ANATOMY & PHYSIOLOGY 12 CIRCULATORY SYSTEM W/S Wilkinson

Name: _____

CARDIOVASCULAR SYSTEM

1. Blood transports molecules to and from the _____ , where exchanges with tissue fluids take place. Blood helps guard the body against microbes, and it _____, preventing loss of blood.

2. The erythrocytes, leukocytes, and thrombocytes collectively are called the _____ _____, and they make up about _____ % of the total blood volume. The liquid portion of the blood is called _____ . Albumin transports _____ , lipoproteins transport _____, and plasma proteins help maintain blood _____ .

3. Red blood cells carry _____ , which binds to the iron portion of the heme group in _____. The four polypeptide chains in hemoglobin make up the protein _____ . The growth factor _____ stimulates erythrocyte stem cells in the red bone marrow. RBCs lack _____ , live for 120 days, and are destroyed in the _____ and _____.

4. Platelets result from fragmentation of large cells, called _____ , in the bone marrow.

5. In order to stop blood loss due to a wound, _____ clump at the site of the puncture and partially seal the leak. These formed elements and the injured tissue release a clotting factor called _____ that converts _____ to thrombin. This reaction requires _____ Thrombin acts as an enzyme to convert _____ to long threads of _____ protein traps red blood cells and platelets to form a clot that is later destroyed by the enzyme _____.

6. At the arterial end of the capillary, blood pressure is higher than _____ pressure and water exits. Since proteins are too large to pass out of the capillary, _____ fluid tends to contain all components of plasma except proteins. At the venule end of a capillary, osmotic pressure is _____ than blood pressure, and water tends to move into the capillary. Tissue fluid contained within lymphatic vessels is called _____ , which returns to the systemic venous blood.

7.

Neutrophil	Lymphocyte
polymorphonuclear	_____
_____	agranular
phagocytic	_____
_____	made in lymphoid tissue

8. For questions 1-12, match the following blood cells to each of the statements below.
a. erythrocyte **b**. neutrophil **c**. monocyte **d**. macrophages **e**. lymphocyte **f**.thrombocytes
g. hemoglobin **h**. erythropoietin **i**. albumin **j**. globulins
k. fibrinogen **l**. prothrombin **m**. lipoproteins

_____1. phagocytizes microbes
_____2. initiates clotting of blood
_____3. transports oxygen
_____4. largest white blood cell
_____5. most abundant white blood cell
_____6. important in immunity
_____7. transports cholesterol and forms antibodies
_____8. transports bilirubin, maintains blood volume
_____9. transports oxygen
_____10. precursor to fibrin
_____11. growth factor that stimulates RBC production

9.The two ways that white cells fight infection are:

10.Blood clotting: These are the reactions that occur when blood clots. Put a check ✓beside those substances that are always present in the blood. Put an X beside those substances that arise after blood begins the process of clotting. Put a star beside those substances that act as enzymes. <u>Underline</u> the words that indicate the actual clot.

_____	platelets	_____	thromboplastin
_____	prothrombin	_____	thrombin
_____	fibrinogen	_____	fibrin threads

11.Fill in the following table:

Blood Type of Antigen	Antibody	Can Receive From	Can Donate To
A	b		
B	a		
AB	-		
O	a,b		

Blood Vessels

1. The _____ circuit circulates blood through the lungs. Blood from all regions of the body first collects in the _____ _____ . The pulmonary trunk divides into the right and left _____ _____, which have blood that is _____ . The largest artery in the systemic circuit is the _____ , and the largest veins are the superior and _____ _____ _____ .

2. Which blood vessels nourish the heart muscle? _____ _____ They originate just above the _____ _____ _____ . A _____ _____system begins and ends in capillaries. The hepatic portal vein begins in the capillaries found in the _____ of the small intestine, and the second occurs in the _____ . The _____ vein leaves the liver.

3. List the three types of blood vessels in the circulatory system and give their functions.
   a.
   b.
   c.

4. The middle layer of an artery has _____ tissue and smooth muscle, but the middle layer of small arteries, called arterioles, primarily has _____ muscle that regulates its diameter.

