

## Review for Unit 6: The Cardiovascular System

1. Know, and be able to apply, the meaning of the following terms:

cardiovascular system	antibody	systole	plaque
artery	leucocyte	depolarize	angioplasty
vein	erythrocyte	repolarize	stent
arteriole	hemoglobin	bicuspid valve	coronary bypass
venule	platelets	tricuspid valve	myocardial cells
capillary	prothrombin	pulmonic valve	heart attack
endothelial cells	thrombin	aortic valve	myocardial infarction
macrophage	fibrinogen	coronary arteries	arrhythmia
phagocyte	fibrin	atherosclerosis	heart murmur
T-cell	hemophilia	hypertension	ischemic stroke
B-cell	diastole	sphygmomanometer	FAST

2. Be able to label these structures on a diagram of the human body or heart. Know their functions:

coronary artery	aorta	right ventricle	bicuspid (mitral) valve
carotid artery	vena cava	left atrium	coronary artery
brachial artery	pulmonary artery	left ventricle	sinoatrial (SA) node
radial artery	pulmonary vein	aortic valve	atrioventricular (AV) node
femoral artery	septum	pulmonic valve	Bundle of His
iliac artery	right atrium	tricuspid valve	Purkinje fibres

### Long and Short Answer Questions:

1. Write the balanced overall chemical equation for cellular respiration. How is the cardiovascular system involved in this process?
2. Explain why planaria, a type of very simple flat worm, do not require a vascular system.
3. Which kingdom(s) include organisms that have vascular systems?
4. Describe the two types of vascular tissue in plants, including the role of each.
5. Distinguish between an open transport and a closed transport system. Give an example of one organism that has an open system and one animal that has a closed system.
6. What are five main functions of the cardiovascular system?
7. Describe the composition of whole blood.
8. Describe the composition of plasma.
9. Describe the function of each component of the 'formed' part of the blood.
10. What is hemoglobin? What is the name of the disorder when a person does not have enough hemoglobin or red blood cells in their blood?
11. Look back at our earlier notes on the immune system. For three types of white blood cells, describe their role in immunity and whether each type of WBC is specific or non-specific.
12. Describe the main steps in the clotting process, including what initiates clotting.
13. What is the name of the genetic disorder that results if a person has a mutation in one of their clotting factors? Why is this serious?
14. Compare and contrast arteries and veins.
15. Explain **why** the structure of an artery is so different from the structure of veins.
16. What is one significant difference in the structure and function of arterioles and venules?
17. Starting in the right atrium, describe the flow of blood (in order) as it passes through the blood vessels, chambers of the heart and valves as it makes one complete circuit through the cardiovascular system. Name the large vessels that enter and leave the heart.

18. Describe the structure of capillaries and give two specific ways that their structure is ideally suited to their function.
19. Identify the parts of the pulmonary and systemic circulatory systems.
20. Explain what causes the “lub dub” sound made by the heart.
21. Draw what a ‘normal’ ECG trace looks like. Explain what is happening at each part of the trace.
22. Describe the path of the electrical signal through the heart for one heart beat, naming all parts of the conduction system in order.
23. What is the critical role of the SA node?
24. What is the correct name for heart muscle cells?
25. Compare and contrast diastole and systole.
26. Explain the difference between depolarization and repolarization.
27. How is the left ventricle different from the right ventricle? Explain why.
28. What is the name of the device used to measure blood pressure? (just be able to recognize it:)
29. Where are the iliac, brachial, carotid and radial pulses found?
30. What are the values that define normal blood pressure? High blood pressure?
31. What is hypertension and why is it dangerous? What parts of the body are the most susceptible to damage from hypertension?
32. What is atherosclerosis and why it is dangerous? What two parts of the body are most susceptible to damage from atherosclerosis?
33. What is an aneurysm and why it is dangerous?
34. What is a cardiac arrhythmia? Why are cardiac arrhythmias so dangerous?
35. Describe two treatments for atherosclerosis in the coronary arteries.
36. Describe what happens during a heart attack. What are the common symptoms of a heart attack?
37. Describe what happens during an ischemic stroke. What are the common symptoms of a stroke?
38. What causes a heart murmur?

