Transport in Mammals

Question Paper 2

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Transport in Mammals
Sub Topic	
Booklet	Multiple Choice
Paper Type	Question Paper 2

Time Allowed : **38 minutes**

Score : **/ 31**

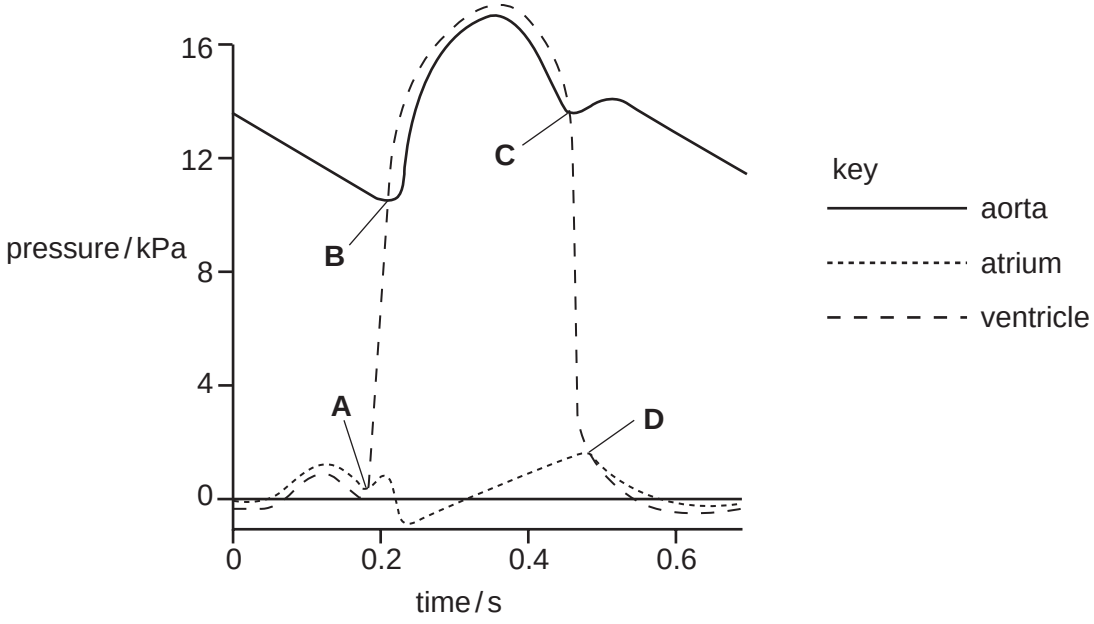
Percentage : **/100**

Grade Boundaries:

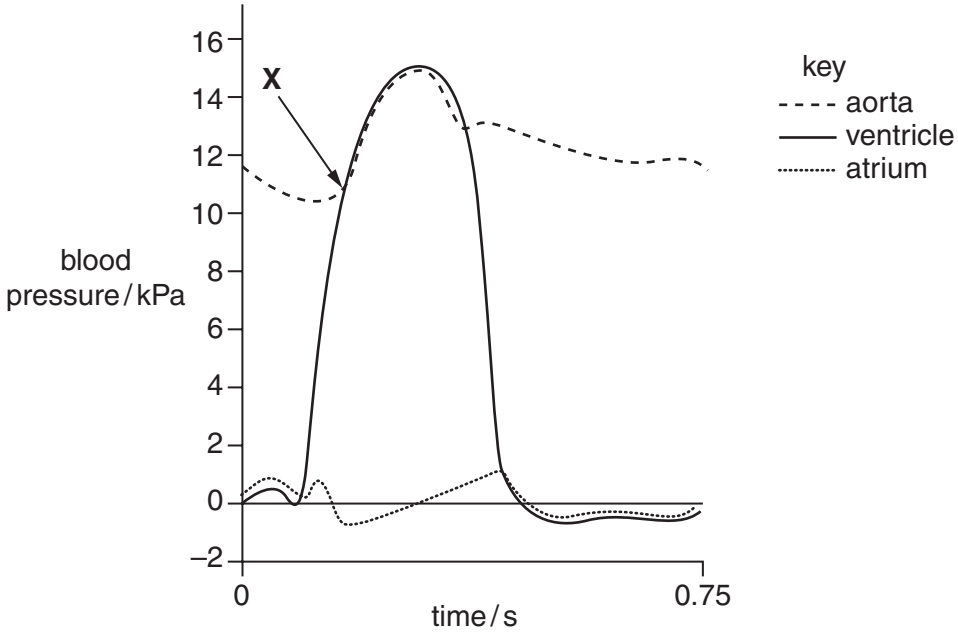
A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 The diagram gives information about blood pressure in various parts of the circulatory system during the cardiac cycle.

