

Anatomy + Physiology Basics

1. Print out 2. Answer 3. Copy 4. Return to your Mentor

1. A structure composed of 2 or more tissues with a defined anatomical boundary is a(n):
 1. Organ system
 2. Organ
 3. Tissue Complex
 4. Membrane

2. The smallest structure capable of carrying out all life processes is the _____.

3. Homeostasis is maintained primarily via _____ feedback mechanisms.

4. /True or False/: Histology and cytology are different names for the same thing.

5. As the magnitude of the stimulus in a homeostatic feedback loop increases, the magnitude of the resulting error signal _____.

7. Memory, decision-making, and issuing commands are functions of _____ tissue.
 1. Connective
 2. Immune
 3. Muscle
 4. Nervous
 5. Epithelial

8. You place two cells in a homogenous solution and notice that cell A shrinks while the cell B lyses. Based on this observation, which of the following could be true?
1. The solution could contain at least 3 different osmolarities
 2. The solution could be pure water
 3. Prior to entering the solution, the 2 cells were identical in every regard
 4. The initial osmolarity of the intracellular fluid of cell A was different than the initial osmolarity of the intracellular fluid of cell B
 5. All of the above are possible
9. Oxygen and carbon dioxide are exchanged in the lungs and through all cell membranes by _____.
1. osmosis
 2. diffusion
 3. filtration
 4. active transport
11. Which of the following pairings is CORRECT?
1. Histology - strictly refers to the analysis of tissues as seen by the naked eye
 2. Pathology - can involve the study of situations in which the body has failed to maintain homeostasis
 3. Embryology - study restricted to analysis of egg fertilization
 4. Physiology - discipline which is intimately tied to anatomy but has NO relationship to cytology
 5. None of the above are correct
12. In a negative feedback loop, the response to the original stimulus causes the amplitude of that stimulus to:
1. Increase
 2. Decrease
 3. Stay the same

13. Which of the following is TRUE?

1. The number of negative feedback systems in the body is much less than the number of positive feedback systems in the body
2. Positive feedback is ALWAYS detrimental to one's health
3. Maintenance of blood glucose concentration at homeostatic levels is an example of negative feedback
4. All of the above are TRUE

14. Homeostasis can be considered:

1. The maintenance of a dynamically stable internal environment
2. The maintenance of a static yet stable internal environment
3. An internal environment that changes as the external environment changes
4. A situation where the degree of internal change is proportional to the square of the degree of external change

15. _____ prevent fluids from seeping between epithelial cells.

1. Desmosomes
2. Hemi-desmosomes
3. Glycosaminoglycans
4. Colloid
5. Tight junctions

Which of the following body systems are involved in excretion of cellular wastes?

1. Respiratory system
 2. Digestive system
 3. Urinary system
1. I ONLY
 2. I and II ONLY
 3. I and III ONLY
 4. II and III ONLY
 5. I, II, and III

/Epinephrine and aldosterone are both hormones. Aldosterone affects cells by diffusing through their cell membrane and interacting with

proteins in the cell interior. Epinephrine affects cells by binding to a protein embedded in the plasma membrane./

16. What organ system is most involved in hormone production?
17. If aldosterone can penetrate the plasma membrane, is it hydrophilic or hydrophobic?
18. How would you classify the membrane protein that interacts with epinephrine?
19. Which you would you expect to be more soluble in the extracellular fluid: aldosterone or epinephrine? Why?

/A team of scientists has been examining how cells take up the chemical XH5. They have determined the following: Treating the cell with 2,4-dinitrophenol, a molecule that impairs ATP synthesis has no effect on the uptake of XH5. XH5 dissolves rapidly in a nonpolar solvent like ether but does not dissolve at all in water./

20. Is XH5 taken up by active or passive transport? How do you know?
21. Based on the 2 facts listed above, which of the following is the most likely mechanism responsible for XH5 uptake? Explain why?
 1. Facilitated diffusion
 2. Simple diffusion
 3. Primary active transport
 4. Secondary active transport
23. Which portion of the molecule is hydrophilic?
24. Which portion of the molecule would face the intracellular fluid?
25. Which portion of the molecule would face the extracellular fluid?
26. Which portion of the molecule is lipid-insoluble?

27. Why is the plasma membrane referred to as a fluid mosaic?
28. Which molecule would be expected to have more kinetic energy?
1. A molecule of sodium (mass=35) at 45 C
 2. A molecule of oxygen (mass=16) at 65 C
29. An inability of certain body cells to uptake LDL cholesterol represents a failure in which one of the following processes?
1. Exocytosis
 2. Phagocytosis
 3. Receptor-mediated endocytosis
 4. Pinocytosis
 5. Osmosis
 6. Filtration
30. Name a cell that typically performs phagocytosis. What organelle would you expect this cell to contain an abundance of due to its phagocytic nature?

/In order for Xylose (a small sugar) to be transported into certain cells, those cells must have a supply of ATP and the concentration of sodium must be lower inside the cell than outside the cell./

31. What type of transport is most likely responsible?
32. What role does sodium play in this transport?
33. What role does ATP play in this transport?
34. Define pathology.
35. Define histology.
36. Define embryology.

