Name: _____

Physiology: Blood Vessels, Pressure and Flow

Directions: Write in and circle best answer on this sheet.

Blood Vessels

1. Closer to the heart, arteries would be expected to have a higher percentage of _____ in order to be able to expand and recoil to maintain _____ _____.

2. The best description veins is they have: _____ walls, _____ lumens, _____ pressure and contain _____ that prevent retrograde flow of blood.

3. An especially leaky type of capillary found in the liver and other tissues is called a _____.

4. Arterioles are often referred to as **resistance** vessels. Why?

5. Cocaine use causes vasoconstriction. Is this likely to increase or decrease blood pressure, and why?

6. This blood vessel has endothelium and connective tissue that makes up only a very thin tunica externa, and it conducts blood toward the heart. What type of vessel is this? Ans: _____.

7. The endothelium is found in the _____ _____ layer of the blood vessel (2 words).

Blood Flow and the Control of Blood Pressure

8. If blood flow through the aorta is 5 L/min, what's blood flow through the pulmonary artery? _____.

9. What is a pressure gradient? _____. Liquids and gases flow from areas of _____ pressure to areas of _____ pressure.

10. How does the cardiovascular system create a region of higher pressure? _____.

As blood moves away from the heart, what happens to the pressure of it? _____.

The highest pressure in the blood vessels is found in the _____ and the lowest in the _____.

11. What happens to pressure when the heart relaxes or the blood vessels dilate? _____.

Blood Flows from Higher Pressure to Lower Pressure

12. Consider this information: Fluid is flowing through two identical tubes. In **tube A**, the pressure at one end is 150 mm Hg and the pressure at the other end is 100 mm Hg. In **tube B**, the pressure at one end is 75 mm Hg and the pressure at the other end is 10 mm Hg. Which tube will have the greatest flow? _____. Why?

13. In a blood pressure measurement of 110/70, the number 70 is the _____.
a) systolic pressure **b)** diastolic pressure **c)** pulse pressure **d)** mean arterial pressure

14. Vessels with the highest pressure are: ___ and vessels with the greatest cross-sectional area are ___.
a) arteries: arteries **b)** arteries: arterioles **c)** arteries: capillaries
d) arterioles: venules **e)** arteries: veins

Resistance Opposes Flow

15. Define resistance (R). _____.

16. When resistance increases, flow (*increases/decreases?*). Express this relationship in a mathematical equation:

17. Name and describe briefly the 3 parameters that influence resistance for fluid flowing through a tube.

1)

2)

3)

18. In humans, which of the factors above plays the most significant role in determining resistance to blood flow (because it can vary and thus not relatively constant as others are)? _____.

19. Write the equation known as Poiseuille's Law: _____.

20. List and briefly compare 5 ways that arteries and veins differ from each other.

	Artery	**Vein**
1)		
2)		
3)		
4)		
5)		

21. When the radius of a tube decreases; what happens to the resistance of that tube? _____.

22. Write a simplified equation for the relationship between resistance and radius: _____.

23. If the radius of a tube doubles, what happens to the resistance? _____.

24. Define the following in terms of *diameter* of vessel and *resistance* to blood flow.
Vasoconstriction =
Vasodilation =

25. If there is an increase in blood pressure, it's detected by _____ that are located in the _____.
a) an increase in pressure; in the veins **b)** baroreceptors: aortic arch and carotid arteries
c) mechanoreceptors: aortic arch and carotid arteries **d)** chemoreceptors; heart

26. A region in the medulla oblongata that regulates blood pressure by modifying the heart activities is the:
a) baroreceptor center **b)** angioreceptor center **c)** the vasomotor center
d) reticular formation center **e)** the cardiovascular center

27. The term used to describe abnormally low blood pressure is
a) tachycardia **b)** bradycardia **c)** hypotension (less than 120/80 mmHg)
d) hypertension (over 140/100 mmHg) **e)** hypotension (less than 90/60 mmHg)

Blood Vessels Contain Vascular Smooth Muscle (VSM)

Table 1. Fill in the details for each vessel that help to distinguish it from other vessels.

Blood Vessel	Physical Characteristics	Function(s)
Arteries		
Arterioles		
Capillaries		
Venules		
Veins		

28. A healthy elastic artery _____.
a) is compliant **b)** reduces blood flow **c)** is a resistance artery **d)** has a thin wall and irregular lumen
e) has a thick wall with a very large diameter lumen

29. Which of the following statements about blood vessels is **true**?
a) the longer the vessel, the lower the resistance and the greater the blood flow.
b) as the diameter in an arteriole decreases, blood pressure also decreases.
c) if there is an increase in blood viscosity, this increases blood flow.
d) at rest, most of the blood is in the systemic veins. **e)** None of these are true.

30. A small increase in blood vessel diameter (radius, r) promotes a _____.
a) slight increase in resistance **b)** huge increase in resistance
c) slight decrease in resistance **d)** huge decrease in resistance

31. Sympathetic stimulation of systemic veins in the cardiovascular system results in
1) vasoconstriction of these vessels **2)** vasodilation of these vessels **3)** an increase venous return
4) an increase in blood pressure **5)** a decreases in venous return **6)** a decrease in blood pressure
a) 1, 3 and 4 **b)** 4, 5 and 6 **c)** 2, 3, 4 and 1 **d)** 1 and 5 **e)** 6, 2 and 5

32. Venous vasoconstriction increases which of the following?
a) blood pressure within the vein **b)** blood flow within the vein **c)** return of blood to the heart
d) all of these **e)** none of these

33. What would happen to your blood pressure immediately after drinking 1 liter of water? Why?

34. How would your body re-establish balance after drinking that water? Why?

Table 2. Fill in with table with vasoconstrictors/vasodilators, where they are made and their receptors on.

Vasoconstrictor	Source and Receptors	**Vasodilator**	Source and Receptors

35. Name 2 cells that release Histamine: **1)** _____ **2)** _____.

36. Name 2 things Histamine does: **1)** _____ **2)** _____.

37. What is cardiovascular shock?

38. Describe **cardiac** shock:

39. Describe **volumetric** shock:

40. Describe **anaphylactic** shock:

41. Describe **septic** shock:

42. A form of circulatory shock common in young children with severe diarrhea or vomiting is _____.
a) obstructive shock **b)** anaphylactic shock **c)** hypovolemic shock **d)** hemorrhagic shock