Transport in Humans

Question Paper

Level	O Level
Subject	Biology
Exam Board	Cambridge International Examinations
Topic	Transport in Humans
Sub Topic	
Booklet	Question Paper 1

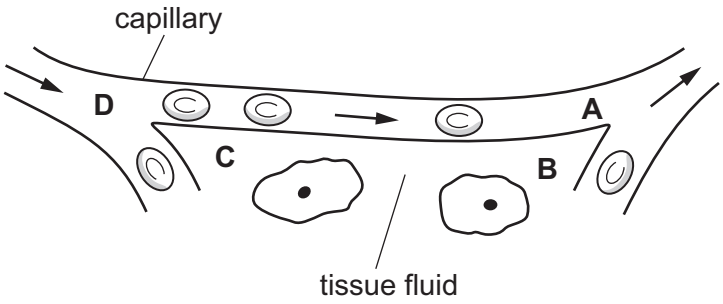
Time Allowed: **60 minutes**

Score: **/50**

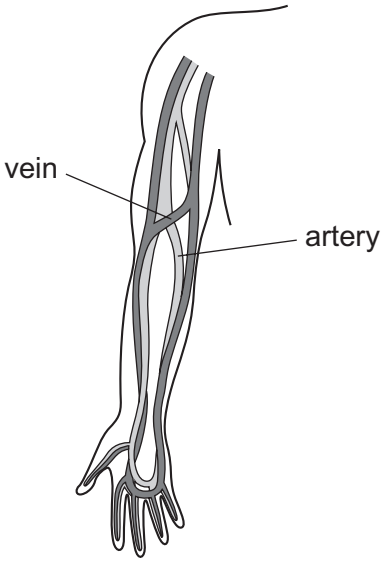
Percentage: **/100**

1 The diagram shows the movement of blood through a tissue.

At which labelled point is the pressure highest?



2 The diagram shows arteries and veins in the human forearm.

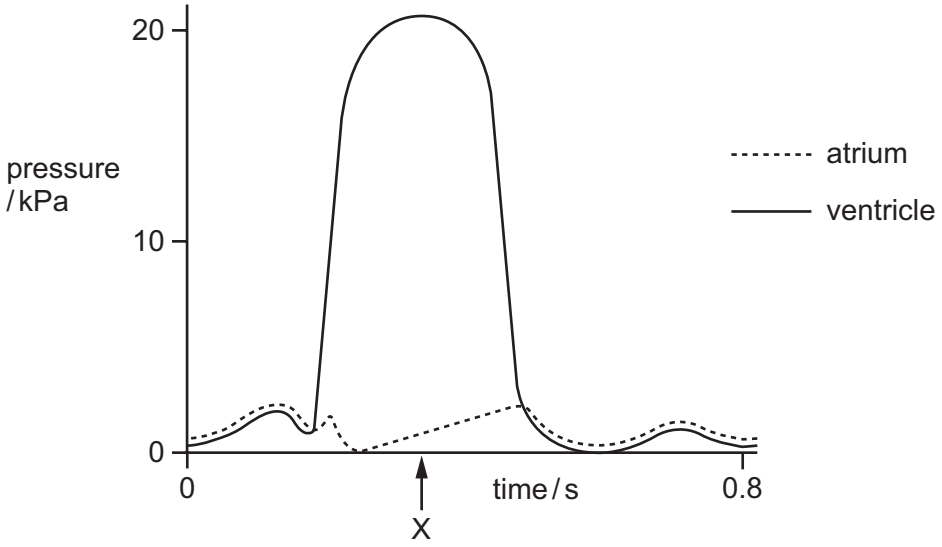


Which statements apply to a vein in the human forearm?

	carries oxygenated blood	has valves	blood is returning to the heart
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

key
✓ = yes
✗ = no

3 The graph shows pressure changes in the left atrium and in the left ventricle during one heartbeat.



What is the state of the valves in the heart at time X?

	left atrio-ventricular valve (bicuspid)	semi-lunar valve (in aorta)
A	closed	closed
B	closed	open
C	open	closed
D	open	open

4 Which two foods would provide the best sources of carbohydrates, calcium, fibre (roughage) and vitamin C?

A fish and eggs

B green beans and cereal

C meat and milk

D yoghurt and cheese

5 Which statements about arteries are correct?

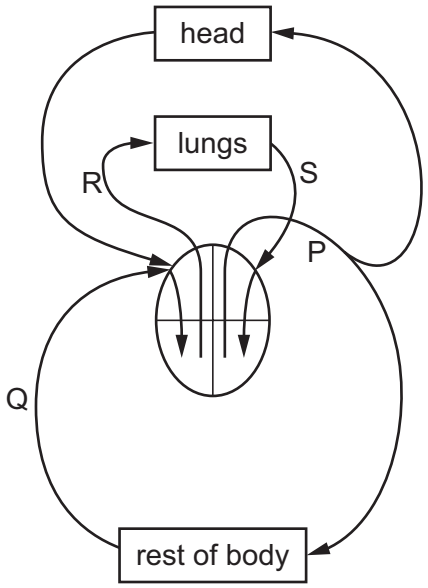
1 All arteries carry oxygenated blood.