37. Which of the following is NOT characteristic of human beings?

1. Large brain size to body size ratio
2. Paired clavicles
3. Bipedalism
4. Vertebrae
5. Mammary glands
6. All of the above
7. Just 2 of the above
8. Just 3 of the above

38. Define homeostasis.

39. Name an example of a positive feedback process.

40. Why is negative feedback much more common than positive feedback in the body?

41. As temperature increases, a molecule's diffusion rate will:

42. As a cell takes up a molecule via passive transport, the amount of ATP expended by the cell will:

43. As the size of the concentration gradient decreases, the rate at which a molecule diffuses will:

44. After a red blood cell is immersed in a hypertonic solution, its size will:

45. If a red blood cell is immersed in an isotonic solution for 20 minutes, and then a mildly hypotonic solution for 5 minutes, you would expect its size to:

46. As the sodium/potassium pump operates, the amount of potassium contained within the cell will:

47. If a cell performs exocytosis, one would expect its surface area to:

Blood Questions

1. The term that refers to the percentage of packed erythrocytes per unit volume of blood is the:
 1. Differential Count
 2. Hemoglobin
 3. Hematocrit
 4. Hemopoiesis

2. Which of the following is a circulating blood cell that is capable of differentiating into a plasma cell?
 1. Neutrophil
 2. Basophil
 3. B lymphocyte
 4. T lymphocyte
 5. Monocyte

3. The component of plasma responsible for maintaining the osmotic pressure of blood is:
 1. Plasmin
 2. Albumin
 3. Fibrinogen
 4. Gamma globulin
 5. Plasminogen activator

4. Erythrocytes:
 1. Enter the circulation only after becoming fully mature
 2. Undergo mitosis in the circulation in response to erythropoietin
 3. Are removed from the circulation after about 120 days by macrophages in the spleen, liver, and bone marrow
 4. Have mitochondria and are capable of oxidative respiration
 5. None of the above

5. Plasma is:

1. Blood that has no red blood cells
2. The liquid portion of blood including the clotting factors
3. The liquid portion of blood minus the clotting factors
4. The proteins of blood

6. Excessive destruction of erythrocytes is characteristic of:

1. Thalassemia
2. Aplastic anemia
3. Pernicious anemia
4. Hemolytic anemia

7. A hematocrit of 80 would be considered:

1. Polycythemia
2. Anemia
3. Thrombocytopenia
4. Leukemia

8. During hemoglobin recycling in the spleen, heme is initially converted into:

1. Bilirubin
2. Stercobilin
3. Urobilin
4. Urobilinogen

9. The Fe³⁺ portion of the hemoglobin is eventually:

1. Converted into transferrin in the large intestine
2. Converted into ferritin in the kidney
3. Excreted from the body
4. All of the above
5. None of the above

10. An increased neutrophil count is typically associated with:

1. An ongoing bacterial infection
2. Neutropenia
3. Allergic reactions
4. An ongoing parasitic infection

11. _____ eventually become macrophages.

1. Neutrophils
2. Basophils
3. Monocytes
4. Macrocytes
5. Lymphocytes

12. Hypoxia induces the kidneys to produce:

1. Platelets
2. Thrombopoietin
3. Erythrocytes
4. Erythropoietin
5. Intrinsic Factor

13. The first phase of hemostasis is:

1. Separation of globin and heme
2. Activation of Prothrombin
3. Platelet aggregation
4. Vascular spasm

14. Which of the following activates platelets during hemostasis?

1. Eosinophil degranulation
2. Exposed collagen or endothelial basement membrane
3. Fibrin thread formation
4. Thromboplastin

15. The phase of coagulation that begins with exposed endothelial collagen is the:

1. Extrinsic pathway
2. Intrinsic pathway
3. Common pathway
4. Fibrin stabilization phase

16. An individual with type B+ blood has which of the following antibodies in their blood?

1. anti-A and anti-O
2. anti-B and anti-Rh
3. anti-A
4. anti-B
5. anti-Rh

17. Which of the following blood cells have some properties similar to connective tissue mast cells?

1. Basophils
2. Neutrophils
3. Eosinophils
4. Lymphocytes>
5. Monocytes

18. Examples of erythrocytes can be found in almost all histological sections. Therefore, knowledge of the approximate diameter of a red blood cell is useful because it can serve as a built-in ruler on the tissue section. Which of the following best describes the diameter of red cells?

1. 5-6um
2. 6-7um
3. 7-8um
4. 8-9um
5. 9-10um

MATCHING. Select from the following terms. Some may be used more than once or not at all!

1. Lymphocytes
2. Monocytes
3. Eosinophils
4. Basophils
5. Neutrophils
6. All of the above

19. Leukocytes

20. Least numerous of the circulating leukocytes

21. First line of cellular defense against a bacterial invasion

22. Found in the buffy coat in a hematocrit tube

23. Most numerous of the circulating leukocytes

24. Specific granules contain heparin and histamine

25. Capable of diapedesis

26. May be found in loose connective tissue

27. Together, leukocytes and platelets comprise approximately _____ percent of total blood volume.

1. 1
2. 15
3. 23
4. 10

28. Which of the following might trigger erythropoiesis?

1. Increased tissue demand for O₂
2. Decreased tissue demand for O₂
3. An increased number of RBCs
4. Moving from a high altitude to a lower altitude

29. An individual who is blood type AB negative:

1. Can receive any blood type in moderate amounts except that with the Rh antigen
2. Can donate to all blood types in moderate amounts
3. Can receive types A, B, and AB but not type O
4. Can donate to types A, B, and AB but not to type O