5. Capillaries are microscopic tubes with one-cell-thick walls composed of simple _____ endothelium. Capillaries exchange _____ and waste molecules. Oxygen and nutrients _____ out. Blood can go directly from the arteriole to the venule by means of the ateriovenus shunt when the _____ muscles are closed around the entrance to the capillaries.

6. Small veins, called _____, drain blood from the capillaries and then join to form a vein. The walls of veins are _____ and often have _____ when compared to arteries. Veins act as a blood _____ since more than half of the total blood volume is in veins.

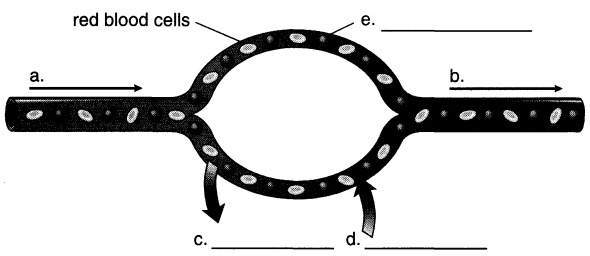
7. Complete the following table to compare systemic arteries, capillaries, and veins.

Blood Vessel	Function	Number of Layers	Valves Present	Cause of Blood Flow	Blood Velocity (Fast/Slow)	Oxygenated/ Deoxygenated
Arteries						
Capillaries						
Veins						

8. Add the following terms to the diagram of a capillary shown below: arterial end, venous end, plasma proteins, oxygen, and nutrients, and carbon dioxide.

a. At what position in the above diagram will blood pressure be most important?

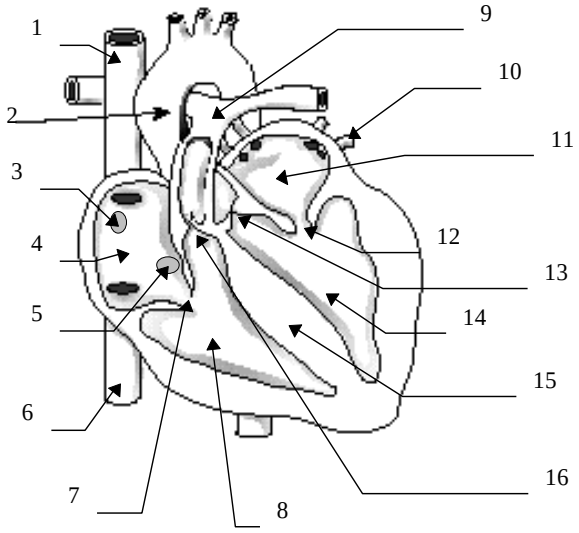
b. At what position in the above diagram will osmotic pressure be most important?



Heart

1. Label the parts of the heart shown in the diagram below.

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	



2. The major portion of the heart, called the _____ , consists of cardiac muscle tissue and lies within the _____ , a membranous sac with fluid. The valves between the atria and the ventricles are called _____ valves. The _____ valve is found on the right side and has three cusps. The bicuspid, or _____ , valve is on the left side of the heart. The _____ semilunar valve lies between the right ventricle and the pulmonary trunk. The _____ semilunar valve lies between the left ventricle and the aorta.

3. Blood from the right ventricle goes where? _____ Through what valve? _____
Blood from the left ventricle goes where? _____ Through what valve? _____
Blood in the pulmonary arteries is _____ Which ventricle wall is thickest? _____

4. Blood from the superior and inferior _____ enters the heart at the _____ _____, passes through the _____ valve and goes into the _____. when this chamber contracts, blood passes through the _____ valve into the pulmonary artery. From there, blood goes to the _____, picks up oxygen and releases _____ before returning to the _____ of the heart via the _____. Blood then passes through the _____ valve into the _____. Upon contraction, blood passes through the _____ valve into the _____.

