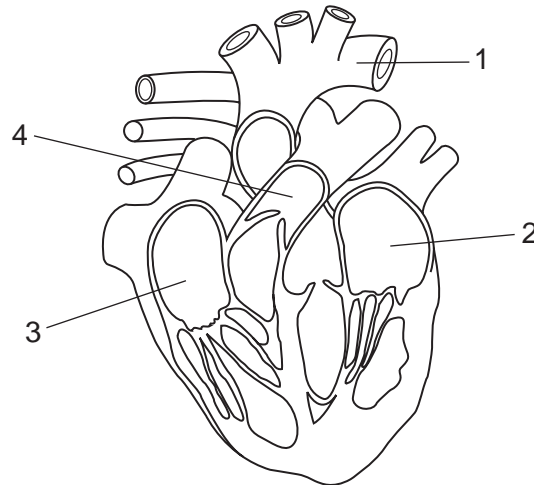
- A** A section of a healthy vein or artery is attached to the aorta at one end and a coronary artery at the other end to bypass diseased sections of coronary artery.
- B** A section of healthy vein or artery is used to bypass the diseased section of aorta in the region where the branches to the coronary arteries occur.
- C** Blockages in coronary arteries with atherosclerosis are cleared surgically by temporarily using an artificial heart to re-route blood and bypass the heart.
- D** The section of diseased coronary artery is removed and then replaced by using a section of a healthy vein or artery of a similar diameter.

3 Which structure is correctly identified?



- A** aorta
- B** pulmonary artery
- C** pulmonary vein
- D** vena cava

4 Which structures transport deoxygenated blood?



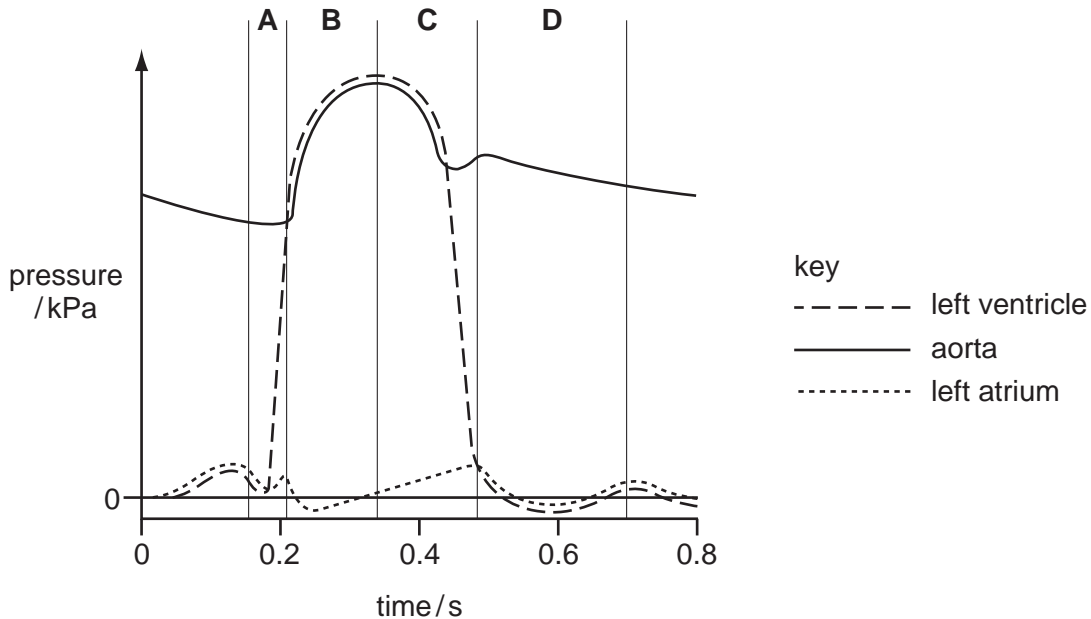
- A** 1 and 2
- B** 2 and 4
- C** 3 and 4
- D** 3 only

5 Which features enable the aorta to withstand ventricular systole?

- A collagen fibres and elastin fibres
- B collagen fibres and smooth muscle
- C elastin fibres and endothelium
- D endothelium and smooth muscle

6 The diagram shows the pressure changes in various structures of the left side of the heart during the cardiac cycle.

At the end of which period, **A**, **B**, **C** or **D**, is the ventricle full of blood?



