A & P 2
TEST 3

1. The ____________ are the receiving chambers of the heart.

2. ________________ is the term used for the contractile muscle within the walls of the atria and the ventricles.

3. **Fill in the blanks**
   - The heart is enclosed in a double-walled membranous sac called the ________________.
   - The inner layer is the ________________. The outer layer is the ________________.

4. Which of the following is another name for the **right** atrioventricular valve?
   a. interatrial septa
   b. interventricular septa
   c. bicuspid
   d. tricuspid

5. Which of the following is the term for the string-like structures attached to each cusp that extend down into the ventricles and attach to the papillary muscles.
   a. semilunar tendons
   b. chordae tendinae
   c. trabeculae carnae
   d. atrioventricular tendons

6. ________________ is the sulcus that marks the location of the interventricular septum.

7. ________________ is the sulcus marking the division of the atria from the ventricles.

8. Which of the following is the name of the sulcus running diagonally on the anterior side of the heart?
9. Blood enters the right atrium from 3 sources. List them:
   a. 
   b. 
   c. 

10. ___________________________ is the name for the wall between the atria.

11. What is the function of the chordae tendinae?
   ___________________________
   ___________________________

12. Which of the following is (are) true of the ventricles of the heart?
   a. thick walled
   b. inferior in the heart
   c. forms the apex of the heart
   d. A & C
   e. all of the above

13. ___________________________ is the valve between the right ventricle and the pulmonary trunk.

14. ___________________________ is the valve between the left ventricle and the aorta.
FILL IN THE BLANKS

15. One complete cardiac cycle takes _______ seconds or about _____ cycles per minute.

16. During each cardiac cycle the atria are in diastole for approximately _______ seconds.

17. During each cardiac cycle the ventricles are in systole for approximately _____ seconds.

18. The ventricles are _______ % filled before the atria contract.

19. Plasma is _______ % water.

20. The smaller the volume of blood in the ventricle before the start of ventricular systole, (within physiological limits)
   a. the less powerful the ensuing contraction
   b. the more powerful the ensuing contraction
   c. the more rapidly the next beat will be completed
   d. the more likely an EKG will occur
   e. the more likely a PVC will occur

21. Are platelets true cells? ____________________________

22. What two factors affect end diastolic volume?

23. What are six factors that effect the heart rate?
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________
   f. __________________________
24. Which of the following does not have the same effect on heart rate as the others listed:
   a. epinephrine
   b. norepinephrine
   c. sympathetic stimulation
   d. parasympathetic stimulation

25. Which one of the following is not true of the semilunar valves?
   a. one set is located at the base of the aorta
   b. one set is located at the base of the proximal end of the pulmonary trunk
   c. they function like a parachute valve
   d. when the ventricles contract, the semilunar valves open

26. Rapid repolarization of the ventricles causes which wave of the ECG?

27. The fibrous skeleton of the heart is a band of connective tissue between the atria and ventricles that has what two functions?
   a. __________________________
   b. __________________________

28. The________________________ is the wall between the atria, and the________________________ is the wall between the ventricles.

29. Define hematocrit (Hct) and include average (normal) level.
30. What are the categories of organic and inorganic solutes of plasma?
   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________

31. Of the vessels listed, which one branches off aorta most superiorly?
   a. superior mesenteric artery
   b. right ovarian artery
   c. celiac artery
   d. left renal artery

32. If a patient has an end-diastolic volume of 96 ml and an end-systolic volume of 17 ml, his stroke volume is _______ ml.

33. Which of the following is a false statement?
   a. chordae tendonae are string-like structures that are attached to the valves.
   b. papillary muscles are lump-like areas where the chordae tendinæ attach.
   c. the chords and papillary muscles act like door stops preventing the flaps from going up into the atria.
   d. the chords and papillary muscles act like door stops preventing flaps from going down into the ventricles.
   e. the chords and papillary muscles act like door stops preventing blood from backing into the atria.
   f. the chords and papillary muscles act like door stops preventing blood from backing into the ventricles.
   g. A, C, and F are false statements
   h. D and F are false statements

34. Which one of the following listed is pierced thirdly by the point of a pin entering the body from the outside?
   a. pericardial fluid
   b. visceral pericardium
   c. parietal pericardium
   d. myocardium
35. The "dup" sound is due to:
   a. contraction of the atria
   b. closure of the semilunar valves
   c. closure of the AV valves
   d. relaxation of the ventricles