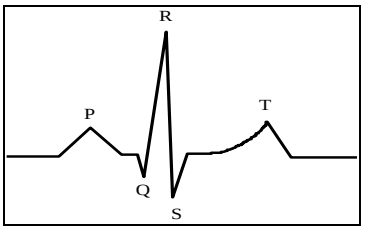
5. The path of blood through the heart. Starting with vena cava, list the structures in order through which blood flows. Use the parts in the column on the left.

Structures (Alphabetical listing)	Correct Order
1. aorta	
2. bicuspid valve	
3. left atrium	
4. left ventricle	
5. lungs	
6. pulmonary artery	
7. pulmonary semilunar valve	
8. pulmonary veins	
9. right atrium	
10. right ventricle	
11. semilunar valve	
12. tricuspid valve	
13. vena cava	

6. The highest arterial pressure, called _____ _____ , is reached during ejection of blood from the heart. The lowest arterial pressure, called _____ _____, occurs while the ventricles are relaxing. Blood pressure is highest in the arteries and lowest in the _____ . There is a sharp _____ in blood pressure when arterioles reach the capillaries that is correlated with an increase in the total cross-sectional of the vessels . Blood velocity is slowest in the _____ so that more time for exchange takes place. Movement of blood through the venous system is due to _____ muscular contraction and presence of valves.

7 When the atria contracts, this forces the blood through the _____valves into the _____. The closing of these valves is the lub sound. Next the ventricles contract and force the blood into the arteries. Now the _____valves close, and this is the DUPP sound. A heart murmur is caused by _____.

8. Of what significance is each of the following in an electrocardiogram like the one on the right?
   i. P wave:_____
   ii. QRS wave:_____
   iii.T wave _____



9. The _____ node is called the pacemaker because it usually keeps the heartbeat regular by stimulating the atria. The AV node signals the _____ to contract. The electrical recording of the heartbeat is called an _____ .

10. The heartbeat is controlled intrinsically by _____ and _____ characteristics. The _____ that causes the _____ node initiates the heartbeat and sends an excitatory impulse every _____ seconds to contract. When the impulse reaches the _____ node, the impulse travels by way of large fibers called _____which branch into smaller _____ fibers, which cause the _____ to contract. The extrinsic control of the heartbeat is achieved by the _____ _____ oblongata of the brain. The parasympathetic nerves promote heart movements associated with_____ , whereas the sympathetic nerves are associated with _____ activity.

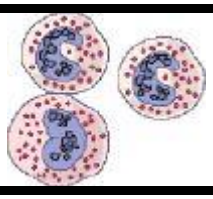
11. The word _____ refers to contraction of heart muscle, and the word _____ refers to relaxation of heart muscle. The lub sound of the heartbeat is due to closing of the _____ valves, whereas the dup sound is due to closing of the _____ valves. The alternating expansion and recoil of an arterial wall can be felt as a _____.

12. Mix and match the correct term for each description on the left.

	Largest artery	A. valves
	Returns tissue fluid to the circulatory system	B. thrombus
	Prevents blood from flowing in the wrong direction	C. systolic blood pressure
	Vessel transporting blood through kidneys	D. stroke
	Vessel transporting blood through legs	E. renal
	Localized swelling due to excess tissue fluid	F. lymphatic system
	Supply blood to the heart	G.iliac
	The highest arterial pressure	H. hypertension
	The lowest arterial pressure	I. heart attack
	Condition of high blood pressure	J. embolism
	"Hardening of the arteries"	K. edema
	A stationary clot along an arterial wall	L. diastolic blood pressure
	A dislodged, moving thrombus	M. coronary arteries
	When a portion of the brain dies due to a lack of oxygen	N. atherosclerosis
	Chest pain (including pain in the left arm)	O. aorta
	Occurs when circulation to part of the heart is blocked	P. angina pectoris

Multiple Choice.

1.What are the functions of each type of cell shown?

		
I	to carry oxygen	to carry carbon dioxide
II	to fight infection	to engulf bacteria
III	to make antibodies	to fight infection
IV	to transport hydrogen ions	to engulf bacteria

a. IV
b. III
c. I
d. II

2.Which blood vessels carry blood away from the heart?

a. lymph vessels
b. veins
c. venules
d. arteries
e. capillaries

3. Contraction of the right ventricle forces blood initially into the

a. pulmonary artery.
b. right atrium.
c. left atrium.
d. aorta.
e. pulmonary vein.