30. Which of the following is not a phase of hemostasis?

1. Vascular spasm
2. Fibrinolysis
3. Platelet plug formation
4. Coagulation

31. Which of the following is characteristic of all leukocytes?

1. They are nucleated
2. They have lobed mitochondria
3. They have cytoplasmic granules
4. They are phagocytic

32. Which sequence is correct for the following events?

1. Fibrinogen --> Fibrin
 2. Clot retraction
 3. Formation of thromboplastin
 4. Prothrombin --> Thrombin
1. 1,2,3,4
 2. 3,4,1,2
 3. 4,3,1,2
 4. 3,2,1,4

33. Platelets:

1. Stick to the damaged area of a blood vessel and help to seal the break
2. Have a lifespan of about 120 days
3. Are the precursors of leukocytes
4. Have multiple nuclei
5. Two of the above

34. Fred's blood type was determined to be AB+. Which of the following is true of Fred's blood?

1. There are no antibodies to antigens A, B, or Rh in the plasma
2. The RBCs contain the A and B antigens on their nuclei
3. The blood totally lacks the Rh factor
4. He cannot receive blood from someone who is type O negative

35. All of the following conditions impair coagulation except:

1. Vascular spasm
2. Vitamin K deficiency
3. Severe hypocalcaemia
4. Liver disease

36. The rarest leukocyte is the _____.

37. When monocytes migrate into the interstitial space, they are called _____.

38. Hemoglobin is composed of ____ polypeptide chains.

39. All leukocytes share the following characteristics except:

1. Ability to perform diapedesis
2. Disease-Fighting
3. Distorted, Lobed Nuclei
4. More active in connective tissues than in blood

40. What is the difference between a thrombus and an embolus?
1. One occurs within the cerebral bloodstream while the other does not
 2. Emboli occur only once
 3. An embolus cannot contribute to the occlusion of a coronary vessel while a thrombus cannot contribute to a blockage of a cranial arteriole
 4. A thrombus must travel to become an embolus
41. The plasma component that forms the fibrous skeleton of a clot is:
1. Platelets
 2. Fibrinogen
 3. Thromboplastin
 4. Thrombin
42. Rank the following in order of abundance:
1. Erythrocyte
 2. Basophil
 3. Monocyte
 4. Platelet
1. 1,2,3,4
 2. 1,4,3,2
 3. 1,4,2,3
 4. 1,3,4,2
43. If Jack has type O+ blood, then which of the following is true?
1. He has no agglutinins at all
 2. He has no A agglutinogens
 3. He has no Rh agglutinogens
 4. None of the above

44. Anemia is:

1. Any condition in which the body has an abnormally low oxygen carrying capacity
2. Only a genetic disorder
3. Marked by a massive increase in blood viscosity
4. Never the result of nutrient deficiency
5. 2 of the above

45. Which of the following is not involved in coagulation?

1. Gamma globulins
2. Calcium
3. Vitamin K
4. Prothrombin

46. Which of the following people would have the most anti-B antibodies?

1. An adult male with B+ blood
2. An adult male with O- blood
3. An adult female with B-blood
4. A female child with AB+ blood

47. If a newborn was blood type O+, which of the following would his blood not contain?

1. Anti-B antibodies
2. Anti-A antibodies
3. Anti-Rh antibodies
4. Erythrocytes which express neither the A nor the B antigen

48. The % of blood volume occupied by packed red blood cells is the _____.

49. Which of the following is not true?

1. Blood is a connective tissue
2. Blood contains both a cellular and a non-cellular portion
3. None of the blood cells contain true nuclei
4. The pH of blood is typically between 7.35 and 7.45

50. In a sample of centrifuged blood, the layer immediately beneath the plasma:

1. Can contain neutrophils
2. Can contain platelets
3. Is called the buffy coat
4. All of the above

51. Water makes up what % of the plasma?

1. 90
2. 70
3. 50
4. 30

52. If you observed a white blood cell with a light microscope and noticed the presence of granules, how would you classify it?

1. Granulocyte
2. Agranulocyte
3. It could be either of the above

53. Which of the following is true of lymphocytes?

1. They contain a nucleus that occupies only a small portion of the cell
2. They are divided into T and B lymphocytes
3. The majority of them are found within the blood
4. They specific granules visible under the light microscope
5. All of the above
6. 2 of the above

54. The process by which white blood cells leave capillaries is called

_____.

55. Normally, eosinophils constitute what % of white blood cells?

56. Basophils, eosinophils, and neutrophils are all:
1. Leukocytes
 2. Granulocytes
 3. Phagocytes
 4. All of the above
57. As the liver's ability to function decreases, yellow discoloration of the sclera _____.
58. In the blood, iron is primarily transported by:
1. Hemosiderin
 2. Ferritin
 3. Stercobilin
 4. Transferrin
59. The stem cells that give rise to all red blood cells, white blood cells, and platelets are known as:
1. Hemocytoblasts
 2. Reticulocytes
 3. Hemophilioblasts
 4. Myeloid stem cells
60. Which of the following anemia types is an example of a genetic disorder?
1. Sickle cell
 2. Iron deficiency
 3. Thalassemia
 4. Hemorrhagic
 5. 2 of the above
61. Which granulocyte is specialized for killing parasitic worms?