2 Arteries carry blood at high pressure.

3 All arteries carry blood away from the heart.

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

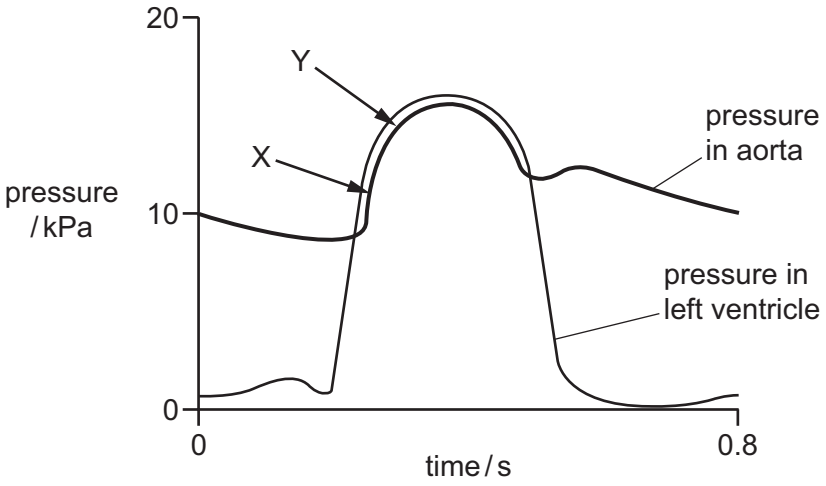
6 The diagram represents the heart and some major blood vessels.



What are possible blood pressures (in kPa) for the vessels shown on the diagram?

	P	Q	R	S
A	1	4	2	16
B	4	16	2	1
C	16	2	4	1
D	16	4	1	2

7 The diagram shows changes in pressure in the aorta and the left ventricle during one complete heart beat.



What causes the increase in pressure between points X and Y?

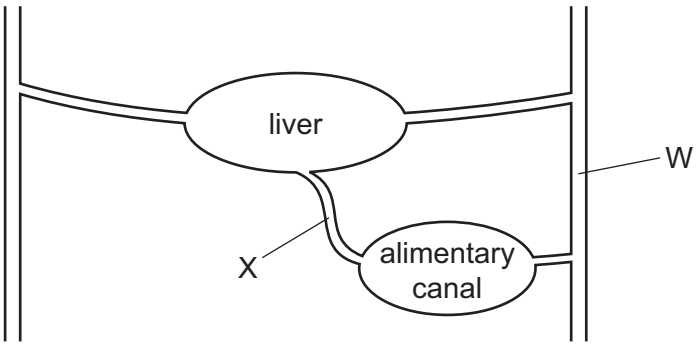
A contraction of the left atrium

B contraction of the left ventricle

C relaxation of the left atrium

D relaxation of the left ventricle

8 The diagram shows the liver and its blood supply.



What is the name of blood vessel X, and which substance increases in concentration between vessel W and vessel X?

	name of X	substance
A	hepatic artery	carbon dioxide
B	hepatic portal vein	carbon dioxide
C	hepatic artery	oxygen
D	hepatic portal vein	oxygen

9 Which organ receives blood from two major vessels and all of this blood leaves it in a single major vessel?

A heart

B kidney

C liver

D lung

10 In the human circulatory system, what causes the transfer of materials from the capillaries to the tissue fluid?

A active transport

B blood pressure

C capillarity

D osmosis

11 Which chamber of the heart would be the first to receive nicotine absorbed into the blood in the lungs of a cigarette smoker?

A left atrium

B left ventricle

C right atrium

D right ventricle

12 Which sequence shows the shortest route taken by blood travelling from a leg to an arm in the human body?

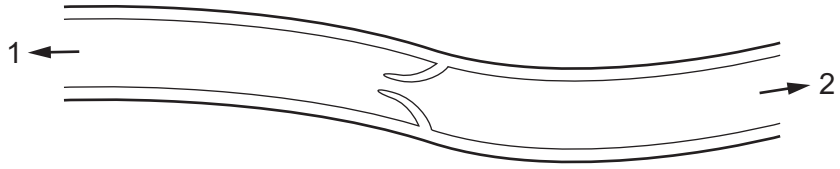
A leg → heart → lungs → heart → arm

B leg → heart → lungs → kidney → arm

C leg → kidney → heart → lungs → arm

D leg → lungs → heart → alimentary canal → arm

13 The diagram shows a section through part of a vein.

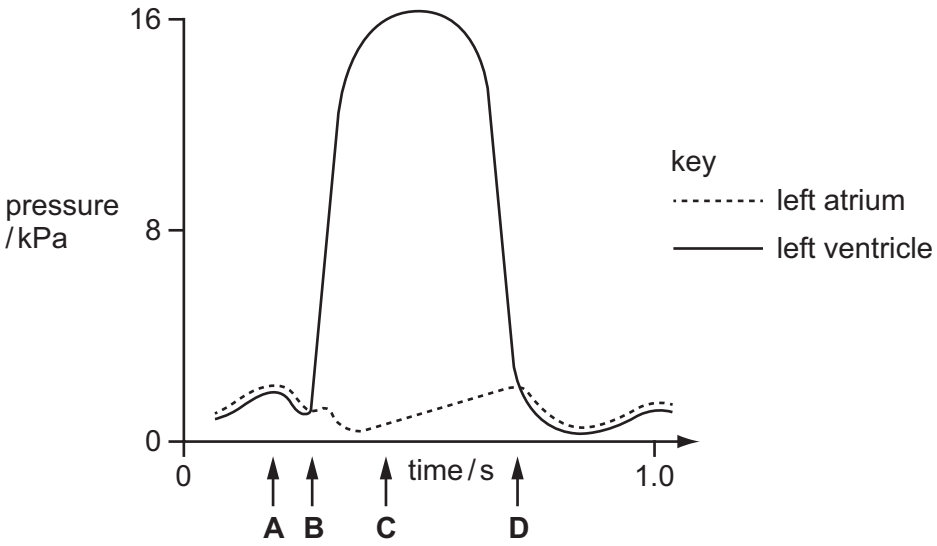


What could be the first organs found in the directions 1 and 2?