36. The "lub" sound is due to:
   a. contraction of the atria
   b. closure of the semilunar valves
   c. closure of the AV valves
   d. relaxation of the ventricles

37. Depolarization of the ventricles causes which wave of the EKG?
   a. P      b. QRS      c. T      d. PQ      e. SA

38. If the aorta were not an elastic artery, there would be:
   a. large increases in the systolic pressure in the systemic circuit
   b. large decreases in the systolic pressure in the systemic circuit
   c. large increases in the diastolic pressure in the systemic circuit
   d. large decreases in the diastolic pressure in the systemic circuit

39. A-G are corrective TRUE or FALSE regarding solutes of plasma.

   A. ___ The three main groups of plasma proteins are albumin, globulins and fibrinogen
   B. ___ The most common group, the albumen, composing about 60% of the plasma proteins, is synthesized by the liver, and plays an important role in maintaining osmotic balance between blood and interstitial fluid
   C. ___ The three main groups of globulins are alpha globulins, beta globulins and gamma globulins.
   D. ___ Fibrinogen is a precursor to fibrin and is the last step in blood clotting
   E. ___ The plasma nutrients are basically food molecules like glucose, amino acids, free fatty acids.
   F. ___ The electrolytes are ions such as sodium, magnesium, calcium, potassium etc.
   G. ___ The nitrogen compounds include creatinine
40. Which of the following about erythrocytes is incorrect?
   a. the function is gas transport in the blood
   b. the structural features include a convex disc with a nuclei.
   c. they contain hemoglobin to transport O₂ and CO₂.
   d. none of the above are incorrect

41. Stroke volume equals:
   a. end-diastolic volume minus end-systolic volume
   b. end-diastolic volume plus end-systolic volume
   c. end-diastolic volume times end-systolic volume
   d. none of the above is correct

42. Which one of the following listed does not increase heart rate and force of contraction of the heart?
   a. epinephrine
   b. sympathetic stimulation
   c. norepinephrine
   d. acetylcholine

43. With the progressive change from arteries to capillaries, which one of the following is not true?
   a. there is a decrease in the diameter of the vessels
   b. there is a decrease in the thickness of the wall of the vessels
   c. there is an increase in the velocity at which the blood travels through the vessels
   d. there is a decrease in the pressure within the vessels

44. Blood in the pulmonary veins is:
   a. high in carbon dioxide
   b. high in oxygen
   c. low in oxygen
   d. two of the above are correct

45. Which of the following is correct about blood.
   a. the body contains about 4-6 liters
   b. it is the fluid found in the vascular compartment
   c. it is composed of plasma and formed elements which are RBC's and WBC's only
   d. all of the above
   e. all of the above except C
46. The formation of RBC’s is called______________________________.

47. What is the name of the cells called that are found in the bone marrow and are described as being pluripotent and later differentiate into RBC’s, WBC’s, and platelets?______________________________.

48. The formation of a clot requires the conversion of:
   a. fibrin to fibrinogen
   b. prothrombin to thrombin
   c. antibodies to antigens
   d. the intrinsic mechanism to the extrinsic mechanism
   e. hemostasis to homeostasis

49. Which one of the following does not open into or out of the right atrium?
   a. superior vena cava
   b. coronary sinus
   c. pulmonary trunk
   d. inferior vena cava

50. The________________________marks the location of the interventricular septum.

51. The heart is innervated by the autonomic nervous system. True or False?____

52. What factors affect end diastolic volume? End systolic volume?
   a. _____________________________________________________________
   b. _____________________________________________________________

53. Which kind of vessel accounts for the greatest total cross-sectional area of the circulatory system?
   a. veins
   b. arteries
   c. arterioles
   d. capillaries
54. ______________ is the volume of blood pumped from the left ventricle per minute. It is the product of ______________ and ________________.

55. Which one of the following structures listed is passed **thirdly** by a drop of blood coming from the lungs?
   a. left ventricle
   b. aorta
   c. tricuspid valve
   d. left atrium

56. Which one of the following listed occurs thirdly?
   a. depolarization of the bundle of His
   b. depolarization of the SA node
   c. depolarization of purkinje fibers
   d. depolarization of bundle branches

57. The ______________ is a specialized mass of myocardial cells found in the upper posterior wall of the right atrium which initiates the next cardiac cycle.