7 Which statement about coronary by-pass surgery is correct?

- A It is carried out to reduce the effects of atherosclerosis, improving the delivery of oxygen and dissolved glucose to the cardiac muscle of the heart.
- B It is the surgical removal of one or more coronary arteries to reduce the strain on the heart of a person with coronary heart disease.
- C Surgeons are able to divert blood around the diseased sections of the coronary arteries so that more oxygenated blood can be pumped round the systemic circulation.
- D The diseased parts of the aorta are replaced by using a section of a main artery from elsewhere in the body of the same person, to avoid rejection.

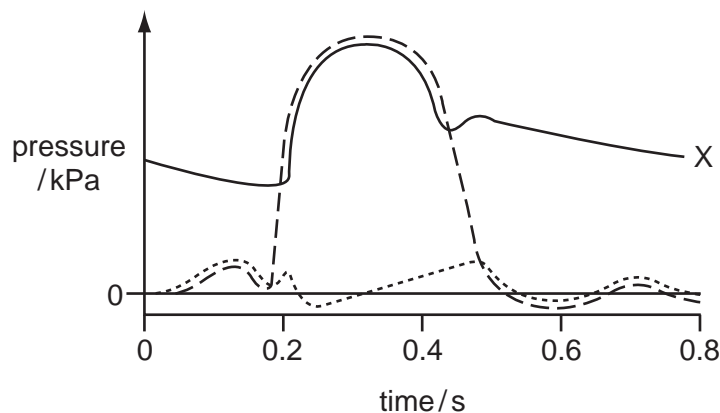
8 Which statement is true for the Bohr effect?

- A As the partial pressure of carbon dioxide increases the dissociation curve becomes S- shaped (sigmoid)
- B At higher partial pressures of carbon dioxide and equal partial pressures of oxygen, the percentage saturation of haemoglobin with oxygen will be higher.
- C The carbon dioxide in the air prevents haemoglobin becoming fully saturated with oxygen during gas exchange in the lungs.
- D The release of oxygen from haemoglobin is more likely at higher partial pressures of carbon dioxide.

9 What can be observed about some of the tissues in a transverse section of a mammalian trachea?

	epithelium	goblet cells	cartilage
A	ciliated	present	in blocks
B	ciliated	present	in C-shaped rings
C	non-ciliated	absent	in blocks
D	non-ciliated	absent	in C-shaped rings

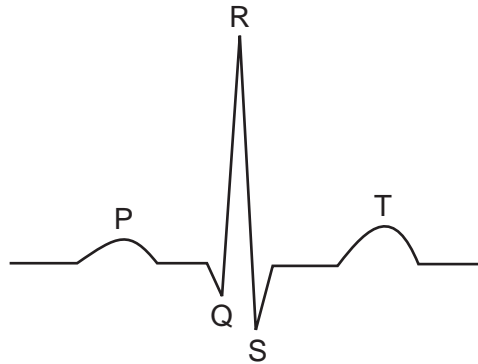
10 The diagram shows the pressure changes in various structures of the **right side** of the heart during the cardiac cycle.



Which structure is represented by letter X?

