

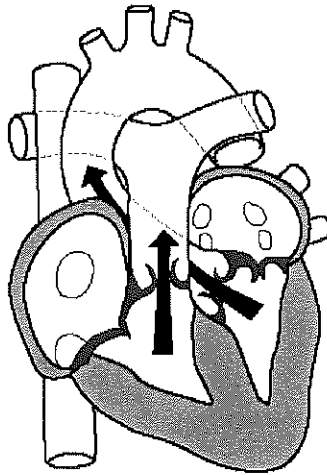
Heart and Circulation Multiple Choice Review

1. A blood vessel that transports blood out of a capillary bed is a(n)
 - a) vein.
 - b) artery.
 - ☒ c) venule. answer
 - d) arteriole.

2. The path followed by blood on one circuit through the heart is
 - a) ventricle, atrioventricular valve, semilunar valve, atrium.
 - ☒ b) atrium, atrioventricular valve, ventricle, semilunar valve. answer
 - c) atrium, ventricle, atrioventricular valve, semilunar valve.
 - d) atrium, semilunar valve, ventricle, atrioventricular valve.

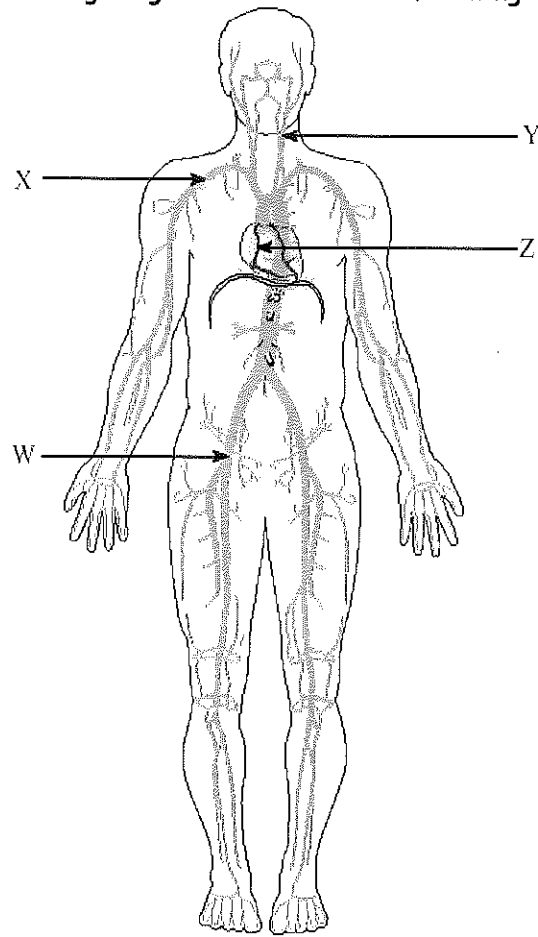
3. A condition called tachycardia exists when a person's heartrate is abnormally high. Which of the following explains how tachycardia may arise?
 - a) The Purkinje fibres are over-stimulating the pacemaker.
 - ☒ b) The sinoatrial (SA) node is receiving increased stimulation. answer
 - c) There is increased stimulation by the parasympathetic nervous system.
 - d) Impulses from the sinoatrial (SA) node are not reaching the atrioventricular (AV) node.

Use the following diagram to answer the following question .



4. The heart shown above is in the process of
 - a) atrial and ventricular systole.
 - b) atrial and ventricular diastole.
 - c) atrial systole and ventricular diastole.
 - ☒ d) atrial diastole and ventricular systole. answer

Use the following diagram to answer the following question.