58. The atrioventricular node is:
   a. found in the floor of the left atrium
   b. found in the floor of the right atrium
   c. fires one-tenth second after the SA node
   d. fires one-tenth second before the SA node
   e. B & C are correct
   f. A & D are correct

**FILL IN THE BLANK**

59. The right AV valve is the ______________ valve and the left AV valve is the ______________ valve.

60. The myocardium is **thickest** in the:
   a. right atrium
   b. right ventricle
   c. left atrium
   d. left ventricle
61. Which one of the following structures is not associated with the atrioventricular valves?
   a. chordae tendinae
   b. trabeculae carneae
   c. papillary muscles
   d. all of the above

62. The anterior surface of the heart is mostly formed by the:
   a. right ventricle
   b. right atrium
   c. left ventricle
   d. left atrium

63. ____________ are large, multinucleated cells in the bone marrow. Fragments of these cells will become platelets.

64. If a white blood cell has large cytoplasmic granules that appear blue-black when stained and carry out a similar function to mast cells, then the cell would be a:
   ________________
   a. monocyte
   b. lymphocyte
   c. eosinophil
   d. basophil

65. At what stage of RBC development do the stem cells leave the bone marrow and enter the bloodstream?
   ________________

66. What determines the rate of erythropoiesis?
   __________________

67. The leukocyte that is converted to macrophages in the area of damaged tissue is the:
   a. monocyte
   b. lymphocyte
   c. neutrophil
   d. basophil

68. What is the function of platelets?
   __________________
69. What organs phagocytize the old RBC's? ____________ and ____________.

70. All lymphatics empty into the thoracic duct or the ____________ ____________ ____________.

71. The three functions of the lymphatic system are:
   1. ____________
   2. ____________
   3. ____________

72. Plasminogen, thrombin, and fibrinolysin are all involved in:
   a. clot retraction
   b. dissolution of a clot
   c. clot formation
   d. the intrinsic reaction

73. A patient with anemia would need to have what change to the level of erythropoietin in the blood?
   a. make it increase
   b. make it decrease
   c. make it remain the same
   d. have no effect

74. Considering the effects of angiotensin, vasopressin, and epinephrine on arterial pressure, which one of the following is correct?
   a. all of them increase arterial pressure
   b. all of them decrease arterial pressure
   c. two of them increase arterial pressure; the other one has no effect
   d. one of them increases arterial pressure; the other two lower it
   e. none of the above is correct
75. What is a difference between the arteries and some veins? Why do we have this difference?

76. __________, __________, and __________ are the 3 main types of vessels.

77. __________ are the vessels that supply the large arteries.

78. What three things occur to lymph fluid as it enters the lymph node? and very slowly trickles its way into the sinuses to make its way out of the efferent lymphatics?
   a. __________
   b. __________
   c. __________

79. __________ is a general defense against any micro-organism or toxin that does not involve recognition of specific antigens.

80. Which one of the following is not true?
   a. the protein portion of hemoglobin is called globin
   b. oxygen is carried by the heme portion of hemoglobin
   c. carbon dioxide-iron complexes involving hemoglobin are called carbamino compounds
   d. most of the oxygen transported per liter of blood is carried by the hemoglobin molecules

81. How does lymph differ from plasma?
   a. __________
   b. __________
   c. __________
82. Three differences between lymphatics and veins:
   a. 
   b. 
   c. 

83. ___________ protect the body against viruses until the immune system can take over.

84. Of the following functions of the lymphatic system, which is the most important?
   a. immunity by phagocytosis of bacteria
   b. immunity by production of lymphocytes
   c. immunity by adding antibodies to the body fluids
   d. to return excess protein containing fluid back into the body
   e. transport chylomicrons from the small intestines back into the blood

85. Diapedesis is the:
   a. passage of leukocytes across the walls of blood vessels
   b. engulfment of foreign microbes by certain kinds of leukocytes
   c. the production of antibodies by cells
   d. the dissolution of old blood clots by the body