62. Why is vitamin B₁₂ necessary for erythropoiesis?
1. It's necessary for the ejection of the RBC nucleus
 2. It's necessary for DNA synthesis
 3. It's essential for protein aggregation
 4. It's essential for oxygen's nucleophilic reaction with hemoglobin
63. If you had 10 RBCs each containing 100 molecules of hemoglobin, how many molecules of oxygen could these RBCs transport?
64. Complications of aplastic anemia generally include:
1. Suppressed immunity
 2. Impaired formation of all formed elements
 3. Clotting deficiencies
 4. All of the above
65. Which of the following females does not have to be concerned with erythroblastosis fetalis?
1. A female with blood type O-
 2. A female with blood type O+
 3. A female with blood type AB-
 4. A female with blood type B+
 5. More than one of the above
66. As the hematocrit increases, plasma erythropoietin levels will _____.
67. After receiving a transfusion of type AB blood, the plasma [bilirubin] of a type A patient will _____.
68. As liver disease progresses, free plasma [bilirubin]...
69. As dietary vitamin K levels decrease below the recommended minimum dosage, blood clotting time...

Vessel, Pressure, and Flow Questions

1. The thickest layer of the wall of veins is the:
 1. Tunica media
 2. Tunica externa
 3. Subendothelial connective tissue
 4. Tunica interna
 5. Internal elastic lamina

2. The basic tissue types found in large blood vessels include:
 1. Muscle
 2. Connective Tissue
 3. Nerve
 4. Epithelium
 5. All of the above

3. Each of the following statements about sinusoidal capillaries is correct EXCEPT:
 1. They have unusually wide lumens
 2. They have abundant fenestrations
 3. They are not found in skeletal muscle
 4. They are the least permeable capillary type
 5. They often have phagocytic cells inserted between the endothelial cells of their lining

4. When compared to arteries, veins generally:
 1. Are thinner walled
 2. Have more muscle in the tunica media
 3. Carry faster moving blood
 4. Have thicker endothelium
 5. Are more elastic

5. The blood vessels that play the most important role in the regulation of blood flow to a tissue and blood pressure are the:
1. Arterioles
 2. Veins
 3. Capillaries
 4. Venules
 5. Arteries
6. As blood travels from the aorta to the capillaries:
1. Pressure Increases
 2. Viscosity Increases
 3. Resistance Increases
 4. Velocity Increases
 5. Flow Increases
7. A patient with a hypothalamic tumor has hypersecretion of ADH. Which of the following BP readings would be most likely for this patient?
1. 95/65
 2. 115/80
 3. 120/60
 4. 165/100
8. The difference between the systolic and the diastolic pressures is known as the:
1. Blood Pressure
 2. Pulse Pressure
 3. Mean Arterial Pressure
 4. End-ventricular Pressure

9. The process by which leukocytes leave the circulation by passing between endothelial cells to enter the surrounding connective tissue is termed:
1. Margination
 2. Diapedesis
 3. Leukopoiesis
 4. Endocytosis
 5. None of the above
10. The tunica interna:
1. Includes a layer of dense connective tissue
 2. Contains some small capillaries
 3. Contains some striated smooth muscle fibers
 4. Includes a layer of simple squamous epithelium
 5. None of the above
11. Which of the following represents the primary kind of tissue found in the tunica media of blood vessels?
1. Skeletal muscle
 2. Longitudinally arranged striated muscle
 3. Concentric layers of smooth muscle
 4. Reticular connective tissue
 5. Loose connective tissue
12. Large diameter capillaries found primarily in the liver, spleen, and bone marrow are called:
1. Continuous capillaries
 2. Fenestrated capillaries
 3. Sinusoidal capillaries
 4. Metarterioles
 5. Megacapillaries
13. As a subject's age increases, his/her arterial compliance _____.
14. As depth of respiration increases, venous return _____.

15. As plasma ADH decreases, blood volume _____.
16. As plasma ANP increases, blood volume _____.
17. As plasma histamine increases, venous return _____.
18. As sympathetic stimulation increases, peripheral resistance _____.
19. As blood flows from the arteries into capillaries, BP _____.
20. As blood flows from the arteries into capillaries, velocity of flow _____.
21. As venous BP increases, tissue edema _____.
22. As cardiovascular shock progresses, sympathetic nervous system output _____.
23. As right atrial diastolic pressure increases, VR _____.
24. Which statement is true of arteries?
1. All arteries carry oxygenated blood away from the heart
 2. All arteries carry blood low in carbon dioxide away from the heart
 3. Some elastic arteries release significant amounts of renin
 4. All arteries lack valves
 5. More than one of the above is correct
25. Peripheral resistance:
1. Decreases with increasing blood vessel length
 2. Decreases if blood vessel diameter is reduced by 50%
 3. Decreases in cases of polycythemia
 4. Is not a major factor in the determination of mean arterial pressure
 5. 2 of the above are correct
 6. None of the above correct

26. The arteries that directly feed into the capillary beds are called

_____.

27. A deficiency of albumin would result in:

1. Increased blood volume
2. Increased blood oncotic pressure
3. Loss of water by osmosis from the bloodstream
4. 2 of the above
5. All of the above