5. Which letter indicates the carotid artery?

- a) W
- b) X
- ☒ c) Y answer
- d) Z

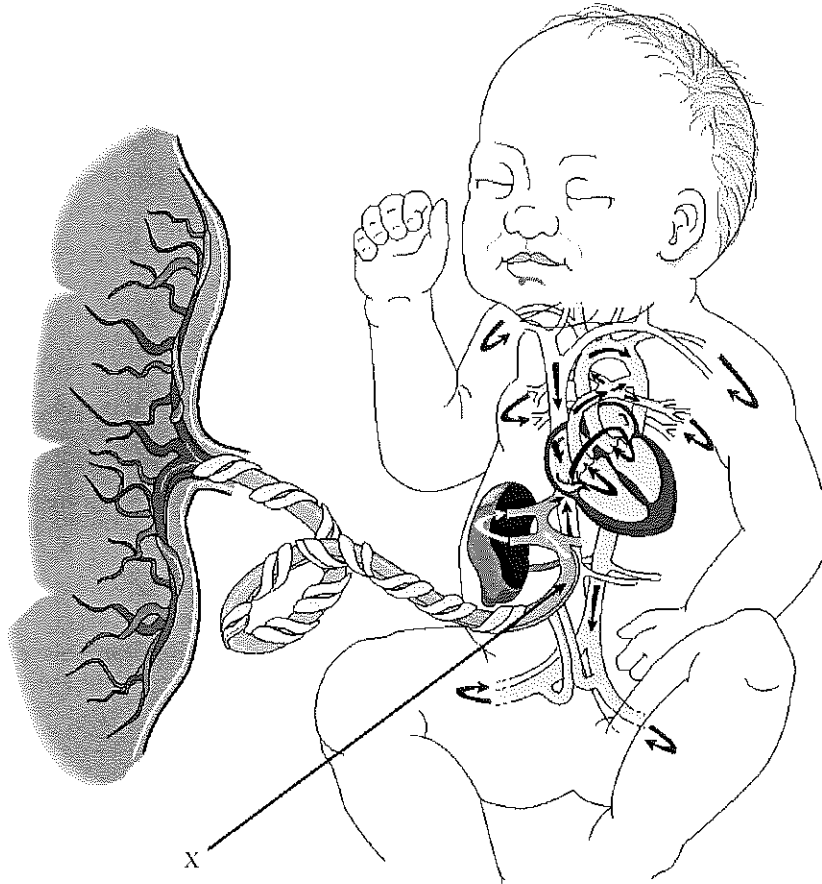
Use the following information to answer the following question.

BLOOD VESSEL	PRESSURE (mm of mercury)	VELOCITY (cm/sec.)
S	less than 5	15
T	20	80
U	10	2
V	40	100

6. Blood vessel U is a(n)

- a) vein.
- b) artery.
- c) venule.
- ☒ d) capillary. answer

Use the following diagram to answer the following question.



7. The blood vessel found in adults that contains oxygen levels similar to the blood vessel labelled X is the

- a) renal vein.
- ☒ b) pulmonary vein. answer
- c) pulmonary artery.
- d) hepatic portal vein.

8. A red blood cell is located in an artery in your right arm. How many capillary beds must this cell pass through before it is returned to the left ventricle?

- a) one
- ☒ b) two answer
- c) three
- d) four

9. The function of the nodes in the lymphatic system is to

- ☒ a) filter debris. answer
- b) produce platelets for clotting.
- c) break down worn-out red blood cells.
- d) help maintain a constant blood pressure.

10. What occurs when an antigen enters the body?

- a) There is increased platelet production.
- b) Red blood cells phagocytize the antigen.
- c) Antibodies change shape to fit the antigen.
- ☒ d) Specific antibodies are produced and released. answer

11. An irregular heartbeat where contraction of the atria does not always result in contraction of the ventricles, likely indicates a problem with the

- a) SA node.
- ☒ b) AV node. answer
- c) AV valve.
- d) semi-lunar valve.

12. An increase in which of the following would cause hypotension?

- a) heart rate
- b) cardiac output
- ☒ c) arteriole dilation answer
- d) reabsorption of water by the kidneys

13. What happens during atrial diastole?

- ☒ a) Atria fill with blood. answer
- b) Semi-lunar valves close.
- c) Ventricles fill with blood.
- d) Atrioventricular valves open.

14. High levels of toxins in the blood may indicate a problem with the function of the

- ☒ a) liver. answer
- b) stomach.
- c) pancreas.
- d) small intestine.