4.Blood pressure will be at its highest when

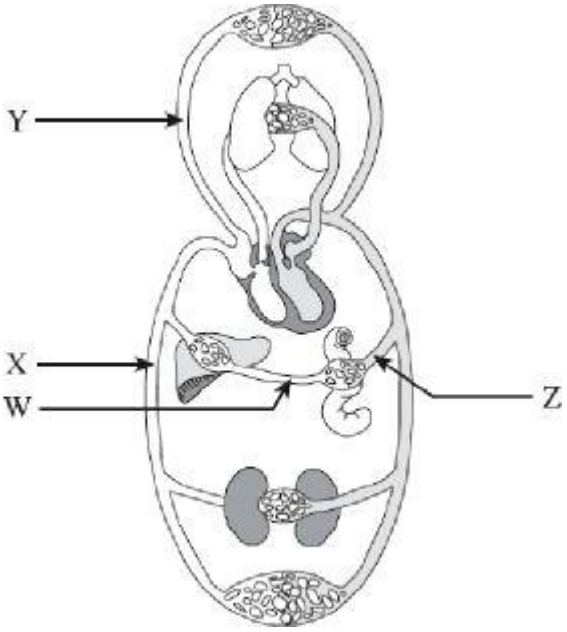
a. Ventricles relax.
b. Atria contracts.
c. Atria relaxes.
d. Ventricles contract.

5. A red blood cell leaves the aorta, makes a circuit through the body and arrives back in the capillaries of the alveoli. The correct sequence of organs through which the cell may have travelled is

a. lungs, heart, small intestine, liver.
b. small intestine, heart, liver, lungs.
c. liver, lungs, small intestine, heart.
d. small intestine, liver, heart, lungs.

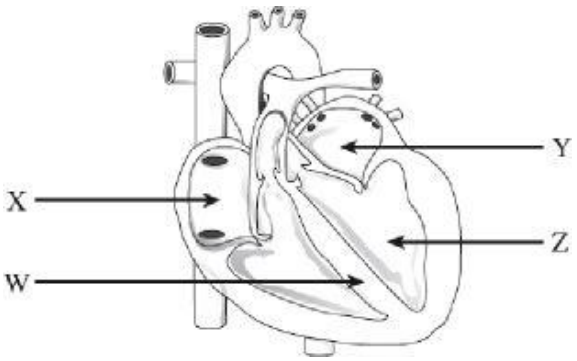
6. The lymphatic system consists of

a. vessels and valves.
b. AV and semilunar valves.
c. the pulmonary artery and the arterial duct.
d. the umbilical artery and the pulmonary vein.



7.Which vessel is the posterior vena cava?

a. W
b. X
c. Y
d. Z



8.In which structure is the sinoatrial node (SA) located?

a. W
b. X
c. Y
d. Z

9.In which structure does blood contain the greatest concentration of oxyhemoglobin?

a. the aorta
b. the right atrium
c. the pulmonary artery
d. the anterior vena cava

10. Where are the chordae tendineae found?

a. in the atria
b. in the ventricles
c. in the coronary arteries
d. in the semilunar valves

11.What blood vessel supplies blood directly to the heart muscle?

a. the aorta
b. the carotid artery
c. the coronary artery
d. the pulmonary artery

12. Hypertension would be indicated by a blood pressure reading of

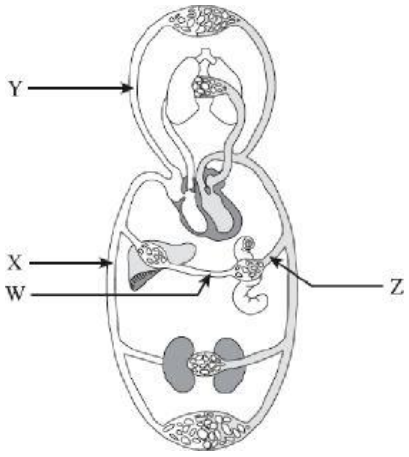
a. 100 / 80
b. 120 / 50
c. 120 / 80
d. 150 / 110