28. As blood flows from the aorta to the capillaries of the gastrocnemius, its velocity of flow will:

1. Increase
2. Decrease
3. Stay the same

29. Which of the following is true?

1. Arteries typically have thinner walls than veins
2. Veins typically have a much wider tunica media than arteries
3. Veins typically have much more elastin than conducting arteries
4. You typically would find fewer valves in arteries than in veins

30. Increasing blood vessel length will cause peripheral resistance to:

1. Increase
2. Decrease
3. Stay the same

31. As you go from arteries to capillaries, the fluid pressure exerted by blood on the vessel walls:

1. Increases
2. Decreases
3. Stays the same

32. Sinusoidal capillaries are found in the:
1. Cerebral cortex
 2. Thyroid gland
 3. Thymus
 4. Bone marrow
33. If MAP increased by 10mmHg, how much must the diastolic pressure have changed?
1. -10mmHg
 2. +10mmHg
 3. 0 mmHg
 4. Cannot be determined from the information given
34. As heart rate decreases, diastolic pressure will:
1. Increase
 2. Decrease
 3. Stay the same
35. The volume of blood moving through a given area in a given time is the:
1. Blood velocity
 2. Blood flow
 3. Blood pressure
 4. Blood resistance
36. If MAP=100mmHg, and SBP=120, then what must DBP be?
1. 80mmHg
 2. 90mmHg
 3. 100mmHg
 4. 120mmHg
37. Histologically, the tunica _____ is squamous epithelium underlain by a sparse connective tissue layer.
38. If the DBP increased by 30mmHg while the SBP remained the same, how much would the MAP change?

39. Permitting the exchange of gases and nutrients between blood and tissue cells is the primary function of what blood vessel type?
40. Arrange the following in the proper order for blood flow.
1. Muscular arteries
 2. Arterioles
 3. Elastic arteries
41. The femoral artery is an example of a(n) _____ artery.
42. The typical diameter of a continuous capillary is:
1. 8 μm
 2. 16 mm
 3. 4 cm
 4. 24 km
43. 65% of the blood volume is contained within the _____.
44. Of the following, which is the most significant factor affecting peripheral resistance?
1. Blood viscosity
 2. Blood vessel length
 3. Blood vessel radius
 4. Blood pH
45. As blood travels from the femoral artery to the right atrium, its oxygen content will _____.
46. Which of the following arteries branches off the aorta first?
1. Left common carotid
 2. Left subclavian
 3. Left coronary
 4. Brachiocephalic
47. A brief increase in blood pressure will cause the sympathetic tone on the blood vessels to _____.

48. Baroreceptors project to the:

1. Vasomotor, Cardioinhibitory, and Cardioacceleratory centers
2. Cardioinhibitory and Cardioacceleratory centers only
3. Vasomotor center only

49. As blood pH decreases, the activity of carotid sinus chemoreceptors will _____.

50. ANP causes Na⁺ excretion in the urine to _____ which causes blood volume to _____.

51. Nitric Oxide is a:

1. Powerful vasoconstrictor
2. Powerful vasodilator
3. Weak vasoconstrictor
4. Weak vasodilator

52. Consider the following events and then put them in correct chronological order.

1. Sustained blood pressure depression
2. Release of aldosterone
3. Conversion of angiotensin I to angiotensin II
4. Release of renin
5. Cleavage of angiotensinogen

1. 1,2,3,4,5
2. 1,4,2,5,3
3. 1,4,5,3,2
4. 1,2,5,3,4

53. Increased local [Lactic Acid] would cause arteriole diameter to _____.

54. If MAP becomes $>160\text{mmHg}$, then which of the following may occur?

1. Cerebral edema
2. Cerebral polythemia
3. Renal atelectasis
4. Renal perfusion

55. As you move from the arterial end of a capillary bed to the venous end, the capillary hydrostatic pressure will _____.

56. Liver dysfunction would cause capillary osmotic pressure to _____.

57. Dehydration causes capillary osmotic pressure to _____.

58. The most common type of shock is:

1. Hypovolemic
2. Anaphylactic
3. Neurogenic
4. Septic

59. Which of the following arteries is not paired?

1. Gonadal
2. Lumbar
3. Renal
4. Inferior mesenteric

60. Which of the following veins does not drain into the inferior vena cava?

1. Lumbar
2. Subclavian
3. Renal
4. Common Iliac
5. 2 of the above

61. Blood in the hepatic portal vein tends to be high in _____ and low in _____.

62. Oxygenated blood is brought to the liver by the _____.

63. How does an ACE inhibitor decrease mean arterial pressure?

64. As thyroid hormone levels increase, MAP will _____.

65. A transient decrease in BP is detected by baroreceptors which respond by activating the _____ center and the _____ center and inhibiting the _____ center.