- A pulmonary artery
- B right atrium
- C right ventricle
- D vena cava

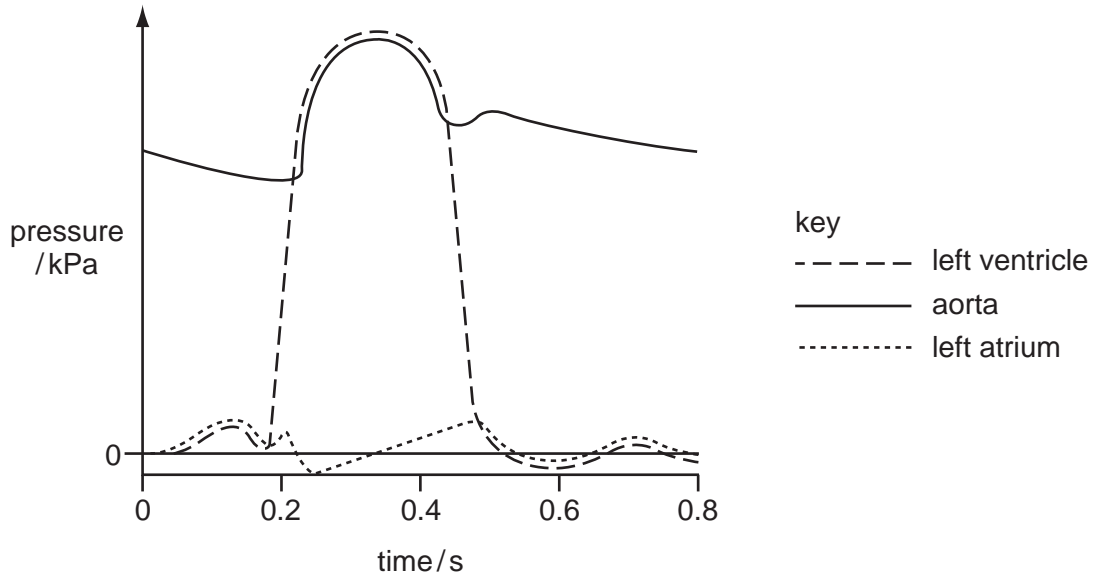
11 The trace represents the electrical activity of the heart during a single heart beat.



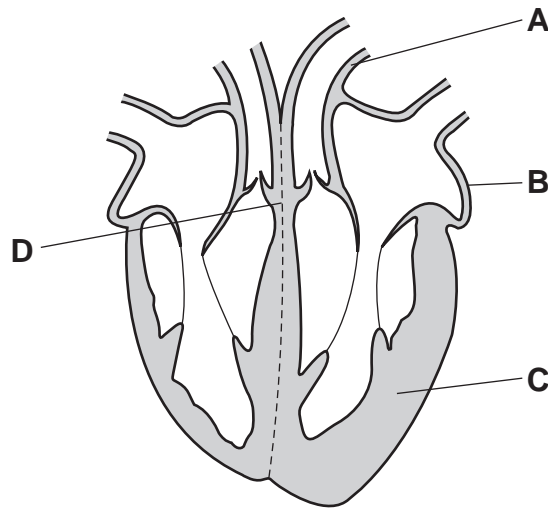
Which letters identify the flow of current through the atria and the recovery of the ventricle walls?

- A** P and R      **B** P and T      **C** Q and R      **D** Q and S

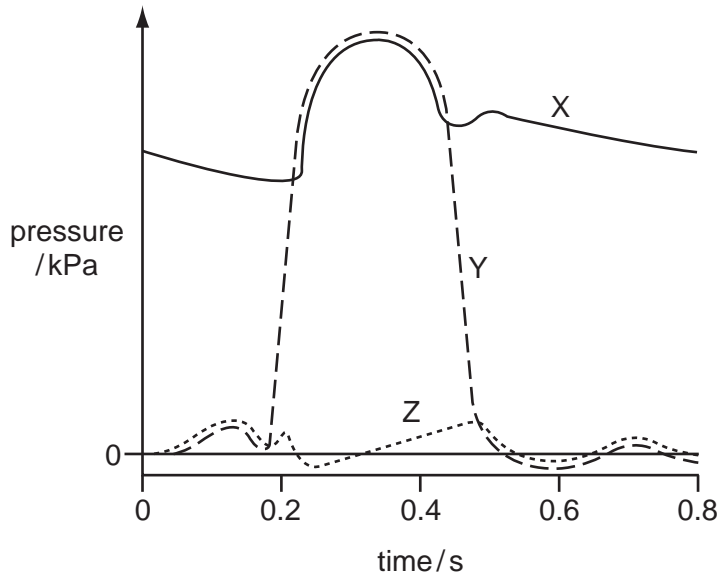
12 The graph shows the pressure in three parts of the heart during one cycle.