13. Which of the following correctly compares the blood in the pulmonary arteries to the blood in the aorta?

a. The blood in both vessels has low concentrations of oxyhemoglobin.
b. The blood in both vessels has a high concentration of oxyhemoglobin.
c. The blood in the pulmonary arteries has less oxyhemoglobin than the blood in the aorta.
d. The blood in the pulmonary arteries has more oxyhemoglobin than the blood in the aorta.

14. Where does lymph enter the circulatory system?

a. at the hepatic vein
b. at the jugular veins
c. at the coronary veins
d. at the subclavian veins



15.Which vessel is the posterior vena cava?

a. W b. X c. Y d. Z

arteries
veins
arterioles
venules
heart
pericardium
atrium
atrioventricular valves
semilunar valves
tricuspid valve
pulmonary arteries
aorta
systole
pulse
atrioventricular bundle
extrinsic control
parasympathetic control
systemic circuit
inferior vena cava
hepatic portal vein
hepatic vein
varicose veins
formed elements
albumin
erythrocytes
erythropoietin
agranular leukocytes
monocytes
lymphocytes
megakaryocytes
prothrombin
thrombin
tissue fluid
hypertension
thrombus
stroke
aneurysm

capillaries
endothelium
capillary beds
valves
myocardium
septum
ventricles
chordae tendineae
vena cava
bicuspid valve
pulmonary veins
cardiac cycle
diastole
sinoatrial node
Purkinje fibers
sympathetic control
pulmonary circuit
superior vena cava
coronary arteries
hepatic portal system
blood pressure
hemorrhoids
plasma
pathogens
hemoglobin
granular leukocytes
neutrophils
macrophages
platelets
fibrinogen
prothrombin activator
fibrin
lymph
atherosclerosis
embolus
heart attack
angioplasty

Biology 12
Ms. Kuiper

Name: _____
Block: _____

Circulatory Disorders

1. Hypertension refers to _____ blood pressure and is present when the systolic pressure is higher than _____ and the diastolic pressure is greater than _____ .

2. _____ refers to an accumulation of cholesterol beneath the inner linings of arteries to form a plaque. A clot that remains stationary is called a _____ , but if it dislodges and moves along with the blood, it is called an _____

3. If a portion of the brain dies due to a lack of oxygen, it is termed a _____ or stroke. A _____ _____ , or heart attack, occurs when a portion of the heart muscle dies due to a lack of oxygen. If a coronary artery becomes partially blocked, the individual may suffer from _____ _____, characterized by a radiating pain in the left arm. Streptokinase and tPA help to dissolve blood clots by converting _____ to plasmin. In _____ a cardiologist threads a plastic tube into an artery to the heart and inflates a balloon at the end.

4. . _____ _____ are abnormal and irregular dilations in superficial veins. Varicose veins in the rectum are called _____ . In _____ , a vein is inflamed.

5. If there is a decreased number of RBCs or not enough hemoglobin in each RBC, the individual suffers from _____ . In pernicious anemia, there is not enough _____ in the diet. Which granular leukocyte has a multilobed nucleus, is the most abundant, and phagocytizes bacteria? _____ Which agranular leukocyte is the largest WBC and differentiates into macrophages? _____ Which agranular leukocyte has a specific role to play in immunity? _____. _____ is a form of cancer characterized by uncontrolled production of WBC s.

6. For questions 1-6, match the following medical conditions to one of the statements below.
a. hypertension b. atherosclerosis c. myocardial infarction d. phlebitis e. thrombus f. CVA

_____1. stationary clot
_____2. portion of the brain dies due to lack of oxygen
_____3. high blood pressure
_____4. inflammation of a vein
_____5. accumulation of cholesterol in lining of arteries
_____6. portion of the heart dies due to a lack of oxygen