66. The primary baroreceptors are found in the:

1. Carotid sinus
2. Aortic arch
3. Atrial bifurcation
4. A and b
5. B and c

67. Chemoreceptor activation will result in:

1. Increased heart rate and respiratory rate
2. Decrease heart rate and respiratory rate
3. Increased heart rate and decreased respiratory rate
4. Decreased heart rate and increased respiratory rate

68. An ANP inhibitor would cause blood volume to:

69. A person with primary hypertension would be expected to have a plasma aldosterone level that is:

1. Greater than normal
2. Less than normal
3. Normal

70. An ACE inhibitor would be expected to cause a:

1. Decrease in systemic BP
2. Decrease in plasma [angiotensin II]

3. Decrease in plasma aldosterone
4. All of the above
5. 2 of the above

71. At rest, the % of cardiac output received by the kidneys is greater than the % received by the heart.

1. This statement is TRUE
2. This statement is FALSE

72. An increase in tissue [lactic acid] will cause the arterioles feeding that tissue to:

1. Constrict
2. Dilate
3. Contract their vascular smooth muscle
4. Increase their resistance
5. 2 of the above

73. Epinephrine causes the blood vessels serving skeletal musculature to:

1. Constrict
2. Dilate
3. Epi has NO EFFECT on these blood vessels

74. If the [O₂] in the capillaries is less than the [O₂] in the interstitial space, then the direction of O₂ diffusion will be from the _____ into the _____.

75. Rank the following forces in order of magnitude.

1. HP_CAPILLARY at the arterial end
2. HP_INTERSTITIAL SPACE
3. HP_CAPILLARY at the venous end

76. Severe vomiting can result in:

1. Septic shock
2. Anaphylactic shock
3. Hypovolemic shock
4. All of the above

77. Increased vasomotor center activity causes TPR to _____.

78. Vascular smooth muscle responds to stretch by:

1. Contracting
2. Relaxing
3. Initiating mitosis
4. Initiating meiosis
5. Secreting renin

79. The intrinsic autoregulation of blood pressure is:

1. Metabolic
2. Myogenic
3. Not suited to respond to long term changes in BP
4. All of the above
5. None of the above

80. If MAP falls below _____mmHg then fainting can occur.

1. 80
2. 100
3. 40
4. 60

81. If a segment of pulmonary tissue has a low [O₂], then the arterioles serving that segment will:

1. Dilate
2. Constrict
3. Release nitroprusside
4. Release ACE

82. Pulmonary arteries are like veins because they have thick walls and small lumens.

1. This statement is TRUE
2. This statement is FALSE

83. The blood-brain barrier protects the brain tissue from being affected by:

1. Decreases in plasma pH
2. Increases in plasma [O₂]
3. Increases in plasma [Glucose]
4. Increases in plasma pH

Practice Questions on the Digestive System

1. The site of production of cholecystokinin and secretin is the:
 1. Stomach
 2. Pancreas
 3. Small Intestine
 4. Large Intestine

2. Alkaline mucous glands are found in the submucosa of the:
 1. Ileum
 2. Jejunum
 3. Duodenum
 4. Cardiac region of the stomach
 5. Fundic region of the stomach

3. The _____ anchors the liver to the lesser curvature of the stomach.

4. /True or False/ Bile and blood flow in opposite directions in the liver lobule.

5. Which of the following is not a function of the liver?
 1. Production of bile
 2. Detoxification of drugs
 3. Storage of glucose
 4. Storage of Vitamin C

6. The gallbladder:
 1. Produces bile
 2. Is attached to the pancreas
 3. Stores and concentrates bile
 4. Produces cholecystokinin

7. The small fat-filled appendages of visceral peritoneum that hang from the surface of the large intestine are known as _____.

8. /True or False:/ All digestive organs are intraperitoneal.
9. The majority of the absorption of digested nutrients occurs in the:
1. Stomach
 2. Ileum
 3. Jejunum
 4. Cecum
10. Which of the following sphincters is under voluntary control?
1. Pyloric
 2. Cardiac
 3. Hepatopancreatic
 4. Internal anal
 5. External anal
11. High doses of antibiotics can destroy the bacterial flora of the large intestine. This can result in impaired:
1. Absorption of protein
 2. Blood coagulation
 3. Bone resorption
 4. Respiratory control
12. Look at the following layers of the alimentary canal. Arrange them from closest to the lumen to farthest from the lumen.
1. Serosa
 2. Mucosa
 3. Muscularis externa
 4. Submucosa
13. During exercise, the percentage of the cardiac output received by the digestive organs will _____.

14. Which structure thickens in certain regions of the alimentary canal in order to act as a sphincter?
1. Circular layer of the muscularis mucosae
 2. Longitudinal layer of the muscularis mucosae
 3. Circular layer of the muscularis externa
 4. Longitudinal layer of the muscularis externa
15. The internal lip is joined to the gum by the _____.
16. The anterior 2/3 of the tongue is separated from the posterior 1/3 by the _____.
17. The 3 pairs of extrinsic salivary glands are the:
1. Parotid, sublingual, and ethmoidal
 2. Parotid, buccal, and submaxillary
 3. Parotid, submandibular, and buccal
 4. Parotid, submandibular, and sublingual
18. Which of the following is correct?
1. Adult incisors lack dentin
 2. Adult incisors lack enamel
 3. Adult premolars lack cementum
 4. Adult premolars lack enamel
 5. None of the above
19. At the junction between the esophagus and the stomach, the epithelial lining changes abruptly from _____ to _____.
1. Nonkeratinized stratified squamous; simple columnar
 2. Simple columnar; nonkeratinized stratified squamous
 3. Nonkeratinized simple squamous; stratified columnar
 4. Stratified columnar; nonkeratinized simple squamous
20. In the stomach, food is turned into a paste called _____.
21. The entire convex lateral surface of the stomach is the _____.