86. The leukocyte that releases histamine is the:
   a. eosinophil
   b. neutrophil
   c. monocyte
   d. basophil

87. A cell with small cytoplasmic granules that stain purple to blue-black, and with a multi-lobed nucleus, is a:
   a. eosinophil
   b. basophil
   c. neutrophil
   d. lymphocyte
   e. monocyte
88. Which one of the following listed occurs **thirdly** in the formation of a clot?
   a. fibrinogen is converted to fibrin
   b. histamine release
   c. prothrombin converted to thrombin
   d. activation of factor X

89. Will viruses slip through the defense of the lymphatic system?____________________

90. __________________are the vessels going away from the heart that will branch
    into_________________which branch into capillaries, microscopic vessels where the
    exchanges between blood and interstitial fluid occurs.The____________________
    are the vessels that bring blood back to the heart.

91. What are 2 reasons why you would want the lymph fluid to flow slowly?

   ________________________________

   ________________________________

92. __________________are small arteries that are less than 0.5 mm in diameter
    that deliver blood to the capillaries.

93. Special concentrations of lymph nodes are found where? What do they have in
    common?
   a. ________________________________
   b. ________________________________
   c. ________________________________
      ________________________________
      ________________________________
94. _______________ is the largest of the lymph organs.

95. Match the following:
   1. tunica intima _______ the inner-most layer
   2. tunica media _______ primarily loose connective tissue
   3. tunica adventitia _______ not found in all vessels but if present is the thickest layer
      AKA tunica externa _______ found primarily in high pressure vessels
      _______ the outer-most layer
      _______ layer that all vessels will have
      _______ simple squamous epithelium

96. Arterioles often have a ______________ near the entrance of each capillary.

97. The tonsils contain white blood cells known as ____________ and ____________.

98. The walls of the vessels contain 3 tissue layers depending on the vessel itself. What are they?
   a. __________________________________________
   b. __________________________________________
   c. __________________________________________

99. The vessels called the _______________ always have thicker and more muscular walls than the veins to handle the increased blood pressure.

100. What 2 things help to prevent bacterial infections from entering the body? If they are broken the inflammatory response follows.
    a. ___________________________    b. ___________________________

101. The ___________________________ cause lymph to flow.
102. The fewer __________________________ drain away from the node while the more abundant __________________________ drain toward the node.

103. What are 2 types of B-cells and what do they do?
   a. __________________________
   b. __________________________
      __________________________
      __________________________
      __________________________
      __________________________

104. What are the types of T-cells?
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________

105. Describe the 3 stages in the primary inflammatory response?
   a. __________________________
   b. __________________________
   c. __________________________
   d. __________________________
   e. __________________________
   f. __________________________
106. Which one of the following is not true of cell-mediated immunity?
   a. it involves T-cells
   b. it provides resistance to the extracellular phase of viral infections
   c. some kinds of T-cells can release lymphokines
   d. cells involved in this kind of immunity are clonal
   e. it is involved in transplant rejection

107. Which of the following is not true of the complement system?
   a. they act as chemotactic agents
   b. they act as opsonins
   c. they can kill microbes by forming tunnels in their surfaces that make the microbe leaky
   d. active complement components may be generated by a pathway initiated by the protein properdin

108. _____________are microscopic, composed only of tunica intima, can change permeability, and have a diameter about equal to an RBC.

109. The process where leukocytes are displaced to the periphery of the blood stream where they first come in contact with the endothelial lining is known as:
   a. walling-off              c. pavementing
   b. margination             d. aggregation
   e. phagocytosis

110. Corrective true or false regarding the thoracic duct. If false, cross out the underlined word or phrase and write in the true answer.
   a. _____ It is the main channel
   b. _____ It is found near the celiac artery
   c. _____ The cisterna receives all the lymph from above the diaphragm and lower left side of the body
   d. _____ It travels up through the thoracic cavity and empties into the left subclavian artery

111. The first leukocytes to arrive at the site of tissue damage are the:
   a. monocytes
   b. eosinophils
   c. macrophages
   d. lymphocytes
   e. neutrophils
112. Which of the following is correct?
   a. the velocity of blood flow in a portion of the circulatory system is directly proportional to the total cross-sectional area of the vessels in that segment
   b. the velocity of blood flow in arteries is lower than that of veins
   c. the flow of blood is the slowest in the capillaries
   d. pressures vary considerably with capillaries and vein