At which point does the semilunar valve of the aorta close?



2 The graph shows changes in blood pressure during one cardiac cycle.



What is happening to the ventricle and aortic semilunar valve at **X**?

	ventricle	aortic semilunar valve
A	contracting	closing
B	contracting	opening
C	relaxing	closing
D	relaxing	opening

3 During the cardiac cycle, the movement of the valves causes sounds that can be heard using a stethoscope.

What causes the first sound after atrial systole in the cardiac cycle?

1 closing of the atrioventricular valves

2 opening of the semilunar valves

3 closing of the semilunar valves

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

4 The following are all parts of the heart that control the heart action.

1 sinoatrial node (SAN)

2 atrioventricular node (AVN)

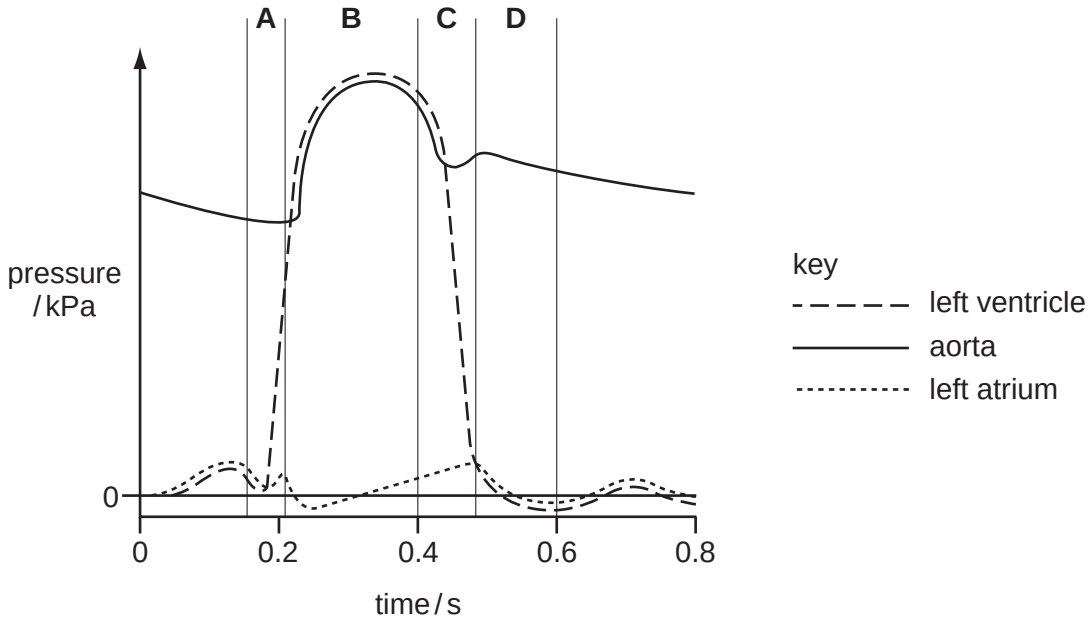
3 Purkyne tissue

Which row for atrial contraction and ventricular contraction is correct?

	atrial contraction	ventricular contraction
A	AVN produces wave of excitation	SAN produces wave of excitation
B	Purkyne tissue carries wave of excitation	AVN produces wave of excitation
C	SAN and AVN node produce wave of excitation	Purkyne tissue carries the wave of excitation
D	SAN produces wave of excitation	Purkyne tissue carries wave of excitation

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

Which letter shows when the ventricle is empty of blood?



6 Which statement concerning events that occur in the heart is correct?

A As the wave of excitation passes through the atrioventricular node there is a time delay before it passes down the Purkyne tissue to the ventricles.