At 0.2 seconds, which part of the heart is responding to the excitatory stimulus?



13 The graph shows the pressure changes in different areas of the left side of the heart during one cardiac cycle.



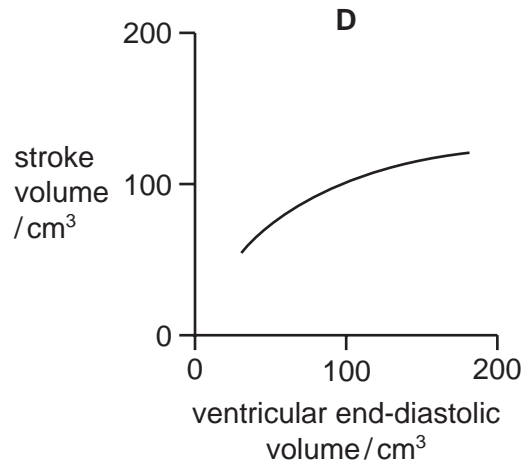
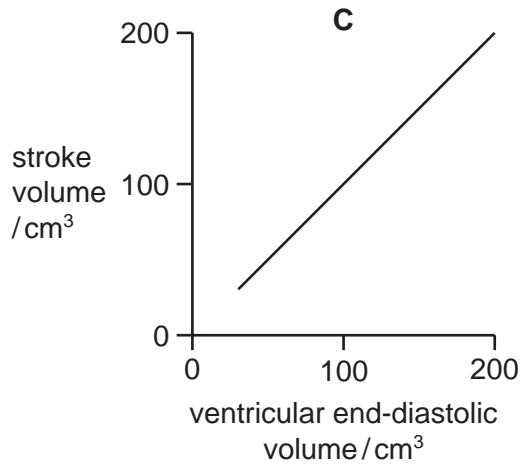
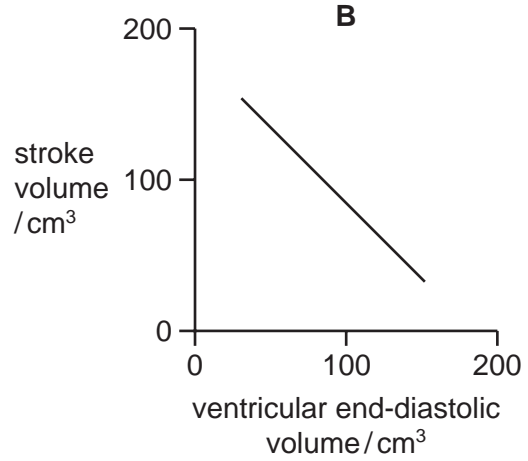
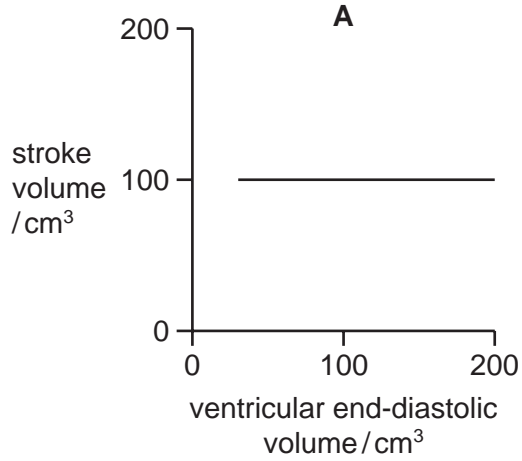
Which row shows the pressure changes in each part of the heart?

	left atrium	left ventricle	aorta
<b>A</b>	X	Y	Z
<b>B</b>	Y	Z	X
<b>C</b>	Z	X	Y
<b>D</b>	Z	Y	X



- 14 The stroke volume is the volume of blood pumped by each contraction of a ventricle. The ventricular end-diastolic volume is the volume of blood in the ventricle just before systole.