113. Which of the following is not a local symptom of inflammation?
   a. redness
   b. release of endogenous pyrogens
   c. swelling
   d. pain
   e. heat

114. Clumping of erythrocytes RBC's due to antibody reaction is known as:
   a. hemostasis
   b. clotting
   c. agglutination
   d. hemolysis
   e. none of the above are correct

115. The_____________________ differs from one class of antibody to another.
116. Match the following:

1. Ig G       2. Ig M       3. Ig A       4. Ig E       5. Ig D       6. all five Ig's

A. ____ also found outside the vascular compartment, especially beneath the epithelium
B. ____ causes degranulation of the most cells
C. ____ about 6% of the Ig in the blood
D. ____ do not know what it does
E. ____ the most common Ig in normal circulating blood
F. ____ causes agglutination of mixed blood types.
G. ____ also found in secretions of exocrine glands, mucous, tears, and saliva
H. ____ antiseptic paint detects this Ig, is important for fighting viral infections of the respiratory and GI tracts
I. ____ the only Ig that crosses the placenta
J. ____ can neutralize toxins
K. ____ can inactivate or destroy extracellular antigens
L. ____ is the first Ig produced against a new antigen
M. ____ normally found in very low levels
N. ____ about 13% of the Ig in the blood
O. ____ involved in severe allergic reactions and is responsible for anaphylactic shock
P. ____ acts as an opsonin
Q. ____ can be produced by the fetus
R. ____ activate complement system

117. ____________ ____________ is the ability of lymphocytes to recognize specific kinds of foreign organisms.

118. ____________ are small lymphatic capillaries found in the villi of the small intestines.
119. Which of the following is not true of B-cells?
   a. they are lymphocytes
   b. they can differentiate into antibody producing cells
   c. they are produced in the thymus and liver
   d. they are found in large numbers in lymph nodes

120. The presence of a large number of eosinophils is an indication
     of an ____________________.

121. ____________________ is when you get an injection of gamma globulins made by
     some other organism to give you temporary immunity. It does not memory cells
     or antibodies.

122. Stem cells in the bone marrow produce unspecialized lymphocytes which are released
     into the blood. These lymphocytes then travel to the_________________ where
     they become_________________or they can return to the bone marrow where
     they become_________________.

123. The__________________ is the amino acid sequence that gives the Ig antigen
     specificity. This region will be similar among the 5 classes of Immunoglobins.

124. In the following sentences, answer if true or false. If false cross out the underlined
     word or phrase and place in the correct answer. These statements are regarding the
     right lymph duct.
     1. It is smaller than the thoracic duct.___________
     2. Upper right side of the body drains into it.___________
     3. It drains into the right subclavian vein.___________
125. Which one of the following is **not** true of baroreceptors?
   a. they are located in the carotid sinuses and aortic arch
   b. they function as pressure receptors
   c. nerve impulses from them increase in frequency when there is a drop in arterial pressure
   d. are used for minute by minute regulation

126. The immunoglobulins that are involved in specific immunity against bacteria and viruses are those that belong to class:

127. Describe the distinction between passive and active immunity.

128. A(n)__________ is an injection of live attenuated or heat killed organisms. This causes a rise in titer. A booster is generally needed to increase__________ titer.

129. The competent immune system needs__________ and__________ to operate.

130. Which one of the following is **not** true of humoral (B-cell) immunity?
   a. plasma cells develop into memory cells
   b. humoral immune responses are important in providing resistance to many bacteria and their toxins
   c. the system responds quickly to a second exposure of an antigen
   d. humoral immunity involve the production of antibodies that travel in the blood and lymph.
131. ________________ is a large "non self" molecule not made by the body. It is usually a protein that can activate a specific immune response.