	1	2
A	heart	brain
B	intestine	liver
C	kidney	heart
D	lung	heart

14 The graph shows the pressure changes in the left atrium and the left ventricle while the heart is beating.

When does the atrio-ventricular (bicuspid) valve close?



15 After muscular exercise, which blood vessel carries the **lowest** concentration of carbon dioxide?

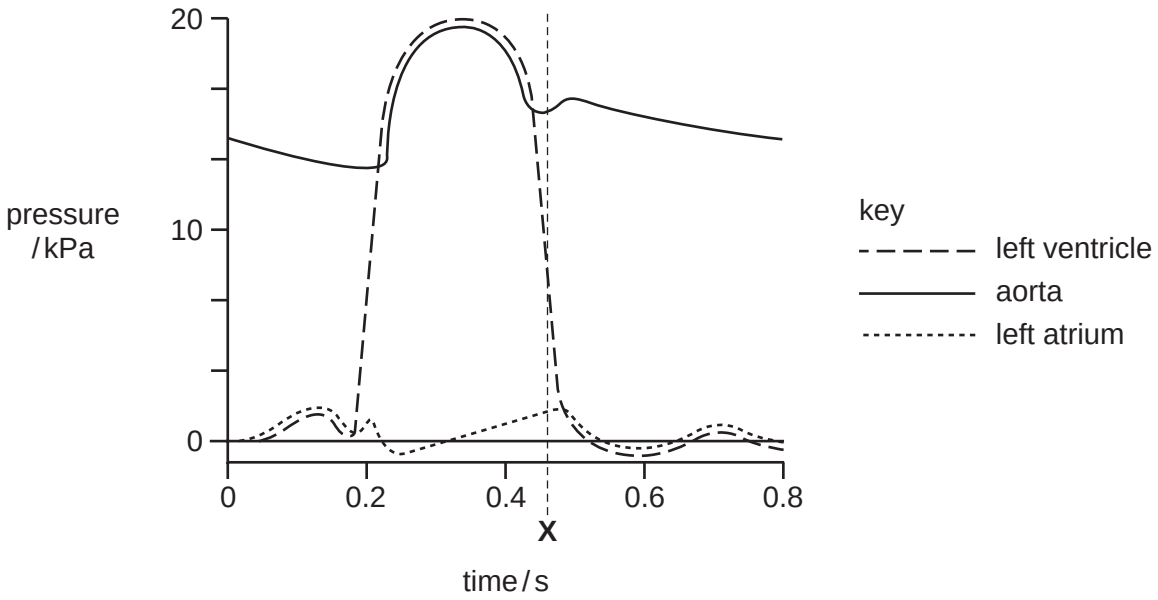
A hepatic vein

B pulmonary artery

C pulmonary vein

D vena cava

16 The diagram shows the pressures in the left side of the heart during one heart beat.



Which valves are open and which are closed at the time marked X?

	bicuspid	semi-lunar
A	closed	closed
B	closed	open
C	open	closed
D	open	open

17 Two hours after eating a meal, which vessel contains blood with the highest concentration of glucose?

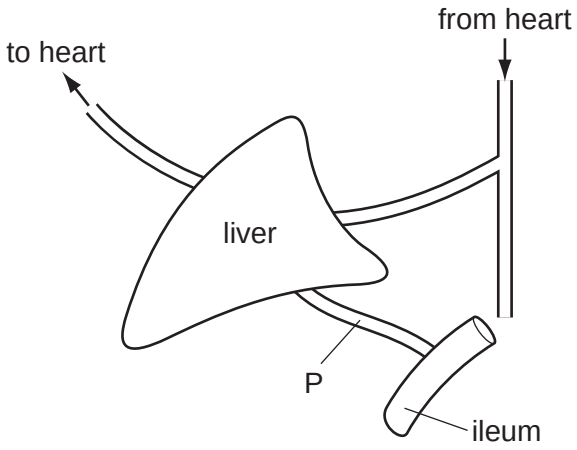
A aorta

B hepatic portal vein

C pulmonary vein

D renal vein

18 The diagram represents the liver and some associated structures.



What does the blood in blood vessel P transport?

A bile to the ileum

B glucose to the liver

C glycogen to the liver

D urea to the ileum

19 Compared to a vein, an artery has

A a thinner wall.

B a wall with more elastic tissue.

C a wider lumen.

D valves.

20 Which row shows the blood vessels carrying blood to and from the organs listed?

	blood vessel carrying blood to the organ	organ	blood vessel carrying blood from the organ
A	aorta	heart	pulmonary vein
B	hepatic artery	liver	hepatic portal vein
C	pulmonary artery	lung	pulmonary vein
D	renal vein	kidney	renal artery

21 What is the correct route for blood flow in a human?

A left atrium → left ventricle → lungs → right ventricle → right atrium

B left atrium → left ventricle → right ventricle → right atrium → lungs

C right atrium → right ventricle → left ventricle → left atrium → lungs

D right atrium → right ventricle → lungs → left atrium → left ventricle

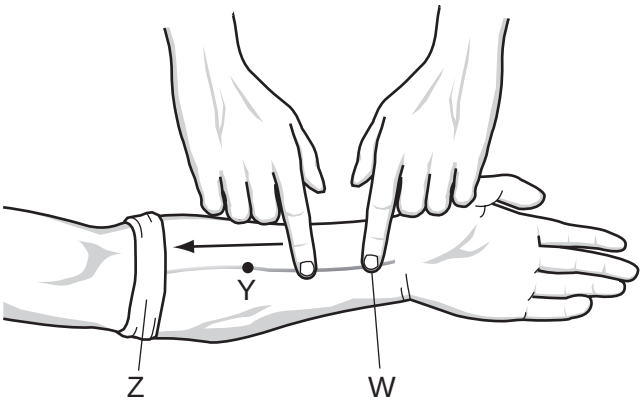
22 The table refers to blood vessels in the human body.

vessel	blood carried		oxygenated/ deoxygenated
	from	to	
aorta	**P**	all organs except lungs	oxygenated
pulmonary vein	lungs	heart	**Q**
hepatic artery	aorta	**R**	oxygenated
hepatic portal vein	alimentary canal	liver	**S**

What are **P**, **Q**, **R** and **S**?