B Movement of blood into the ventricles following atrial contraction causes the ventricular blood pressure to rise above the blood pressure in the atria, closing the atrioventricular valve.

C The band of non-conducting tissue between the atria and ventricles causes the wave of excitation to pass through the Purkyne tissue to reach the atrioventricular node.

D The sinoatrial node in the left atrium, sends out a wave of excitation that spreads across the walls of the atria, resulting in the movement of blood from the atria into the ventricles.

7 What occurs during ventricular systole in a mammalian heart?

1 aortic pressure increases

2 atrial pressure does not change

3 ventricular pressure increases

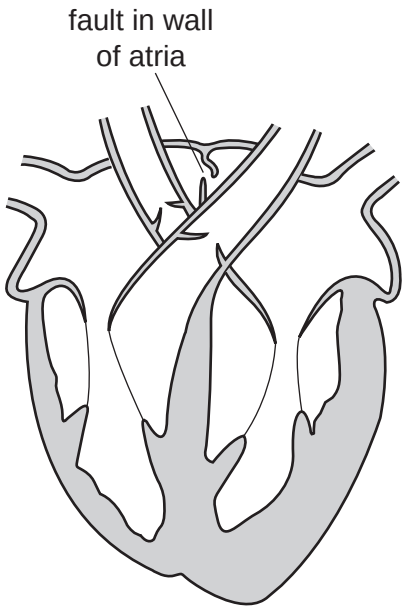
A 1 and 2

B 1 and 3

C 2 and 3

D 3 only

8 The diagram shows a defect in the walls between the atria.



What effect would this defect have on the blood circulatory system?

A increased pressure in the pulmonary artery

B irregular heart beat

C reduced oxygen saturation of haemoglobin

D ventricular systole is delayed

9 'Heart block' is a disease which can result in a lower than normal heart rate. A doctor treating a patient suffering from heart block found that electrical impulses were initiated as normal but were not correctly conducted to the ventricles, so the rate of ventricular contraction was slowed.

Which may be functioning incorrectly in the patient?

1 atrioventricular node (AVN)

2 Purkyne tissue

3 sinoatrial node (SAN)

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

10 Which reactions are **not** likely to occur in blood that is passing through active tissues?

1 $Hb + 4O_2 \rightarrow HbO_8$

2 $Hb_8 + H^+ \rightarrow HHb + 4O_2$

3 $HC_3^- + H^+ \rightarrow H_2CO_3$

4 $_2O + CO_2 \rightarrow H_2CO_3$

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

11 The pressure of blood entering capillaries is about seven times higher than that of blood leaving the capillaries.

What correctly explains this observation?