### Practice Multiple Choice Questions

1. A blood pressure of 144/88 mmHg means that there is a pressure of:
 

a) 56 mmHg when the left ventricle is at rest	c) 144 mmHg when the left ventricle contracts
b) 88 mmHg when the left ventricle contracts	d) 144 mmHg when the left ventricle is at rest
2. A chronic disease is one which:
 

a) begins rapidly and lasts a very short time	c) is highly contagious
b) is usually fatal	d) goes on for a very long time
3. The circulatory system is made up of the:
 

a) heart, lungs and brain	c) heart, blood vessels and blood
b) blood, lungs and bladder	d) blood, brain and kidneys
4. The pulse in the neck is called the:
 

a) thoracic pulse	b) aortic pulse	c) jugular pulse	d) carotid pulse
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5. A deep wound to the upper thigh might damage the:
 

a) brachial artery	b) femoral artery	c) radial artery	d) carotid artery
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6. After blood leaves the right ventricle, it enters the:
 

a) right atrium	b) left atrium	c) pulmonary artery	d) pulmonary vein
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7. After oxygen-rich blood leaves the lungs, it enters the:
 

a) right atrium	b) left atrium	c) right ventricle	d) left ventricle
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8. The chamber of the heart that has the thickest muscle wall is:
  - a) right atrium
  - b) left atrium
  - c) right ventricle
  - d) left ventricle
9. Which of the following blood vessels carries oxygenated blood?
  - a) jugular vein
  - b) vena cava
  - c) pulmonary vein
  - d) none of these
10. The \_\_\_\_\_ carry blood away from the heart while the \_\_\_\_\_ carry blood toward the heart.
  - a) arteries, veins
  - b) veins, arteries
  - c) atria, ventricles
  - d) capillaries, septum
11. The bicuspid (mitral) valve is found between the:
  - a) left ventricle and the aorta
  - b) left atrium and left ventricle
  - c) right ventricle and the pulmonary artery
  - d) right and left ventricles
12. The tricuspid valve prevents blood from flowing back into the:
  - a) right atrium
  - b) left atrium
  - c) right ventricle
  - d) left ventricle
13. Which part of the cardiovascular system contains blood with the lowest amount of oxygen?
  - a) aorta
  - b) vena cava
  - c) pulmonary vein
  - d) left ventricle
14. Myocardial cells get their oxygen from blood in the:
  - a) atria
  - b) ventricles
  - c) coronary arteries
  - d) aorta
15. The "P" wave on an ECG is related to the depolarization of the:
  - a) SA node
  - b) AV node
  - c) Bundle of His
  - d) Purkinje fibres
16. During systole:
  - a) the ventricles contract and atria relax
  - b) the ventricles relax and atria contract
  - c) both the ventricles and atria relax
  - d) both the ventricles and atria contract
17. The function of the Bundle of His and Purkinje fibres is to carry the electrical signal rapidly from the:
  - a) SA node to the AV node
  - b) AV node to the SA node
  - c) AV node to the bottom of the ventricles
  - d) SA node across both atria
18. The QRS complex on an ECG occurs when the:
  - a) heart is in systole
  - b) heart is in diastole
  - c) the SA node fires
  - d) none of the above
19. If a person has a heart attack that damages the left ventricle, the person will have an ECG with:
  - a) a very long P wave
  - b) many small P waves
  - c) no P wave at all
  - d) an abnormal QRS complex
20. A person has resting blood pressure of 124/112. This person has:
  - a) high systolic blood pressure
  - b) high diastolic blood pressure
  - c) low systolic blood pressure
  - d) low diastolic blood pressure
21. What is plaque?
  - a) a fatty material made of cholesterol and calcium that builds up in arteries
  - b) a region of the heart that is dead or damaged because of a heart attack
  - c) a region of the brain that is dead or damaged because of a stroke
  - d) a thick board that is used to support the head and spine if a person has a spinal injury
22. Angioplasty relieves the symptoms of myocardial infarction and angina by:
  - a) opening up coronary arteries that are blocked with plaque
  - b) dissolving blood clots that are blocking coronary arteries
  - c) repairing the coronary arteries where they are losing blood by hemorrhaging
  - d) by-passing blocked coronary arteries by sewing in pieces of veins taken from the leg

