**Chapter 18 Hemodynamics Study Guide**

**Know the formulas for Pressure gradient (long and short), Resistance, know what factors are needed to figure the Reynolds #.**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the study of blood moving through the circulatory system.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ indicates the speed or swiftness of a fluid moving from one location to another, and can be expressed by cm/s or m/s.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow occurs when blood moves with a variable velocity. Blood accelerated and decelerates as a result of cardiac contraction, and appears in the arterial circulation.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow also occurs when blood moves with a variable velocity. Blood accelerates and decelerates as a result of respiration, and it usually occurs in the venous circulation.
5. The two types of laminar flow: (Parabolic and Plug)

A.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow- occurs when all of the layers and blood travel at the same velocity

B.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow- has a bullet-shaped profile, where velocity is highest in the center of the lumen.

1. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_number predicts whether flow is laminar or turbulent.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Turbulent/Parabolic) flow is characterized by chaotic flow patterns in many different directions.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ flow converts flow energy into sound and vibrations such as a murmur or a bruit.
4. The Reynolds number for turbulent flow is greater than?
5. Blood moves from regions of higher energy to lower energy, this is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gradient.
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_energy is associated with a moving object.
7. Which will have a greater kinetic energy? A cannon ball fired from a cannon or a stone from a sling shot?

Why/what 2 factors determines KE?

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_energy is a form of stored or potential energy.
2. Energy is lost in circulation due to 3 factors:
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ loss-due to the thickness of fluid(honey vs water)

B.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ loss- when flow energy is converted to heat as objects rub together.

C.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ loss- when the speed of a fluid changes (objects in motion tend to stay in motion.)

1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a narrowing in the lumen of a vessel.
2. Maximum velocity will be observed where the vessel is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Bernoulli’s Principle describes the relationship between velocity and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in a moving fluid.
4. Where the pressure energy is lowest the kinetic energy is **(highest/lowest)**.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gradient = flow X resistance
6. Veins are thin walled and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. As the pressure within a vein increases they become more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in shape to accommodate increased flow.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pressure is the pressure related to the weight of blood pressing on a vessel measured at a height above or below heart level.
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pressure is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the same units used to measure blood pressure.
10. TRUE or False? A supine individual will have differing blood pressures at differing locations in their body.
11. TRUE or False? A supine individual will have differing hydrostatic pressures at differing locations in their body.
12. A standing individual will have the highest hydrostatic pressure at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. A standing individual will have the lowest hydrostatic pressure at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
14. During inspiration venous flow to the heart **(increases/decreases)** and venous flow in the legs **(increases/decreases).**
15. During expiration venous flow to the heart **(increases/decreases)** and venous flow in the legs **(increases/decreases).**
16. During inspiration the diaphragm moves (downward/upward).
17. During expiration the diaphragm moves (downward/upward).
18. A bearing down or forceful attempt at expiration when the nose and mouth are closed is called a \_\_\_**Valsalva**\_\_\_\_\_\_\_\_\_\_\_\_ maneuver.
19. Pressure within the abdominal cavity decreases with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
20. This is the term used to describe the Doppler image of turbulent flow (small regions of turbulent flow have vastly different velocities).
21. Flow energy lost as a tissue vibration is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
22. A Reynolds number of less than 1,500 is indicative of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_flow.
23. A Reynolds number of greater than 2,000 is indicative of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_flow.
24. A swirling pattern of rotational flow is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
25. Flow is associated with **(volume/speed)**.