	P	Q	R	S
A	left ventricle	deoxygenated	kidney	deoxygenated
B	left ventricle	oxygenated	liver	deoxygenated
C	right ventricle	deoxygenated	kidney	oxygenated
D	right ventricle	oxygenated	liver	oxygenated

23 The diagram shows an investigation of blood flow in the veins of the lower arm.



A cloth is tightly wrapped round the arm at point Z and the veins stand out clearly. One finger presses firmly on the vein at W.

When another finger strokes the vein, as shown in the diagram, the vein lies flat between points W and Y.

Four reasons are given to explain why the vein lies flat.

1 The bandage at Z prevents backflow of blood.

2 The finger pressed at W prevents more blood entering the vein.

3 A valve at Y prevents backflow of blood.

4 A valve at Z prevents more blood from entering the vein.

Which are correct?

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

24 Which row describes the functions of the blood components?

	plasma	platelets	white blood cells
A	antibody formation	clotting	transport of nutrients
B	clotting	transport of nutrients	antibody formation
C	clotting	antibody formation	transport of nutrients
D	transport of nutrients	clotting	antibody formation

25 In the liver, which substances are present in higher concentration in the hepatic vein than in the hepatic artery?

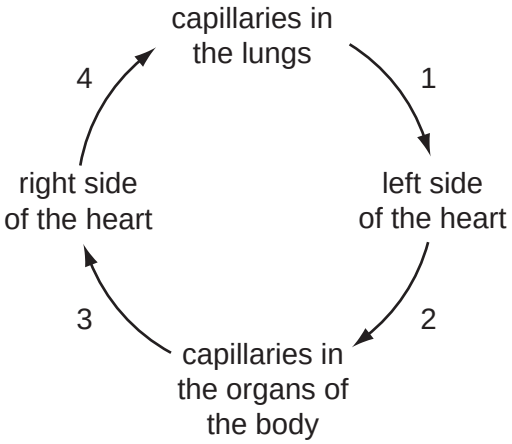
A carbon dioxide and protein

B carbon dioxide and urea

C oxygen and protein

D oxygen and urea

26 The diagram shows the direction of blood flow in the human body.



Which numbered stages have blood containing the most oxygen?

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

27 Which row in the table describes the features of the pulmonary vein?

	feature of pulmonary vein		
	blood	lumen	muscle layer
A	deoxygenated	narrow	thin
B	deoxygenated	wide	thick
C	oxygenated	narrow	thick
D	oxygenated	wide	thin

28 Which is a difference between plasma and tissue fluid?

	plasma	tissue fluid
A	less dissolved glucose	more dissolved glucose
B	dissolved glucose	no dissolved glucose
C	more protein molecules	fewer protein molecules
D	no white blood cells	white blood cells

29 The table shows changes in the concentrations of blood components as the blood flows through an organ.

blood component	change in concentration
carbon dioxide	increased
glucose	increased
oxygen	reduced
urea	increased

Which organ has the blood passed through?