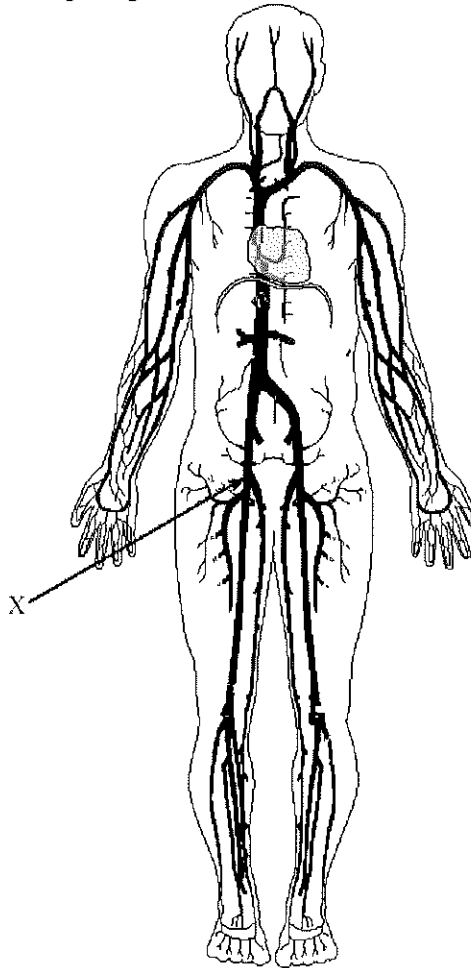
Use the following characteristics to answer the following question.

- one-way valves
- thin elastic layer
- near skeletal muscle

15. The characteristics above describe which type of vessel?

- a) vein answer
- b) artery
- c) arteriole
- d) capillary

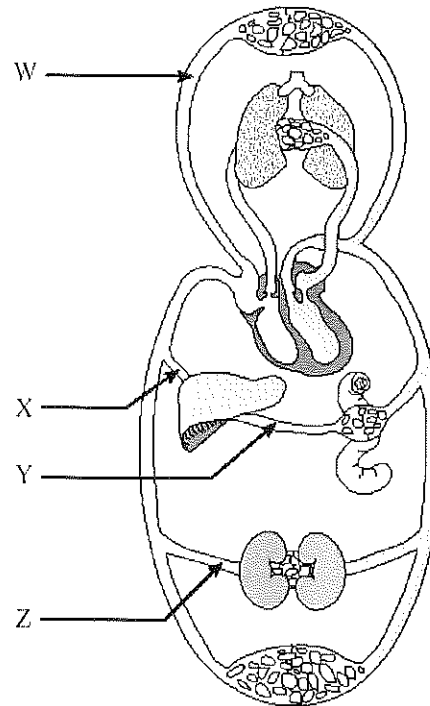
Use the following diagram to answer the following question.



16. The structure labelled X is the

- a) iliac vein. answer
- b) renal vein.
- c) subclavian vein.
- d) posterior vena cava.

Use the following diagram to answer the following question.



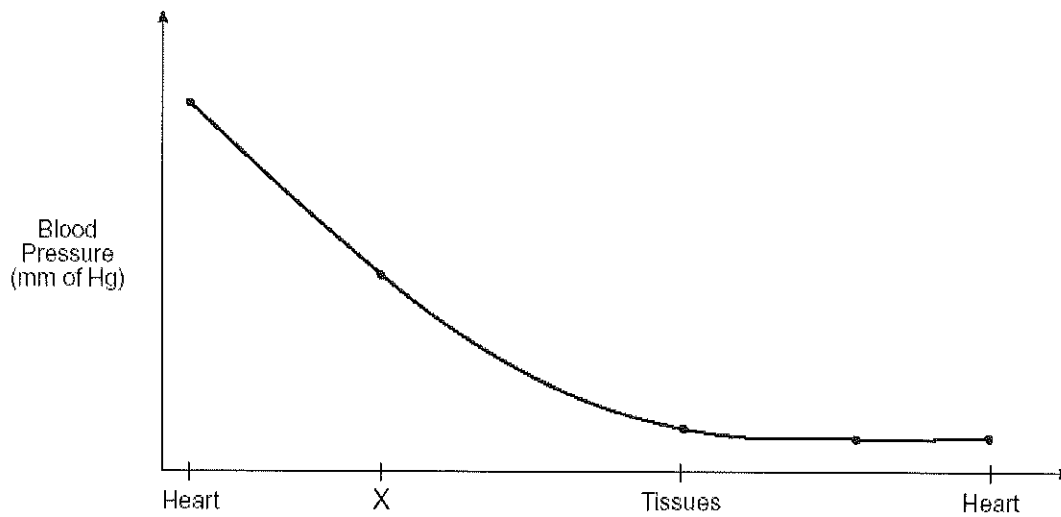
17. Which letter indicates a portal vein?