22. Histologically, the stomach wall is unique because it contains:

1. No lamina propria
2. 1 extra layer in its muscularis mucosae
3. 1 extra layer in its muscularis externa
4. An adventitia in addition to a double-membraned serosa

23. The gastric gland cell whose absence could lead to pernicious anemia is the:

1. Chief cell
2. Goblet cell
3. Mucous neck cell
4. Parietal cell
5. Enteroendocrine cell

24. The layer of the digestive tube wall which contains blood vessels, lymphatic nodules, and a rich supply of elastic fibers is the:

1. Mucosa
2. Submucosa
3. Muscularis Externa
4. Serosa

25. Tooth structure includes:

1. The dentin, which is the hardest substance in the body
2. A root covered in enamel
3. A thin periodontal ligament which holds the tooth in place
4. Pulp, an avascular connective tissue filling the hollow cavity of the tooth

26. Chemical digestion occurs in:

1. Oral Cavity
2. Esophagus
3. Stomach
4. Pharynx
5. 2 of the above

27. Mechanical digestion occurs in the:

1. Stomach
2. Cecum
3. Pharynx
4. Esophagus
5. 2 of the above

28. Which of the following is NOT true of saliva?

1. It cleanses the mouth
2. It typically contains IgE antibodies
3. It moistens food and aids in the compaction of the bolus
4. It dissolves food chemicals

29. The sheets of peritoneal membrane that holds the digestive tract in place are called _____.

30. The entry of bile into the duodenum is controlled by the:

1. Liver sinusoids
2. Common pancreatic duct
3. Pyloric sphincter
4. Cardiac sphincter
5. None of the above

31. Paneth cells:

1. Are more common in the esophagus than in the jejunum
2. Are essential for bile synthesis
3. Secrete antibacterial enzymes
4. Do not have nuclei
5. None of the above

32. A baby is admitted into the hospital with a history of projectile vomiting after each feeding. On examination, it is found that the pyloric sphincter is thickened and does not open readily. Because of the baby's loss of gastric juice, his blood probably indicates:
1. Acidosis
 2. Leukocytosis
 3. Alkalosis
 4. An excessively low pH
 5. Excessive proteinuria
33. /True or False/: The digestive function of the liver is to produce bile.
34. The fusion of the common bile duct and the pancreatic duct forms the _____.
35. Increasing the surface area of its mucosal lining enhances the absorptive effectiveness of the small intestine. Which of the following accomplishes this task?
1. Plicae circulares
 2. Intestinal villi
 3. Microvilli
 4. All of the above
 5. 2 of the above
36. /True or False/: The number of mucosal cells bearing microvilli increases as you proceed from the cecum to the sigmoid colon.
37. Which of the following gastric cell types synthesizes and releases gastrin, histamine, cholecystokinin, and serotonin?
1. Enteroendocrine cells
 2. Parietal cells
 3. Zymogenic cells
 4. Paneth cells
 5. Mucous neck cells

38. A major function of the large intestine is to:
1. Secrete digestive enzymes
 2. Remove waste materials
 3. Regulate the release of bile
 4. Secrete water in order to regulate blood volume
39. Its muscular wall contracts in response to cholecystokinin.
40. It secretes an alkaline fluid in response to cholecystokinin.
41. It is the largest gland in the body.
42. It is associated with vitamin K production.
43. Part of the digestive tract whose cells have a brush border.
44. Which of the following is NOT true of the appendix?
1. Bacteria have a tendency to accumulate within it.
 2. It typically contains lymphocytes
 3. It typically contains MALT
 4. It typically contains almost no capillaries
45. What distinguishes the rectum from the colon?
1. The lack of microvilli
 2. The lack of teniae coli
 3. The lack of villi
 4. All of the above
 5. 2 of the above
46. The sphincter between the stomach and the duodenum is the _____.
47. Before blood carrying the products of protein digestion reaches the heart, it must first pass through capillary networks in the _____.

48. Cancer chemotherapy will _____ the rate of renewal of the intestinal lining.
49. Paneth cells are responsible for the production of which of the following?
1. Gastrin
 2. Secretin
 3. Lysozyme
 4. Amylase
 5. Lipase
50. Which of the following is not produced by an enteroendocrine cell?
1. Pepsin
 2. Cholecystokinin
 3. Gastrin
 4. Secretin
 5. 2 of the above
51. Which of the following would not be seen in a section of the soft palate?
1. A stratified epithelium
 2. Blood vessels
 3. Bone
 4. Muscle
 5. 2 of the above
52. Which of the following does not produce digestive enzymes?
1. Pancreas
 2. Small Intestine
 3. Salivary glands
 4. Stomach
 5. Liver

53. Which of the following cell types is NOT present in the stomach?
1. Mucous neck cells
 2. Chief cells
 3. Parietal cells
 4. Epithelial cells
 5. Alpha cells
54. Which of the following is NOT produced by the exocrine pancreas?
1. Amylase
 2. Carboxypeptidase
 3. Trypsinogen
 4. Pepsinogen
 5. Chymotrypsinogen
55. Which of the following is the central component of the liver lobule?
1. Bile canaliculus
 2. Hepatic artery
 3. Central vein
 4. Portal vein
 5. Portal space
56. Which of the following statements concerning the liver lobule is true?
1. Portal triads are at the center of the lobule
 2. Blood flows from the center to the periphery of this lobule
 3. Bile flows from the center to the periphery of this lobule
 4. All of the above
 5. 2 of the above
57. Intrinsic factor is produced by which of the following cells?
1. Chief cells
 2. Paneth cells
 3. Enteroendocrine cells
 4. Parietal cells
 5. Mucous neck cells

