MULTIPLE CHOICE:

1. Which of the following veins does NOT carry blood directly to the right atrium?
   a. superior vena cava
   b. inferior vena cava
   c. pulmonary vein
   d. coronary sinus
   e. all of the above DO carry blood to the right atrium

2. The velocity of blood flow:
   a. is fastest in the large arteries because of higher resistance.
   b. is slowest in the capillaries since the total cross-sectional area is the greatest.
   c. is slower in the veins than in the capillaries since veins have a large diameter.
   d. is slower in the arteries than capillaries since they possess a relatively large diameter.
   e. All but (a.) are correct.

3. A person with type A blood has:
   a. A agglutinins (antigens) on their blood cells
   b. A agglutinogens (antibodies) in their plasma
   c. B agglutinogens (antibodies) on their red blood cells
   d. B agglutinins (antigens) in their plasma
   e. the ability to receive AB blood cells

4. The level of erythropoietin in the blood would rise
   a. during anemia
   b. at high altitudes
   c. as a consequence of hemorrhage
   d. when blood flow to the kidneys is disrupted
   e. all of the above

5. No distinct cytoplasmic granules are present in:
   a. monocytes
   b. basophils
   c. mast cells
   d. eosinophils
   e. neutrophils

6. Over 95% of the protein in a red blood cell is
   a. albumin
   b. hormones
   c. hemoglobin
   d. immunoglobulin
   e. fibrinogen
7. An elevated T-lymphocyte count would be most indicative of:
   a. an allergic reaction
e   b. a bacterial infection
c. a viral infection
d. a parasitic infection
e. increased antibody production

8. Blood flow to a tissue will increase if the
   a. level of oxygen at the tissue increases
   b. level of carbon dioxide at the tissue increases
   c. pH rises
d. vessel vasoconstricts (precapillary sphincters close)
e. all of the above

9. Granulocytes called:
   a. neutrophils are bacterial phagocytes and the most numerous of all white cell types.
   b. monocytes function in phagocytosis.
   c. eosinophils increase in number when viral infection occurs.
   d. lymphocytes all make antibodies.
e. all but c are correct.

10. Factors which aid venous return include all except:
    a. activity of skeletal muscles
d. venous valves
    b. pressure changes in the thorax
e. increased release of nitric oxide
    c. decreased urinary output

11. Normal heart sounds are associated with which of the following activities?
    a. closure of the heart valves.
    b. excitation of the SA node
c. friction of blood against the chamber walls
d. contraction of ventricular muscle
e. all of the above are correct.

12. Which sequence is correct for the following events?
    1. Fibrinogen ----> fibrin
    2. Clot retraction
    3. Plasminogen ----> plasmin
    4. Prothrombin ----> thrombin

    a. 3, 4, 1, 2
d. 3, 2, 1, 4
    b. 1, 2, 3, 4
e. 4, 1, 2, 3
c. 4, 1, 3, 2

13. Cells in the bone marrow called myeloid stem cells form
    a. erythrocytes
d. platelets
    b. monocytes
e. both b & c
    c. lymphocytes
14. Old, worn and defective blood cells are removed from circulation in the liver in 
_________ capillaries by phagocytic cells called _________.
   a. continuous; mast cells  d. continuous; hepatocytes
   b. sinusoidal; Kupffer cells  e. fenestrated; hepatocytes
   c. fenestrated; reticuloocytes

15. The compound released by intact endothelial cells that prevents platelets from sticking is
   a. thromboxane  d. prothrombin
   b. albumin  e. calcium
   c. prostacyclin

16. The pericardial cavity
   a. is another name for the chambers of the heart.
   b. is a space between the epicardium and the parietal pericardium.
   c. contains a lubricating fluid called serous fluid.
   d. is the region of the thoracic cavity that contains the heart, esophagus, & trachea.
   e. both b & c.

17. The “slow” calcium gates are responsible for ____________________, while the “fast” calcium gates are responsible for ____________________.
   a. neurotransmitter release from autorhythmic cells; myosin head attachment to actin
   b. ventricular systole; ventricular diastole
   c. long depolarization and refractory period in cardiac muscle cells; depolarization of autorhythmic cells
   d. closing of atrioventricular valves; closing of semilunar valves
   e. stimulation of cardiac centers in the medulla; stimulation of vasomotor center in the medulla

18. Which of the following would decrease at rest blood pressure (all else being equal)?
   a. greater stroke volume  d. ANP release
   b. ADH release  e. thinking about my tests
   c. cutting nerves to heart

19. Increased levels of carbon dioxide in the blood will result in
   a. decreased heart rate
   b. decreased cardiac output
   c. decreased blood flow to the lungs
   d. decreased parasympathetic impulses to the heart
   e. none of the above