A brain

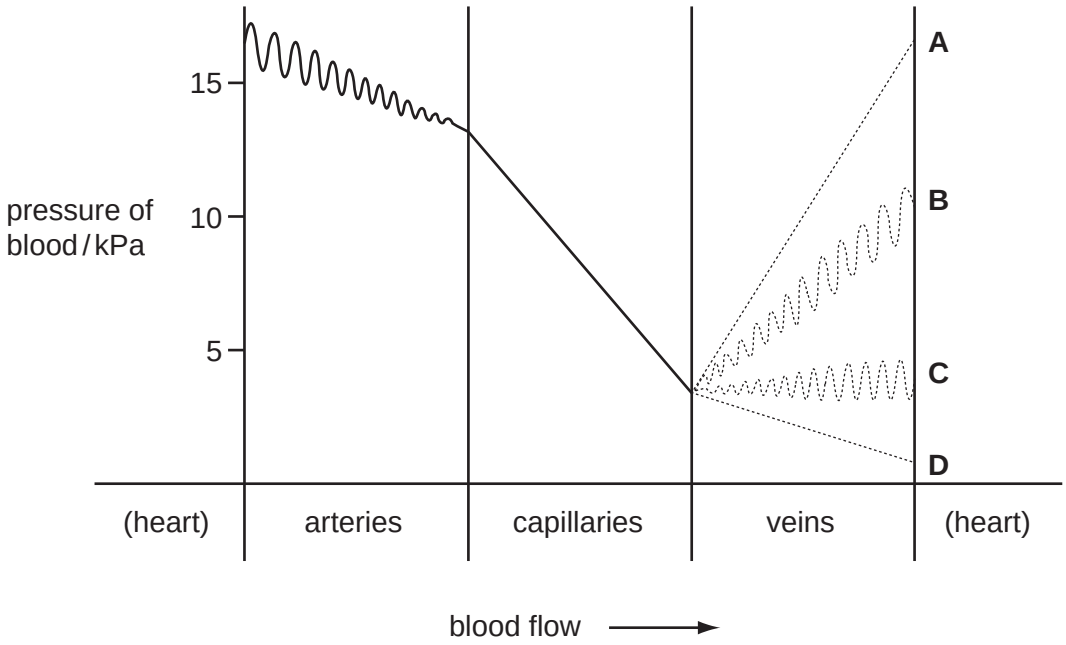
B kidney

C liver

D stomach

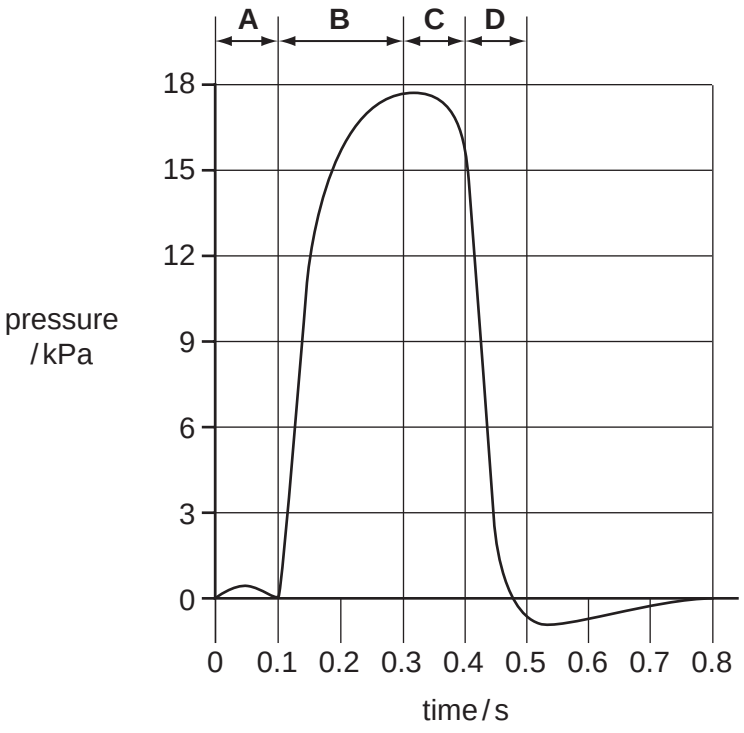
30 The diagram shows the blood pressure of a person at rest as the blood leaves the heart and passes through arteries and then capillaries.

Which line shows the pressure of blood as it flows through veins before returning to the heart?

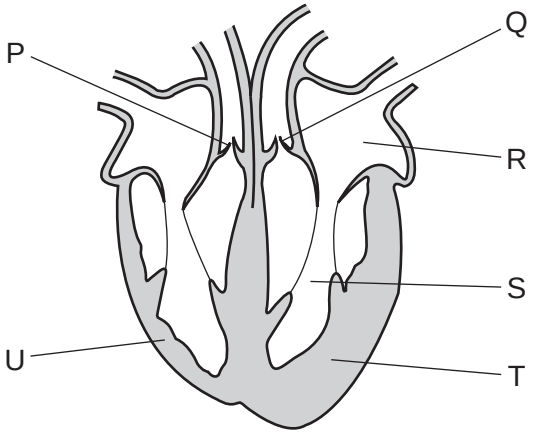


31 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left atrium contracting?



32 The diagram shows a section through the human heart.



Which labelled features suggest that blood leaves the heart at different pressures, when going to the lungs and to the body?

A Chambers R and S have different volumes.

B The walls of the atria are thinner than the walls of the ventricles.

C Valve P is stronger than valve Q.

D Wall T is more muscular than wall U.

33 Which blood vessel carries blood with the highest concentration of urea?

A hepatic artery

B hepatic vein

C renal artery

D renal vein

34 How do veins differ from arteries?

	width of lumen	wall thickness	elastic fibres	muscles in wall
A	narrower	thicker	more	less
B	narrower	thinner	less	more
C	wider	thicker	more	more
D	wider	thinner	less	less

35 The table shows the characteristics of the blood in one blood vessel in the body.

oxygen concentration	carbon dioxide concentration	pressure
high	low	high

Which blood vessel contains blood with these characteristics?