Which graph shows the relationship between the stroke volume and the ventricular end-diastolic volume?



15 What happens during ventricular diastole?

- A All semilunar valves open.
- B The atrio-ventricular valves open.
- C The pressure in the atria rises above the pressure in the ventricles.
- D The pressure in the left atrium rises more than the pressure in the right atrium.

16 Which row correctly describes the events during the cardiac cycle?

	nerve impulses from atrio-ventricular node (AVN) to	nerve impulses from Purkyne tissue (PT) to	nerve impulses from sino-atrial node (SAN) to
<b>A</b>	SAN	the ventricles	AVN
<b>B</b>	PT	the atria	PT
<b>C</b>	PT	the ventricles	AVN
<b>D</b>	SAN	the atria	PT

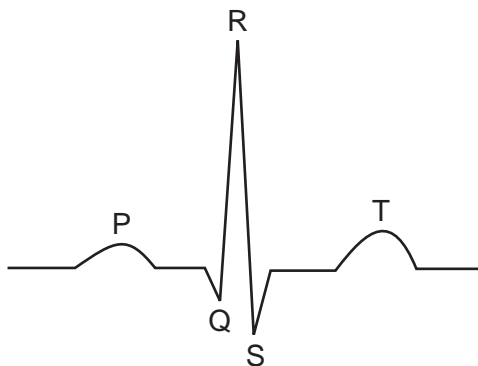
17 Which features enable the aorta to withstand high pressure at ventricular systole?

- A collagen fibres and elastin fibres
- B collagen fibres and endometrium
- C elastin fibres and large lumen
- D smooth muscle and small lumen

18 What events occur during contraction of the left ventricle?

- A The bicuspid valve opens and semilunar valve in the aorta opens.
- B The bicuspid valve closes and semilunar valve in the aorta closes.
- C The pressure in the left atrium becomes greater than the pressure in the left ventricle.
- D The pressure in the left ventricle becomes greater than the pressure in the aorta.

- 19 The trace represents the electrical activity of the heart during a single heart beat.



Which letters identify the flow of current through the atria and the recovery of the ventricle walls?

- A** P and R      **B** P and T      **C** Q and R      **D** Q and S

- 20 What is systolic blood pressure?

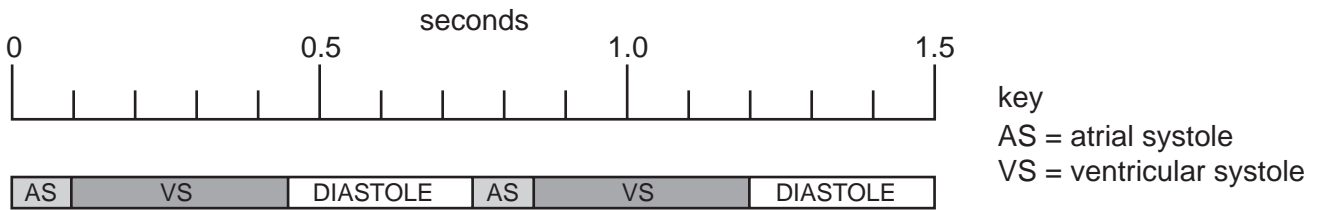
- A** the blood pressure in the arteries when the heart is relaxing  
**B** the blood pressure in the left ventricle at the end of a contraction  
**C** the maximum blood pressure in the arteries  
**D** the maximum blood pressure in the right ventricle

- 21 Aortic stenosis is a heart valve disorder in which the aortic semi-lunar valve opening is narrow.

Which effect could aortic stenosis have on the heart structure and function?

- A** The tendons of the heart valves are weakened by blood being forced back through the bicuspid/left atrio-ventricular valve into the left atrium.  
**B** The cardiac muscle of the left ventricle wall is thinned by blood leaking out of the left ventricle during ventricular diastole.  
**C** There is less cardiac muscle in the left ventricle and reduced diastolic blood pressure, caused by the smaller blood volume entering the left atrium.  
**D** The wall of the left ventricle thickens, leading to an enlarged heart and inability to relax and fill completely during diastole.