20. Which ion is most important in the coagulation pathway?
   a. sodium  d. iron
   b. calcium  e. chloride
   c. potassium
TRUE - FALSE:

21. White blood cells are produced in response to chemicals called colony-stimulating factors.

22. Each hemoglobin molecule can transport four molecules of oxygen.

23. The kidneys receive about 5% of the overall systemic blood flow when you are at rest.

24. Transfusion of type O blood rarely triggers a transfusion reaction.

25. The process of fibrinolysis can dispose of clots when healing has occurred.

26. The brain receives a decidedly larger amount of blood when concentrating on a task.

27. Mild polycythemia is normal in individuals who move to higher altitudes.

28. The aortic semilunar valve opens when pressure in the aorta is lower than the ventricular pressure.

29. The vasa vasorum is responsible for delivery of blood to the myocardium.

30. Tissues have at least some ability to maintain their own perfusion, even with mild fluctuation in systemic pressure.

(31-37) Study the following pairs of statements, and indicate which is greater (if possible) or if the two items are equal.

A. Left is greater.
B. The items are the same.
C. Right is greater
D. Not enough information given.

31. Sensitivity of circulatory chemoreceptors to plasma carbon dioxide concentrations – Sensitivity of circulatory chemoreceptors to plasma oxygen concentrations

32. Number of platelets in blood – Number of erythrocytes in blood

33. Amount of blood pumped by left ventricle with each beat – Amount of blood pumped by right ventricle with each beat

34. Number of basophils in blood – Number of monocytes in blood

35. % of skeletal muscle cells contracting in leg muscle when walking – % of cardiac muscle cells contracting during one beat

36. Amount of fluid leaving arteriole – Amount of fluid returning from tissue
end of capillary bed into tissue

Systemic blood pressure with significant NO release

into venule end of capillary bed

Systemic blood pressure with significant renin release

MATCHING: Answers may be used more than once or not at all.

38. Forms blood brain-barrier.
   A. Continuous capillaries
   B. Fenestrated capillaries
   C. Veins
   D. Arterioles
   E. Elastic Arteries
   A. Muscular Arteries

39. Thickest walled.

40. Function as extra “pumps” to help move blood along
    A. During ventricular systole:
    a. the atria are contracting
    b. blood is entering the ventricles
    c. the AV valves are closed
    d. the pressure in the ventricles is constant
    e. the ventricles are relaxed
    A. Most carbon dioxide is carried in the plasma
    a. attached to hemoglobin
    b. as carbon dioxide
    c. as carbonic acid
    d. as bicarbonate ion
    e. none of the above

41. Anastomoses are most numerous between these.

42. Where volume of blood contained is greatest.

MORE MULTIPLE CHOICE: (Oh Boy!)

43. During ventricular systole:
    a. the atria are contracting
    b. blood is entering the ventricles
    c. the AV valves are closed
    d. the pressure in the ventricles is constant
    e. the ventricles are relaxed

44. Most carbon dioxide is carried in the plasma
    a. attached to hemoglobin
    b. as carbon dioxide
    c. as carbonic acid
    d. as bicarbonate ion
    e. none of the above

45. In response to an increase in (resting) arterial pressure, the baroreceptor reflex would cause:
    a. an increase in sympathetic nervous system activity.
    b. a decrease in peripheral resistance.
    c. an increase in chemoreceptor stimulation.
    d. vasoconstriction.
    e. an increase in heart rate

46. The force that draws blood back in at the venule end of a capillary bed is
    a. osmotic pressure
    b. blood pressure
    c. tissue pressure
    d. lymphatic pressure
    e. air pressure
FILL - IN - THE - BLANK:

47. ____________ proteins are the most abundant plasma proteins, and are important in maintaining normal blood volume.

48. ____________ are the slightly immature red blood cells released from the bone marrow into the blood stream.

49. The pressure in the ____________ circuit is higher than the pressure in the ____________ circuit.

50. Clot ____________ is what the platelets do when they are compacting the clot.

SHORT ANSWER: Answer any two (2) of the following.

A. What is unique about the antibodies associated with blood types? (2 pts.)

B. Why does it make sense that red blood cells would have virtually no mitochondria? (2 pts.)

C. Describe how the Frank Starling Law works. In other words, explain why is it that when the heart is stretched, it can contract more strongly. (2 pts.)

D. Define the following: anastomosis, vascular spasm. (2 pts.)

E. Since all heart muscle cells are connected by gap junctions, why is the intrinsic conduction system of the heart necessary? (2 pts.)

F. Define the following: perfusion, myogenic control. (2 pts.)
G. Indicate the source of: erythropoietin, thrombopoietin, thromboxane, ADH (2 pts.)