1 Blood pressure decreases with distance from the heart.

2 Tissue fluid formation is due to a net loss of plasma from capillaries.

3 Veins have fewer elastic and muscle fibres in their walls than arteries.

A **1**, 2

B 1 and 2 only

C 1 and 3 only

D 2 and 3 only

12 What happens during ventricular systole in a mammalian heart?

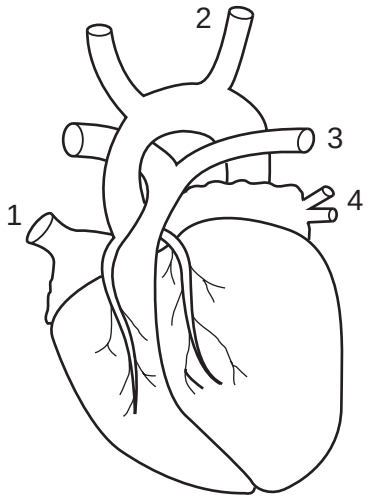
A aortic pressure increases

B atrioventricular valves open

C semilunar valves close

D ventricular pressure decreases

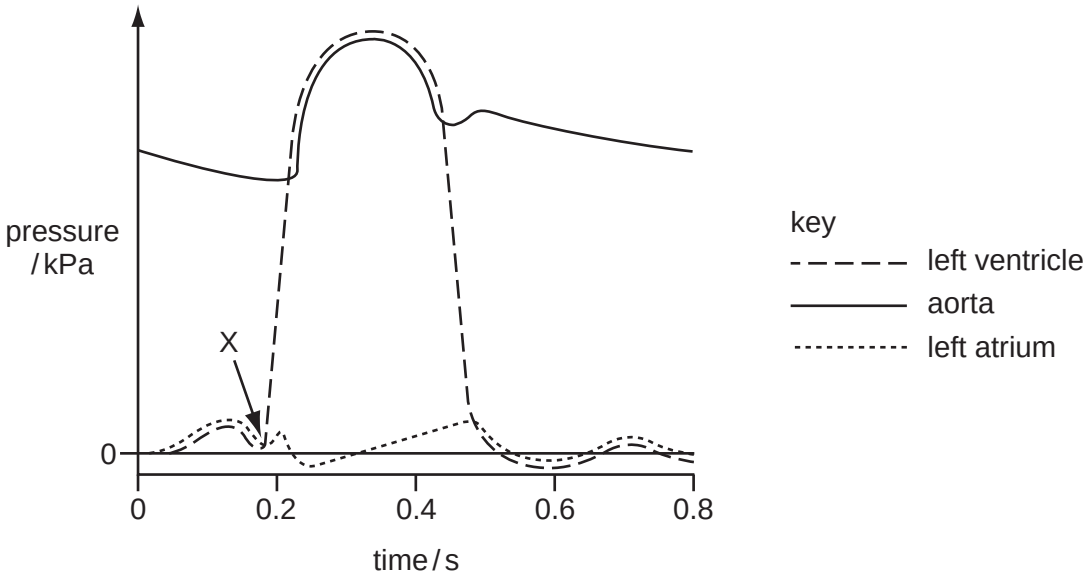
13 The diagram shows the heart and some of its blood vessels.



Which combination of numbers correctly identifies the blood vessels that supply blood to the heart and carry blood from the heart?

	to the heart	from the heart
A	1 and 2	3 and 4
B	2 and 3	1 and 4
C	3 and 4	1 and 2
D	4 and 1	2 and 3

14 The diagram shows pressure changes in the left side of the heart during the cardiac cycle.



What happens at X?

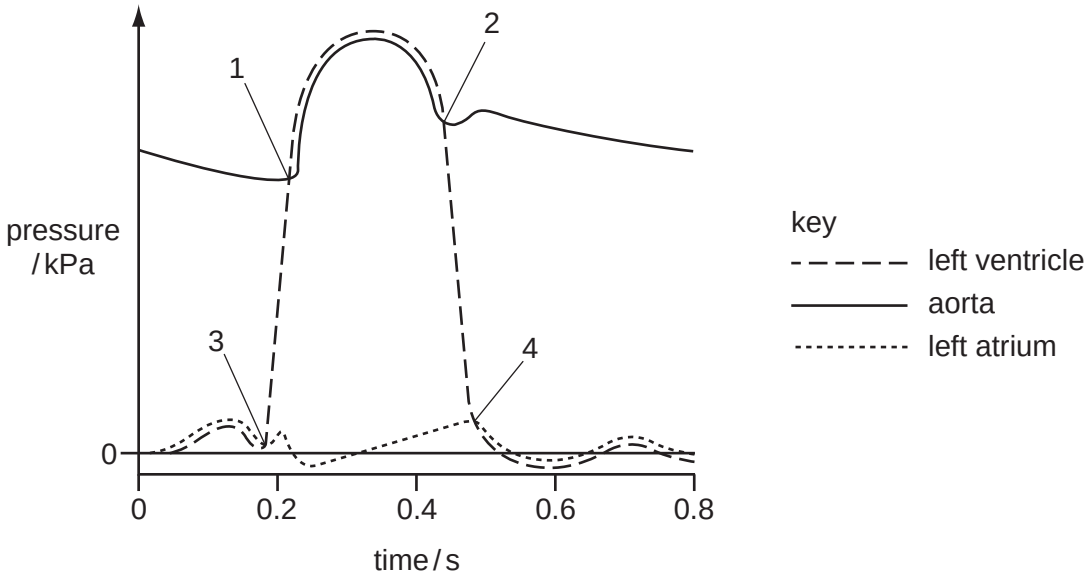
A atrioventricular valves close

B atrioventricular valves open

C semilunar valves close

D semilunar valves open

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



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

	semilunar valve		atrioventricular valve	
	opens	closes	opens	closes
A	1	2	3	4
B	1	2	4	3
C	2	3	1	4
D	2	3	4	1