- a) W
- b) X
- ☒ c) Y answer
- d) Z

18. Oxygen is delivered to the heart muscle by the

- a) aorta.
- b) carotid artery.
- ☒ c) coronary artery. answer
- d) pulmonary artery.

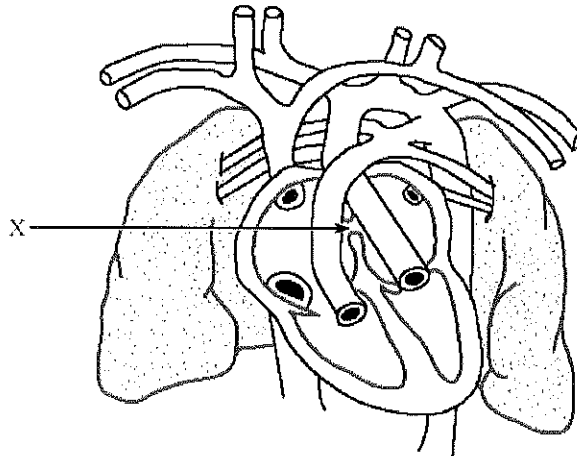
19. A person's blood pressure was measured at five blood vessels and plotted on the graph below.



The reading taken at X would be at the

- ☒ a) renal artery. answer
- b) pulmonary vein.
- c) posterior vena cava.
- d) peritubular capillaries.

Use the following diagram to answer the following question.



20. In the fetus, the function of the structure labelled X is to

- a) take blood to the lungs.
- b) ensure adequate blood flow to the brain.
- c) return blood from the placenta to the heart.
- ☒ d) direct some of the blood away from the lungs. answer

21. Blood capillaries and lymph capillaries both

- a) filter bacteria.
- b) have one-way valves.
- c) contain red blood cells.
- ☒ d) have walls which are one-cell thick. answer

Use the following information to answer the following question.

- transport gases
- maintain body temperature
- protect the body against blood loss
- produce hormones that stimulate metabolism
- carry digestive enzymes to the small intestine

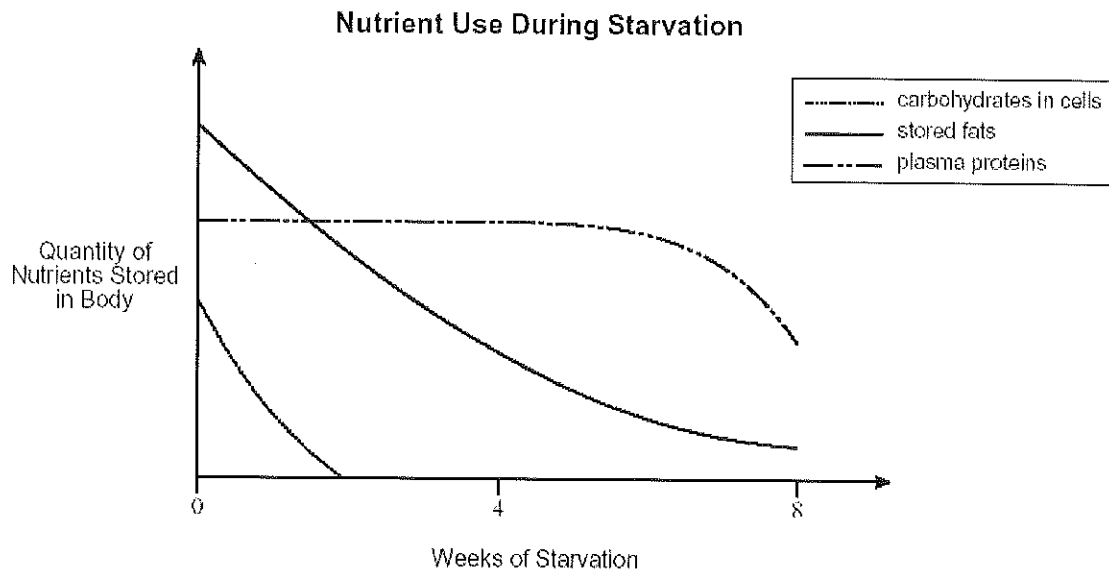
22. How many of the above are functions of the blood?