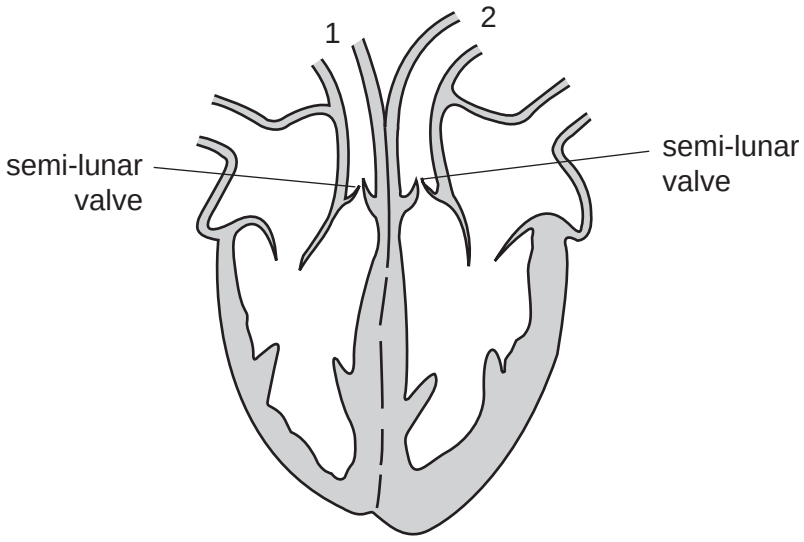
A aorta

B pulmonary artery

C pulmonary vein

D vena cava

36 The diagram shows a section through the human heart.

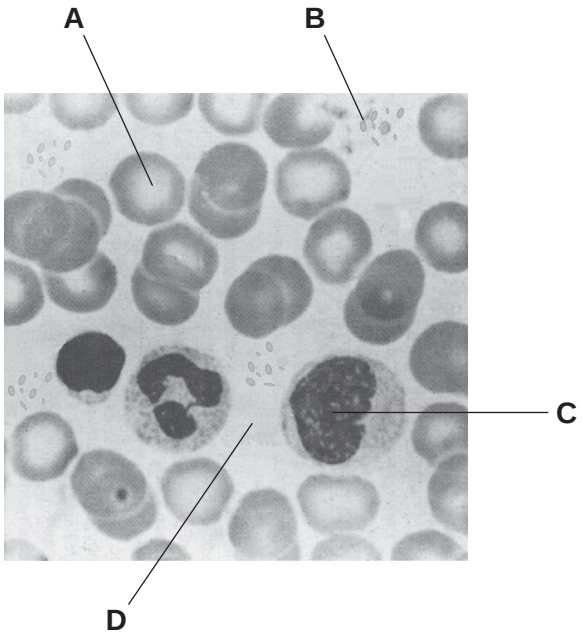


What happens as blood is being pumped out of the heart?

	semi-lunar valves	vessel through which blood passes to the lungs
A	open	1
B	open	2
C	closed	1
D	closed	2

37 The photomicrograph shows human blood.

Which component cannot function effectively if a person's diet lacks iron?



magnification ×1000

38 Which blood vessel carries absorbed food material from the small intestine to the liver?

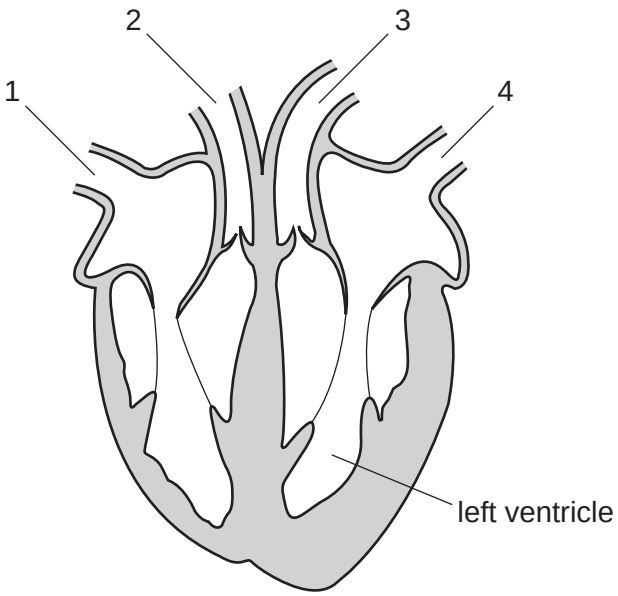
A coronary artery

B hepatic portal vein

C pulmonary artery

D renal vein

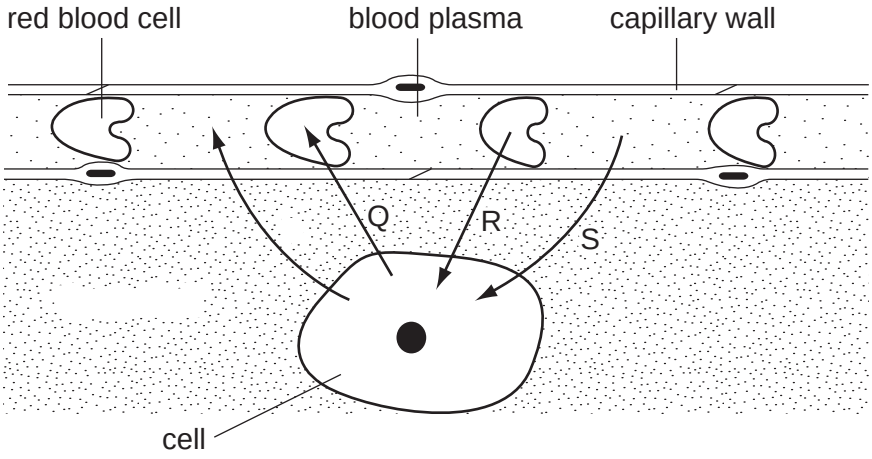
39 The diagram shows a vertical section through the heart.



What are the functions of the numbered blood vessels?

	carries blood to body	carries blood to lungs	carries blood from lungs	carries blood from body
A	1	4	3	2
B	2	1	3	4
C	2	3	4	1
D	3	2	4	1

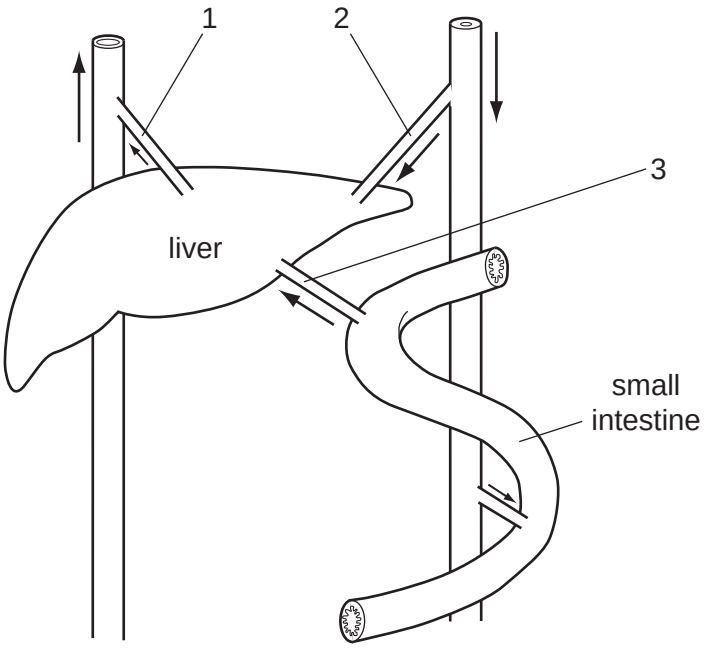
40 The diagram represents a blood capillary with an adjacent cell. The arrows represent the transfer of substances between the capillary and the cell.