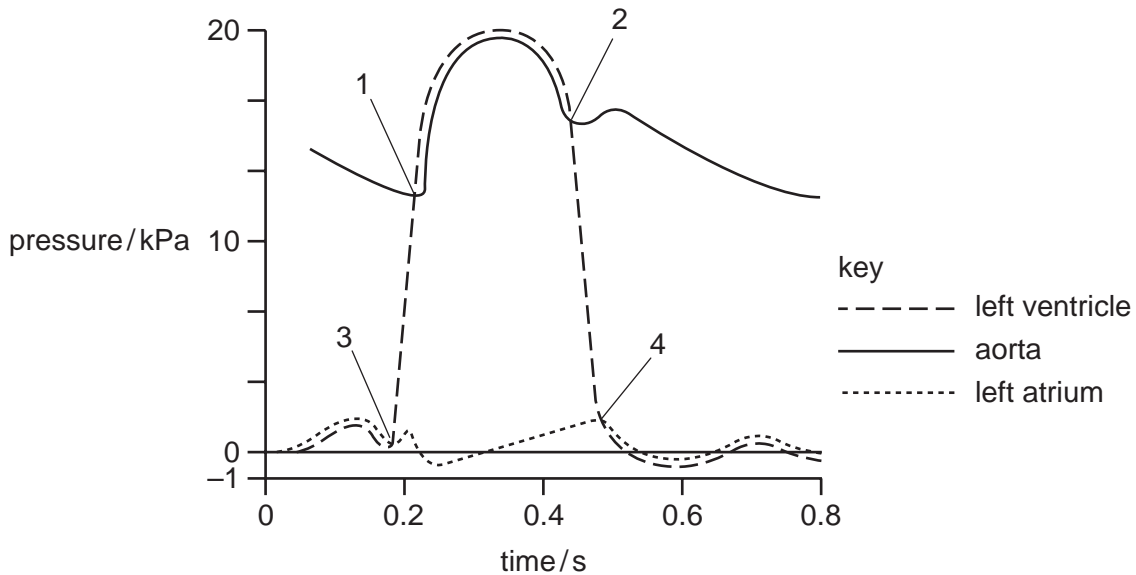
22 The diagram shows two cardiac cycles of a student, with the sequence of events set against a time scale.



How many times per minute is the student's heart beating?

- A 72
- B 75
- C 80
- D 90

23 The following graph shows the pressure changes in the left atrium, left ventricle and aorta during a cardiac cycle.



With reference to the semilunar and bicuspid valves, what is happening at points 1, 2, 3 and 4?

	semi-lunar valve		bicuspid valve	
	opens	closes	opens	closes
<b>A</b>	1	2	3	4
<b>B</b>	1	2	4	3
<b>C</b>	2	3	1	4
<b>D</b>	2	3	4	1