- a) two
- ☒ b) three answer
- c) four
- d) five

23. Which of the following correctly matches structure with function?

- a) platelets — provide immunity
- b) plasma proteins — carry oxygen
- ☒ c) red blood cells — carry carbon dioxide answer
- d) white blood cells — initiate blood clotting

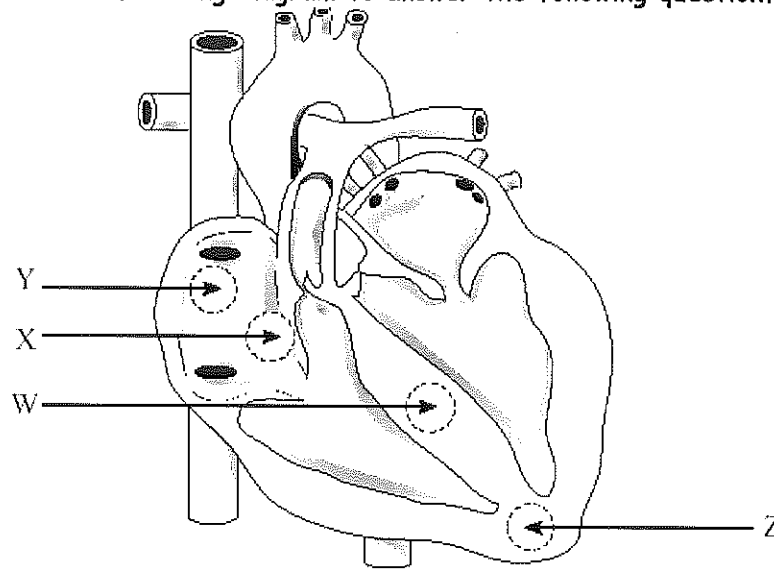
Use the following graph to answer the following question.



24. The graph illustrates how the body consumes stored nutrients during a prolonged period of starvation. After eight weeks,

- a) blood pressure will increase.
- ☒ b) fluids will accumulate in tissues. answer
- c) glycogen production will increase.
- d) hemoglobin will not release oxygen.

Use the following diagram to answer the following question.



25. Which area indicated in the diagram is the location of the AV node?

- a) W
- ☒ b) X answer
- c) Y
- d) Z

b) In the table below, contrast the structure and/or function of the hepatic vein versus the hepatic portal vein.

(4 marks)

	HEPATIC VEIN	HEPATIC PORTAL VEIN
CONTRASTS	<ul style="list-style-type: none"> • Joins the liver and the inferior vena cava. 	<ul style="list-style-type: none"> • Joins the digestive tract and the liver.
	<ul style="list-style-type: none"> • After a meal, carries blood lower in glucose than the hepatic portal vein. 	<ul style="list-style-type: none"> • After a meal, carries blood higher in glucose than the hepatic vein.
	<ul style="list-style-type: none"> • Between meals, carries blood higher in glucose than the hepatic portal vein. 	<ul style="list-style-type: none"> • Between meals, carries blood lower in glucose than the hepatic vein.
	<ul style="list-style-type: none"> • Starts in a capillary bed and ends in a vessel. 	<ul style="list-style-type: none"> • Starts and ends in capillary beds.
	<ul style="list-style-type: none"> • Carries blood higher in urea than the hepatic portal vein. 	<ul style="list-style-type: none"> • Carries blood lower in urea than the hepatic vein.
	<ul style="list-style-type: none"> • Larger in diameter. 	<ul style="list-style-type: none"> • Smaller in diameter.
	<ul style="list-style-type: none"> • Carries purified blood away from the liver. 	<ul style="list-style-type: none"> • Carries blood containing poisons to the liver.
	<ul style="list-style-type: none"> • Part of systemic circulatory system. 	<ul style="list-style-type: none"> • Part of portal system.