23. A stent is:
- a) a balloon used to expand a clogged artery
  - b) the sticky fatty material inside an artery
  - c) a fine wire mesh tube to hold open an artery
  - d) a vein that is used to bypass a blocked artery
24. Which of the following can increase the risk of a myocardial infarction?
- a) atherosclerosis
  - b) a sedentary (inactive) lifestyle
  - c) smoking
  - d) all of the above
25. Infarction means:
- a) someone has broken the law
  - b) tissue death due to lack of oxygen
  - c) closing of the trachea due to swelling
  - d) severe abdominal gas
26. The “FAST” test for stroke stands for:
- a) feet, arms, smile test/time
  - b) fast, adult stroke test/time
  - c) face, arm, speech test/time
  - d) frown, anger, shuffle test/time
27. Facial signs that a person may have had a stroke include:
- a) uneven pupils or a droopy eyelid
  - b) smoothing out of one side of the forehead
  - c) drooping of one corner of the mouth
  - d) all of the above
28. Veins **always**:
- a) transport blood away from the heart
  - b) transport blood toward the heart
  - c) carry oxygenated blood
  - d) carry deoxygenated blood
29. Which of the following is/are found in arteries and veins, but not capillaries?
- a) elastic connective tissue
  - b) smooth muscle
  - c) epithelial lining cells
  - d) both a & b
30. The pulmonic valve prevents the backflow of blood into which chamber in the heart?
- a) right atrium
  - b) right ventricle
  - c) left ventricle
  - d) left atrium
31. Leucocytes are:
- a) also called red blood cells
  - b) involved in blood clotting
  - c) involved in the immune response
  - d) all of the above
32. What initiates clotting?
- a) platelets are activated by a cut or injury in the blood vessel wall
  - b) white blood cells detect a foreign cell or antigen and engulf it
  - c) antibodies in the blood agglutinate foreign antigens
  - d) calcium ions help to convert prothrombin to thrombin
33. Which of the formed parts of the blood has the shortest lifespan?
- a) RBC
  - b) WBC
  - c) platelets
  - d) phagocytes
34. The primary role of erythrocytes is to:
- a) initiate clotting
  - b) transport oxygen
  - c) fight infection
  - d) transport CO<sub>2</sub>
35. In the blood clotting process, various blood clotting substances are created through a series of chemical reactions. Which of the following is the final product in the clotting process?
- a) fibrin
  - b) fibrinogen
  - c) platelets
  - d) thrombin
36. In the clotting process, red blood cells:
- a) activate enzymes to make fibrin
  - b) initiate inflammation and increase blood flow
  - c) get caught in fibrin strands to form part of the clot
  - d) carry oxygen to the damaged cells for healing