Which arrows represent glucose, carbon dioxide and oxygen?

	glucose	carbon dioxide	oxygen
A	P	R	Q
B	Q	S	P
C	R	Q	S
D	S	P	R

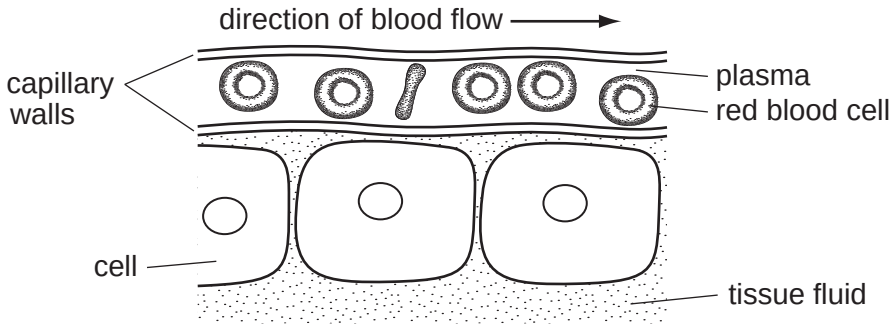
41 The diagram represents the liver and associated blood vessels.



After a meal, how is the blood affected by the liver as it passes between these blood vessels?

	blood vessels	effect of liver
A	2 to 1	glucose added
B	2 to 1	urea removed
C	3 to 1	glucose added
D	3 to 1	urea removed

42 The diagram shows a blood capillary close to some tissue cells bathed in tissue fluid. Exchange of nutrients takes place here.



Which row shows the type of nutrient in the plasma and in the tissue fluid and the method of transfer between the two?

	plasma	tissue fluid	method of transfer
A	amino acid	amino acid	diffusion
B	amino acid	protein	osmosis
C	protein	amino acid	digestion
D	protein	protein	active uptake

43 Blood enters the left atrium (left auricle) of the heart through

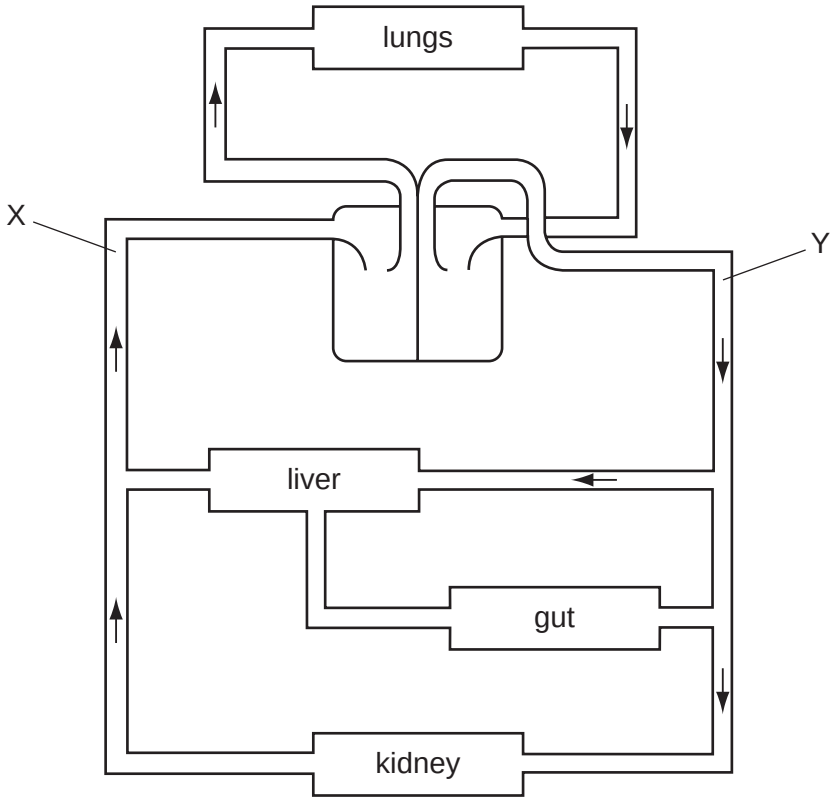
A the aorta.

B the bicuspid valve.

C the posterior vena cava.

D the pulmonary vein.

44 The diagram shows a plan of part of the circulatory system.



Which vessel **must** the blood pass through in flowing from X to Y?