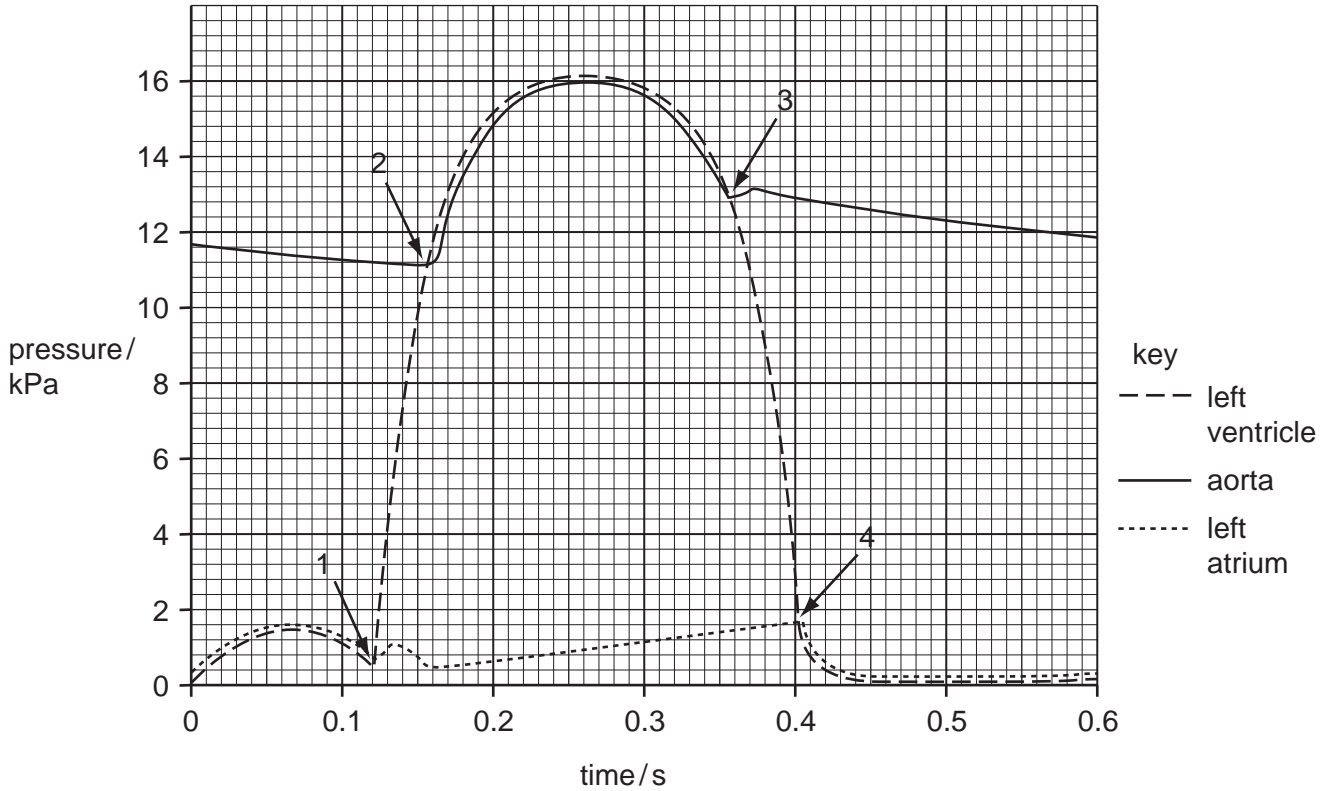
24 A red blood cell, entering the right side of the heart, passes by or through the following structures.

- 1 atrioventricular valve
- 2 semilunar valve
- 3 right atrium
- 4 right ventricle
- 5 sinoatrial node

In which order will the red blood cell pass the structures?

- A** 3 → 1 → 4 → 5 → 2
- B** 3 → 5 → 1 → 2 → 4
- C** 5 → 3 → 1 → 4 → 2
- D** 5 → 3 → 2 → 4 → 1

- 25 The diagram shows pressure changes in the left side of the heart and aorta over time. The length of this cardiac cycle is 0.6 s. Points 1, 2, 3 and 4 indicate when atrio-ventricular valves and semi-lunar valves either open or close.



What is the total time during one cardiac cycle that the atrio-ventricular valves and the semi-lunar valves are both closed at the same time?

- A** 0.03 s      **B** 0.04 s      **C** 0.07 s      **D** 0.21 s

- 26 What is the state of the valves in the mammalian heart when the pressure in the ventricles reaches its maximum?

	semilunar valves	atrioventricular valves
<b>A</b>	closed	closed
<b>B</b>	closed	open
<b>C</b>	open	closed
<b>D</b>	open	open

- 27 Fish oils are thought to have beneficial effects on the conduction of electrical excitation through the ventricles of the heart.

What could the fish oils influence?

- A** atrioventricular node
- B** Purkyne tissue
- C** sinoatrial node
- D** vagus nerve