37. Blood travels from the heart to the body cells and back to the heart. Which circulatory system is this?  
 a) cardiac                      b) lymphatic                      c) pulmonary                      d) systemic
38. Blood is classified as:  
 a) connective tissue              b) epithelial tissue              c) adipose tissue              d) nervous tissue
39. Blood moving through the pulmonary artery is:  
 a) oxygenated and low-pressure              c) oxygenated and high-pressure  
 b) deoxygenated and low-pressure              d) deoxygenated and high-pressure
40. The blood moving from the lungs back to the heart is:  
 a) oxygenated, high-pressure              c) oxygenated, low-pressure  
 b) deoxygenated, low-pressure              d) deoxygenated, high-pressure
41. The average resting heart rate for an adult is:  
 a) 120/80                      b) 72 beats per minute              c) 120 beats per minute              d) 80 beats per minute
42. Compared to arteries, veins have:  
 a) a thicker layer of muscle and elastic tissue              c) valves to prevent backflow  
 b) a smaller inside diameter              d) all of the above
43. The “*lub-dub*” sound of the heart is caused by:  
 a) the contraction of the atria              c) blood hitting the closed valves in the heart  
 b) the relaxation of the ventricles              d) blood pushing on the heart valves to open them
44. How does atherosclerosis affect the arteries?  
 I) the inside diameter of the artery is narrowed because of plaque  
 II) the artery walls become thickened and less flexible because of plaque  
 III) the valves in the arteries weaken and allow backflow of blood  
 IV) the artery is more likely to form an aneurysm and burst  
 a) I and II only              b) II and III only              c) I and III only              d) III and IV only
45. When plaque or a blood clot blocks an artery in the brain it is called a(n):  
 a) aneurysm              b) stroke              c) myocardial infarction              d) angina
46. Which WBC manufactures antibodies?  
 a) macrophages              b) T cells              c) phagocytes              d) B cells
47. Which WBC engulfs pathogens such as viruses and bacteria by phagocytosis?  
 a) macrophage              b) T cell              c) B cell              d) erythrocytes
48. Two people with type O blood have children. The proportion of their children with Type O blood will be:  
 a) 25%              b) 50%              c) 75%              d) 100%
49. Which blood type is considered to be the universal donor?  
 a) Type A              b) Type B              c) Type AB              d) Type O
50. Which blood type is considered to be the universal recipient?  
 a) Type A              b) Type B              c) Type AB              d) Type O

## Genetics Problems Related to the Cardiovascular System

- Hemophilia is an X-linked recessive trait ( $X^H$  is normal,  $X^h$  is the hemophilia allele). A man with hemophilia has a daughter of normal phenotype. She marries a man who does not have hemophilia.
  - What is the probability that their daughter will have hemophilia?
  - What is the probability that their daughter will have hemophilia?
- A man with hemophilia marries a normal, homozygous woman.
  - What is the probability that their daughter will have hemophilia?
  - What is the probability that their daughter will have hemophilia?
- A human female "carrier" for hemophilia marries a normal male.
  - What is the probability that their daughter will have hemophilia?
  - What is the probability that their daughter will have hemophilia?
- A man with AB blood is married to a woman with AB blood. Predict the blood types of their children and the probability of each of these blood types.
- A man who is homozygous Type B blood marries a woman with Type O blood. Predict the blood types of their children and the probability of each of these blood types.
- A woman with Type A blood (hybrid) is married to a man who is heterozygous for Type B. Predict the blood types of their children and the probability of each of these blood types.
- A woman with Type A blood (unknown genotype) gives birth to a child with type AB blood. The woman claims that a man with type AB blood is the father of her child. Is this possible? Show the possible crosses; remember the woman can have AO or AA genotypes.
- A man with Type AB blood is married to a woman with Type O blood. They have two natural children, and one adopted child. The children's blood types are: A, B, and O. Which child was adopted?

### Answers to Multiple Choice:

1. c	6. c	11. b	16. a	21. a	26. c	31. c	36. c	41. b	46. d
2. d	7. b	12. a	17. c	22. a	27. d	32. a	37. d	42. c	47. a
3. c	8. d	13. b	18. a	23. c	28. b	33. c	38. a	43. c	48. d
4. d	9. c	14. c	19. d	24. d	29. d	34. b	39. d	44. a	49. d
5. b	10. a	15. a	20. b	25. b	30. b	35. a	40. c	45. b	50. c