16 Which of the following can result in heart failure?

1 increase in blood pressure

2 deposits of fatty material in arteries and veins

3 reduced oxygen supply to cardiac muscle

4 increased risk of blood clotting

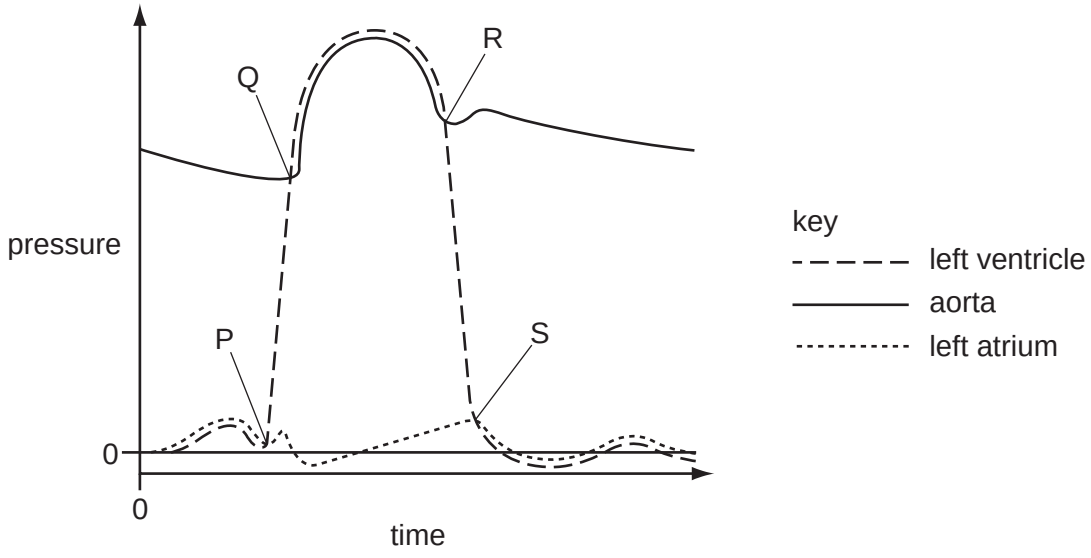
A 3 and 4 only

B 1, 2 and 3 only

C 1, 2 and 4 only

D 1, 3 and 4 only

17 The diagram shows changes in pressure in the left side of the heart during the cardiac cycle.



Which statement about the heart valves is correct?