A hepatic artery

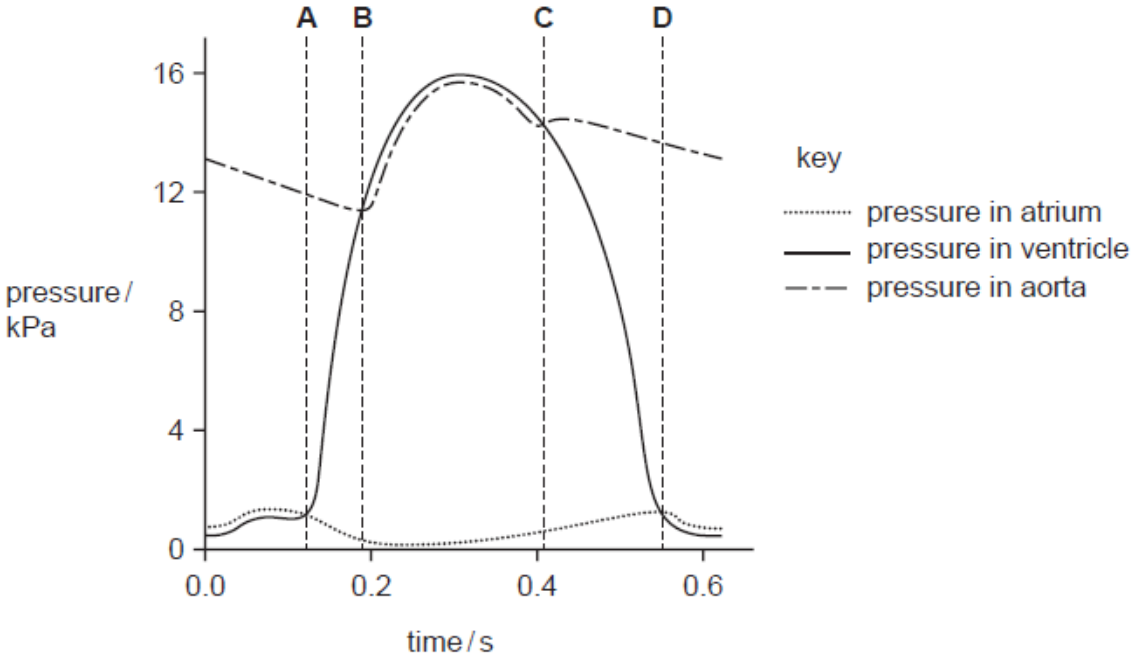
B hepatic portal vein

C pulmonary artery

D renal vein

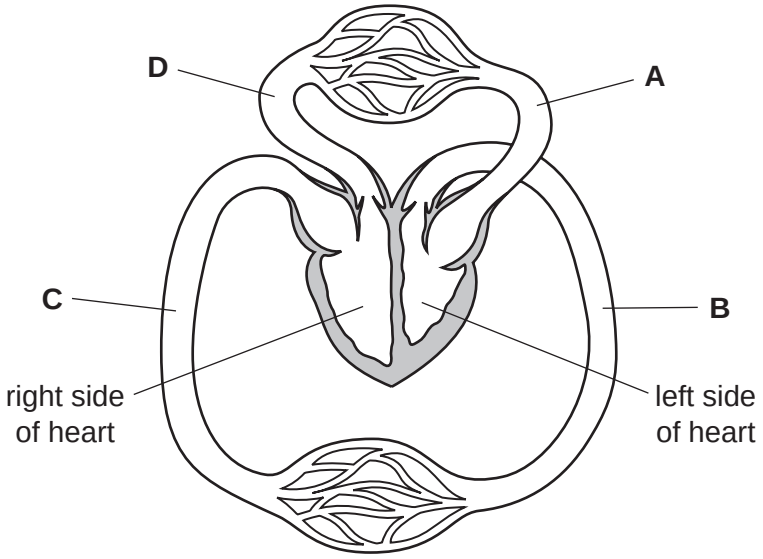
45 The graph shows pressure changes in the left side of the heart, during a single heart beat.

At which point do the semi-lunar valves open?



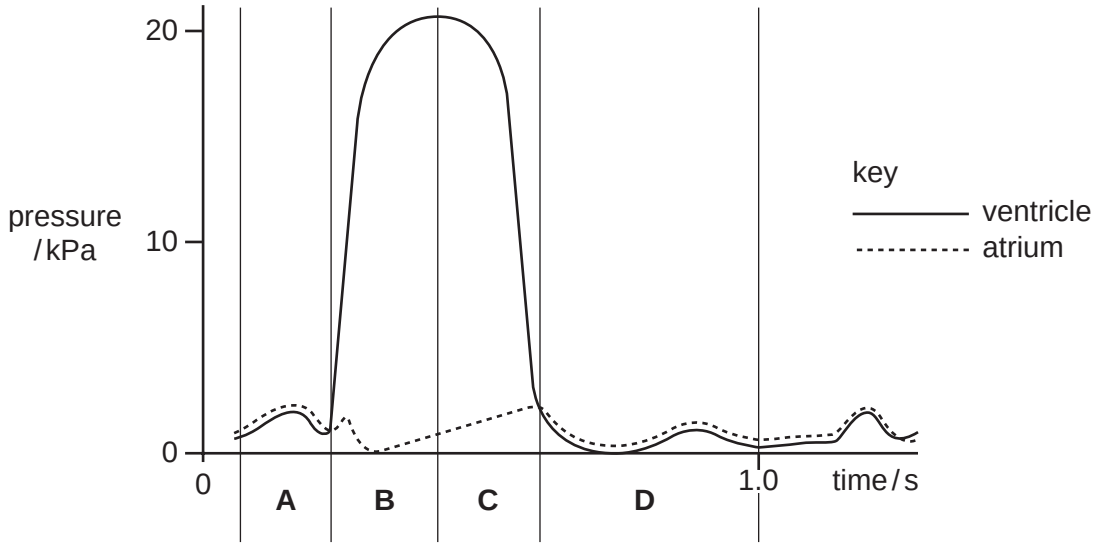
46 The diagram represents part of the human circulatory system.

Where is the blood pressure highest?



47 The graph shows pressure changes in the left ventricle and the left atrium (auricle) in one cycle of contraction of the heart.

During which period of time is the ventricle contracting?



48 In the human body, blood circulating from the gut to the heart passes through the

A aorta.

B kidneys.

C liver.

D lungs.

49 The table shows substances that pass between capillaries and tissues in a part of the body.

substance	into the capillaries from the tissues	out of the capillaries into the tissues
oxygen		✓
carbon dioxide	✓	
amino acids		✓
urea	✓	

key

✓ = does pass

In which part of the body are these capillaries?

A between the alveoli

B in the kidney

C in the liver

D in the villi

50 Look at the diagram of a heart.

Which vessel is a vein carrying oxygenated blood?