132. Which type of immune cell requires cell-to-cell contact?______________________.

133. Describe what occurs when you encounter a new antigen:
   1. ____________________________
   2. ____________________________
   3. ____________________________
   4. ____________________________
   5. ____________________________

134. Match the following:  
   1. Cytotoxic or effector T-cells  
   2. Memory T-cells  
   3. Helper T-cells  
   4. Suppressor T-cells

   A. ___ activate B-cells causing them to release antibodies
   B. ___ suppress or inhibit the cytotoxic T-cells and B-cells
   C. ___ binds to the infected cell and destroys it by lysing the membrane
   D. ___ they attract and activate macrophages
   E. ___ they take up residence or move into lymphoid tissues
   F. ___ once you're over an infection, they help to slow things down again
   G. ___ provides a link between the cells mediated immunity that T-cells do and the humoral immunity that B-cells do
   H. ___ release chemicals called lymphokines
ESSAY IDEAS

1. Factors affecting blood pressure—effect on blood pressure, how, why?

2. Step in clot formation—list & describe.

3. What is the difference between the variable region and the constant region of an antibody?

4. Difference between syncytiotrophoblast, hemocytes, stem cells.

5. Factors affecting heart rate—list factors, explain effect.

6. Trace the blood flow through the heart. Enters where and exits where?

7. What are the five things involved in stimulation of the heart?

8. Draw a typical EKG graph, label waves and time of waves. What is happening at each stage?

9. Go through the 10 steps of the cardiac cycle.

10. Describe the system of fetal circulation. What are the links between placenta and fetus?
A & P II
PRACTICE TEST 3
KEY

1. Atria
2. Trabeculae Carneae
3. Pericardium, visceral pericardium, parietal pericardium
4. D
5. B
6. Anterior longitudinal sulcus
7. Coronary sulcus
8. C
9. A. Superior vena cava
   B. Inferior vena cava
   C. Coronary sinus
10. Interatrial septum
11. Hold cusps of AV valves in place & prevent eversion of the valves when the ventricles contract.
12. E
13. Pulmonary semilunar valve
14. Aortic semilunar valve
15. 0.8 sec, 72 c.p.s.
16. 0.7 sec. in diastole; 0.1 sec. in systole
17. 0.3 sec. in systole, 0.5 sec diastole
18. 70%
19. 90-92%
20. A
21. No
22. A. Venous pressure    B. Length of diastole
23. A. Autonomic control  
   B. Chemicals & hormones (epinephrine, Na+, K+, Ca++) 
   C. Temperature 
   D. Age 
   E. Sex 
   F. Overall physical condition 
24. D (all others increase heart rate) 
25. C 
26. E 
27. A. Prevents impulses from continuing to ventricle 
   B. Supports the AV valves 
28. Interatrial septum, interventricular septum 
29. The proportion of erythrocytes in the blood is the Hct., considerable variability-averages are 46.2%(males) and 40.6%(females) 
30. A. Plasma proteins-albumins, globulins, fibrinogen 
   B. Plasma nutrients 
   C. Electrolytes 
   D. Nitrogenous compounds 
31. C (in order of most superior first: C,A,D,B) 
32. EDV-ESV=79 ml 
33. H 
34. B (in order: C,A,B,D) 
35. B 
36. C 
37. B 
38. D 
39. A-G are all true statements 
40. B (RBC has no nucleus) 
41. A 
42. D 
43. C 
44. B (pulmonary veins go from lungs to heart)
45. E
46. Erythropoiesis
47. Stem cells (=hemocytoblasts)
48. B
49. C (from right ventricle)
50. Anterior longitudinal sulcus
51. True
52. EDV: length of diastole, venous return (p. 613)
   ESV: strength of contraction, arterial pressure
53. D
54. Cardiac output, heart rate x stroke volume
55. A (in order: D,C,A,B)
56. D (in order: B,A,D,C)
57. SA node
58. E
59. Tricuspid, bicuspid
60. D
61. B
62. A
63. Megakaryocytes
64. D
65. At reticulocytes
66. The hormone erythropoietin
67. A
68. To form blood clots
69. Liver, spleen
70. Right lymphatic duct
71. 1. Drain excess protein-containing fluid from interstitial spaces  
    2. Transport chylomicrons  
    3. Immune functions: produce lymphocytes, phagocytize bacteria, and synthesize antibodies.

72. B

73. A (need to make more RBCs)

74. A

75. Veins have one-way valves especially in extremities, needed because of the pressure differences and to prevent the backflow of blood (keep it flowing toward heart). Arteries have thicker walls (more muscular) to handle the greater blood pressure. Arteries are also deeper in the body than veins.