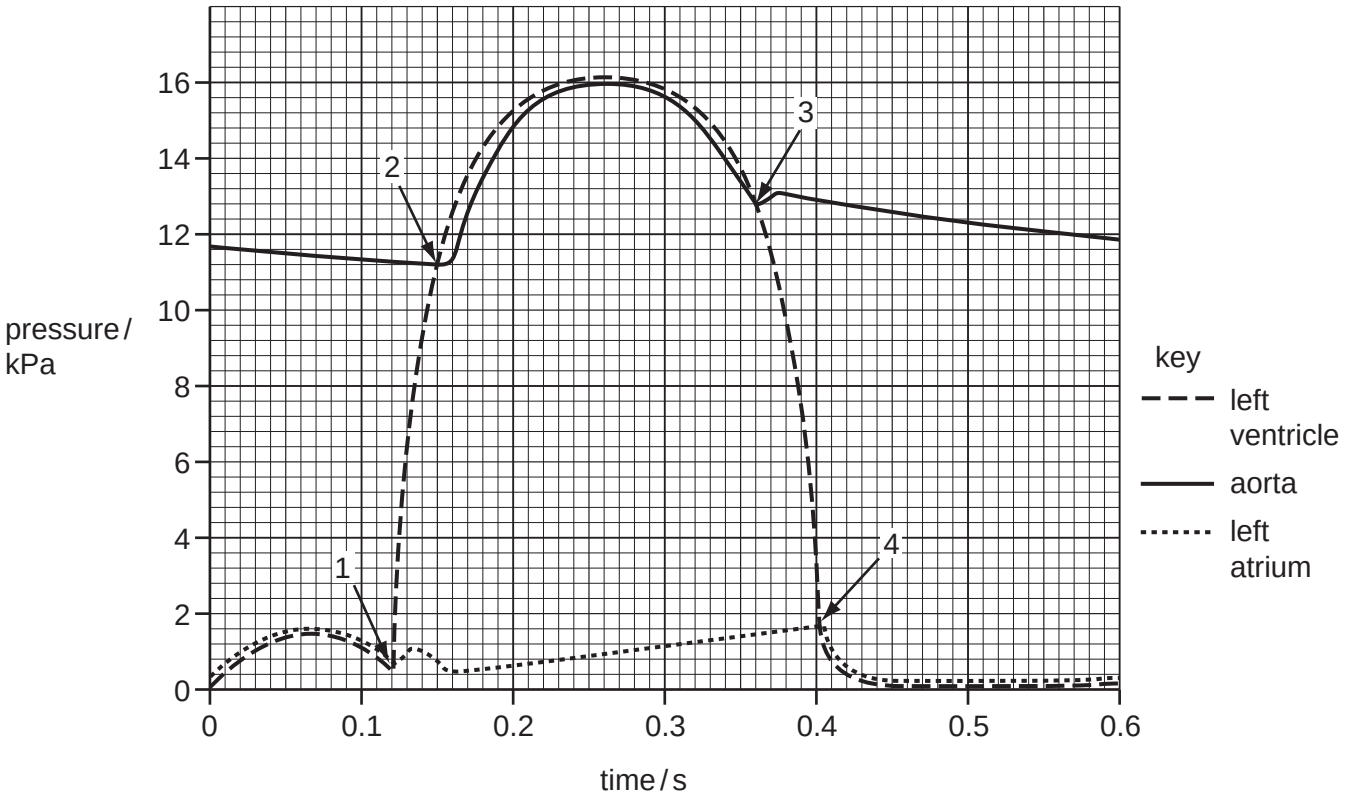
A At P, the atrioventricular valve opens.

B At Q, the semilunar valve opens.

C At R, the semilunar valve opens.

D At S, the atrioventricular valve closes.

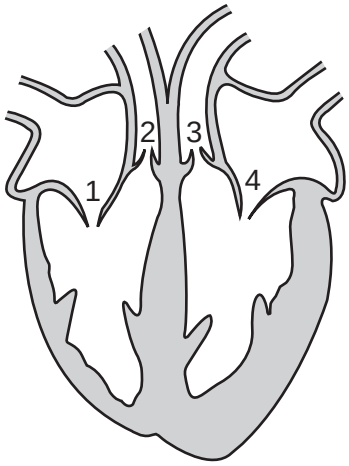
18 The diagram shows pressure changes in the left side of the heart and aorta over time. The length of this cardiac cycle is 0.6 s. Points 1, 2, 3 and 4 indicate when atrio-ventricular valves and semi-lunar valves either open or close.



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

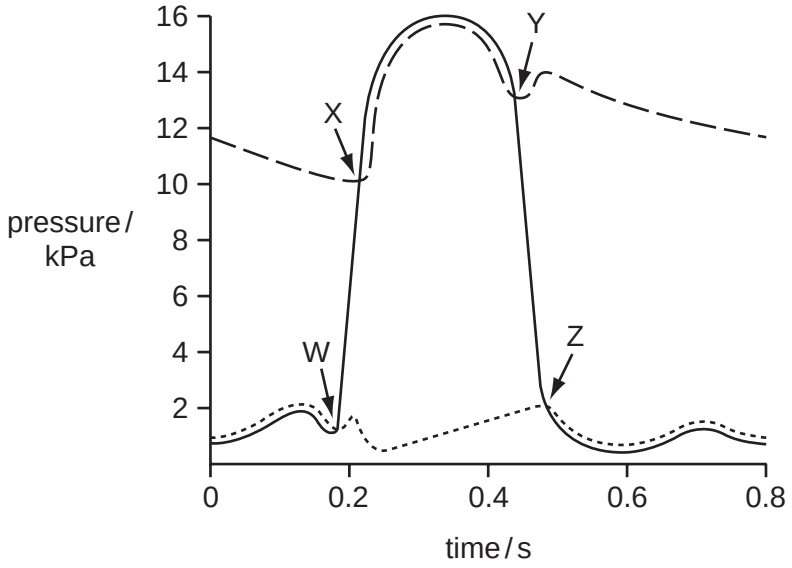
19 The diagram shows the valves inside the heart.