any two contrasting pairs for 2 marks per pair

Note to markers: Students must show a valid contrast. No single marks should be given if student fills in only one of the pair of boxes.

c) Name **two** structures present in fetal but **not** in adult circulatory systems and describe the function of each. **(4 marks: 1 mark each for name; 1 mark each for function)**

Students may choose any **two** of the following:

Name: **oval opening**

Function: **Allows blood to move from the right to the left atrium, bypassing the pulmonary circuit.**

Name: **arterial duct**

Function: **Allows blood to move from the pulmonary artery and the aorta, bypassing the pulmonary circuit.**

Name: **umbilical arteries**

Function: **Take blood containing wastes to the placenta.**

Name: **umbilical vein**

Function: **Brings nutrient-rich blood from the placenta.**

Name: **venous duct**

Function: **Allows blood to flow from the umbilical vein to the inferior vena cava.**

Name: **umbilical cord**

Function: **Carries O₂ / nutrients from the placenta; carries wastes to the placenta.**

4. Explain how a damaged AV valve on the left side of the heart could cause fluids to build up in the lung tissues. (4 marks)

- The valve might leak, causing backflow into the left atrium.
- This would cause a buildup in blood pressure in the pulmonary vein.
- The high blood pressure at the venule end of the capillary bed would prevent tissue fluid from re-entering the blood (increasing fluid buildup).
- Osmotic pressure in the capillary beds will be less than the blood pressure at the venule end of these beds.
- This would reduce wastes entering the blood from the tissues.
- More fluid would enter by osmosis and the tissues would swell.
- There is less water re-entering the bloodstream.

any four for
1 mark each

4. Explain how nutrients and oxygen in the blood move first into the tissue fluids, and then into the cells.

(4 marks)

Part 1:

- Oxygen and nutrients diffuse from the blood into the tissue fluids.
- Blood carrying oxygen and nutrients reaches the capillary bed and slows down. (Blood velocity is lower in the capillary bed).
- Blood pressure at the arteriole end of the capillary bed is higher than the osmotic pressure.
- Blood pressure pushes plasma containing oxygen and nutrients into the tissue fluid.
- Oxygen is released from hemoglobin (red blood cells / blood) at a higher temperature.
- Oxygen is released from hemoglobin (red blood cells / blood) at a lower pH.

Any one for
a minimum
1 mark
(up to 3 marks)

Part 2:

- Oxygen and nutrients diffuse from the tissue fluids into the cells (moving from high to low concentration).
- Nutrients move by active transport (use ATP).
- Nutrients move by facilitated diffusion (use protein carriers) into the cells.
- Nutrients move into the cells by endocytosis (pinocytosis).
- Water moves by osmosis.

Any one for
a minimum
1 mark
(up to 3 marks)

- c) Name two structures present in fetal but not in adult circulatory systems and describe the function of each. (4 marks: 1 mark each for name; 1 mark each for function)

Students may choose any two of the following:

Name: **oval opening** → *foramen ovale*

Function: Allows blood to move from the right to the left atrium, bypassing the pulmonary circuit.

Name: **arterial duct** → *ductus arteriosus*

Function: Allows blood to move from the pulmonary artery and the aorta, bypassing the pulmonary circuit.

Name: **umbilical arteries**

Function: Take blood containing wastes to the placenta.

Name: **umbilical vein**

Function: Brings nutrient-rich blood from the placenta.

Name: **venous duct** → *inferior vena cava*

Function: Allows blood to flow from the umbilical vein to the inferior vena cava.

Name: **umbilical cord**

Function: Carries O_2 / nutrients from the placenta; carries wastes to the placenta.