76. Arteries and arterioles, veins and venules, capillaries

77. Vasa vasorum

78. A. Macrophages phagocytize bacteria  
    B. Antibodies added to lymph by B-cells  
    C. Add lymphocytes to blood (T-cells and B-cells)

79. Innate (non-specific) immunity

80. C (O₂-Fe complex)

81. A. None or few RBCs  
    B. Much less plasma protein  
    C. Many more WBCs (especially lymphocytes)

82. A. Thinner walls, more permeable than veins  
    B. More valves than veins  
    C. Travel through lymph nodes

83. Interferons

84. D

85. A

86. D

87. C (PMN)

88. C (in order: B, D, C, A)

89. Yes

90. Arteries, arterioles, veins and venules
91. 1. Slowing lymph traffic down gives the lymph nodes more time to attack any infection.
   2. Keeps infection from disseminating

92. Arterioles

93. A. Cervical
   B. Inguinal
   C. Axillary

They are all where other parts of the body (head and extremities) meet the trunk.

94. The spleen

95. 1,3,2,2,3,1,1

96. Pre-capillary sphincter

97. Phagocytes (macrophages), lymphocytes

98. A. Tunica intima
   B. Tunica media
   C. Tunica Adventitia

99. Arteries

100. A. Intact skin B. Mucous membranes

101. Muscular and respiratory pumps ("milking action" & breathing)

102. Efferent lymphatics, afferent lymphatics

103. A. Plasma B-cells: synthesize and secrete antibodies
   B. Memory B-cells: spread out over body and give memory of infection, lodge in lymph tissue, allow body to respond quickly to a subsequent attack

104. A. Helper T-cells (T_h)
   B. Cytotoxic T-cells (T_c)
   C. Memory T-cells
   D. Suppressor T-cells

105. Stage 1: Vasodilation and Increased Permeability
    Inflammatory chemicals involved:
    Histamine, kinins, prostaglandins, complement system (see your notes on the complement system!)

Stage 2: Phagocyte Migration
    Action of WBCs
    Margination and pavementing CAM's
    Extravasation and chemotaxis

Stage 3: Walling Off
    Form loose fibrin network around inflamed area (form a defensive perimeter)
106. B (intracellular phase)
107. E (involved in clot formation)
108. Capillaries
109. B

110. A. T
   B. T
   C. F - below the diaphragm and upper left side
   D. F - vein

111. E
112. C

113. B - causes fever (systemic symptom)
114. C

115. Constant region

116. A. 1(IgG)    J. 1-5(all)
    B. 4(IgE)    K. 1-5(all)
    C. 2(IgM)    L. 2(IgM)
    D. 5(IgD)    M. 4(IgE)
    E. 1(IgG)    N. 3(IgA)
    F. 2(IgM)    O. 4(IgE)
    G. 3(IgA)    P. 1(IgG)
    H. 3(IgA)    Q. 2(IgM)
    I. 1(IgG)    R. 1 & 2(IgG & IgM)

117. Specific immunity

118. Lacteals
119. C

120. An allergic reaction

121. Passive immunity

122. Thymus, T-cells, B-cells

123. Variable region

124. 1. T
    2. T
    3. T

125. C(nerve impulses drop when there is a sudden drop in blood pressure and vasomotor center responds by constricting to increase the blood pressure).
126. D

127. Passive immunity occurs when the host does not make its own antibodies - the host receives antibodies made from another person (like mother to child through breast milk or through blood at birth). Usually shorter-lasting because no memory cells are formed. Active immunity is when the host mounts its own antibody response. This is what happens when you are vaccinated.

128. Immunization/vaccination

129. T-cells, B-cells

130. A (You have B-cells that are either plasma cells or memory cells. Plasma cells synthesize and secrete antibodies. Memory cells spread out over the body and are long-lived. They give the immune system ability to mount a fast response upon a repeat infection.)

131. An antigen

132. T-cell (They recognize antigen proteins bound to MHC.)

133. 1. APC (antigen presenting cell) engulfs antigen and processes it. APC moves Ag proteins to its cell surface and "flags" lymphocytes with it.
2. Clonal selection (APC finds the right clone (type) of lymphocyte.)
3. Clonal expansion (paracrine chemical, Interleukin II, activates the selected lymphocyte to divide. All offspring have same receptor and thus recognize the same antigen.)

134. A. 3   E. 2
    B. 4   F. 4
    C. 1   G. 3
    D. 1   H. 3