Which valves are open or closed when the atria are relaxed and the ventricles contracted?

	valves open	valves closed
A	3 and 4	1 and 2
B	2 and 4	1 and 3
C	2 and 3	1 and 4
D	1 and 4	2 and 3

20 The graph shows pressure changes during a cardiac cycle.



Which row correctly identifies W, X, Y, and Z?

	W	X	Y	Z
A	atrio-ventricular valves close	semi-lunar valves close	semi-lunar valves open	atrio-ventricular valves open
B	atrio-ventricular valves close	semi-lunar valves open	semi-lunar valves close	atrio-ventricular valves open
C	semi-lunar valves close	atrio-ventricular valves open	atrio-ventricular valves close	semi-lunar valves open
D	semi-lunar valves open	atrio-ventricular valves close	atrio-ventricular valves open	semi-lunar valves close

21 Some babies are born with a hole between the right and left atria. These newly born babies are found to have an increased number of red blood cells.

What is the reason for this increase?

A More blood is needed because it is pumped faster.

B Newly born babies' haemoglobin has a higher affinity for oxygen.

C Newly born babies' haemoglobin molecules only have one haem group.

D There is less oxygen available to the newly born baby.

22 Which chamber of the heart shows the greatest pressure changes during one cardiac cycle?

A left atrium

B left ventricle

C right atrium

D right ventricle

23 What happens to the blood flow in the cardiac cycle?

A Blood flows into the aorta through the semilunar valve due to contraction of the right ventricle.

B Blood flows into the left atrium through the pulmonary artery when the walls of the left atrium relax.

C Blood flows into the right atrium through the vena cava when the walls of the right atrium relax.

D Blood flows into the right ventricle through the semilunar valve when the walls of the right atrium contract.

24 A molecule of haemoglobin contains four haem groups. The haem groups contain iron atoms which can bond reversibly with oxygen.

How many oxygen atoms can be carried by one haemoglobin molecule?

A 4 **B** 8 **C** 12 **D** 16

25 What is the function of the Purkyne (Purkinje) tissue in the mammalian heart?

A to conduct a wave of electrical excitation over the atria

B to conduct a wave of electrical excitation over the ventricles

C to reduce the spontaneous contraction rate of the heart

D to separate oxygenated blood from deoxygenated blood

26 Which event occurs during contraction of the left ventricle?

A The bicuspid valve opens.

B The 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.

27 What will directly stimulate the sinoatrial node (SAN), causing an increase in heart rate?

A high blood carbon dioxide concentration

B low blood oxygen concentration

C low blood pressure

D release of adrenaline

28 In the mammalian heart, which structure is the pacemaker?

A atrioventricular node

B bundle of His

C Purkyne (Purkinje) fibres

D sinoatrial node

29 The table shows changes occurring in the body.

Which combination would cause the greatest rise in cardiac output?

	aortic blood pressure	blood pressure in the vena cava	carbon dioxide concentration of the blood	frequency of impulses in the vagus nerve
A	decrease	no change	increase	no change
B	decrease	no change	no change	increase
C	no change	decrease	increase	no change
D	no change	decrease	no change	increase

30 Which chamber of the heart shows the greatest pressure changes during one cardiac cycle?

A left atrium

B left ventricle

C right atrium

D right ventricle

31 Four people of the same age, sex and mass had their pulse rate taken before and immediately after taking a standard strenuous exercise.

Which person had the most well developed heart muscle?

	pulse rate / beats per minute	
person	resting	after exercise
A	55	160
B	72	190
C	75	180
D	81	175