58. Which of the following induces contraction of gallbladder smooth muscle?
1. Secretin
 2. Cholecystokinin
 3. Serotonin
 4. Gastrin
 5. Somatostatin
59. Which of the following is not a component of gastric juice?
1. Hydrochloric acid
 2. Mucus
 3. Pepsin
 4. Amylase
 5. Water
60. Which of the following is true of the liver?
1. Hepatocytes synthesize many of the blood proteins such as albumin and antibodies
 2. Hepatocytes synthesize 80% of the bile in the body with the other 20% coming from the pancreas
 3. The liver receives more nutrient-rich blood than oxygen-rich blood
 4. The liver is the 2nd largest gland in the body
61. Pepsinogen is synthesized and released by which of the following?
1. Parietal cells
 2. Enteroendocrine cells
 3. Paneth cells
 4. Chief cells
 5. Pancreatic acinar cells

62. Which of the following pairs of hormones are mainly involved in

controlling pancreatic exocrine secretions?

1. Insulin and glucagon
2. Cholecystokinin and secretin
3. Somatostatin and gastrin
4. Motilin and serotonin
5. Glucagon and somatostatin

63. Which of the following organs does not have both endocrine and exocrine function?

1. Stomach
2. Small Intestine
3. Gallbladder
4. Liver
5. Pancreas

64. Which of the following cell types would not be found in lamina propria of a villus?

1. Endothelial cell
2. Smooth muscle cell
3. Lymphocyte
4. Plasma cell
5. Goblet cell

65. The function of the hepatic portal circulation is to:

1. Carry toxins to the venous system for disposal thru the urinary tract
2. Collect absorbed nutrients for metabolic processing or storage
3. Hormone distribution
4. Transfer bile to the liver from the pancreas

66. Which of the following is true?

1. There are 27 primary teeth, none of which are molars
2. There are 24 primary teeth and no new primary teeth appear after 13 months
3. There are 20 primary teeth and most children have all of them by 24 months of age
4. There are 32 primary teeth

67. Peristaltic waves are:

1. Segmental regions of the GI tract
2. Churning movements of the GI tract
3. Pendular movements of the GI tract
4. Waves of muscular contractions that propel contents from one point to another
5. Circular contractions of the GI tract muscularis mucosae

68. If you eat a meal of french fries, buttered toast, ice cream, and whole milk, which of the following glands would secrete the most enzymes that would be involved in digesting all this food?

1. Liver
2. Exocrine pancreas
3. Endocrine pancreas
4. Ileum
5. Buccal Glands

69. Which of the following is true of the small intestine?

1. Site of carbohydrate and protein but NOT fat digestion
2. Site of the majority of water absorption in the GI tract
3. First site of protein hydrolysis
4. All of the above
5. None of the above

70. If you compared the blood entering the liver and the blood leaving the liver, you find that:

1. Blood leaving the liver has more glucose
2. Blood leaving the liver contains more oxygen
3. Blood leaving the liver contains fewer amino acids
4. Blood leaving the liver contains more toxins and less carbon dioxide

71. Chemical digestion reduces large molecules to simpler compounds by the process of:

1. Mastication
2. Dehydration synthesis
3. Metabolism
4. Anabolism
5. Catabolism

72. Which of the following is NOT characteristic of the colon?

1. Lacks villi
2. Contains teniae coli
3. Longer than the small intestine
4. Contains a submucosa
5. Contains fat filled appendages of unknown function

73. Digestive processes in the large intestine include:

1. Mass peristalsis
2. Absorption of some vitamins and electrolytes
3. Elimination of cellulose-based material
4. All of the above
5. 2 of the above

52. Which of the following does not produce digestive enzymes?

1. Pancreas
2. Small Intestine
3. Salivary glands
4. Stomach
5. Liver

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 2. Absorption of some vitamins and electrolytes
 3. Elimination of cellulose-based material
 4. All of the above
 5. 2 of the above
74. A protein molecule will be hydrolyzed by enzymes secreted from the:
1. Mouth, stomach, small intestine, liver
 2. Stomach, pancreas, small intestine
 3. Stomach, small intestine, liver
 4. Mouth, pancreas, colon

75. Carbohydrates are acted on by:

1. Trypsin, chymotrypsin, and enterokinase
2. Amylase, maltase, and sucrase
3. Lipase
4. Hexokinase, pepsin, and amylase

76. Select the correct enzyme-substrate combination.

1. Amylase - starch
2. Chymotrypsin - fat
3. Nuclease - nuclei
4. Lipase - disaccharides
5. 2 of the above are correct

77. Which of the following is true of electrolyte absorption?

1. Sodium ion absorption is coupled to glucose and amino acid uptake
2. Potassium can diffuse through the intestinal epithelium
3. Vitamin D is necessary for calcium absorption
4. All of the above

78. The bonelike material that underlies the enamel cap and forms the bulk of the tooth is the _____.

79. Chief cells in children secrete an enzyme that curdles milk. That enzyme is:

1. Chymotrypsin
2. Pepsinogen
3. Pepsin
4. Lactin
5. Rennin

80. The chief bile pigment is _____.

81. Contributors of enzymes to the digestive tract lumen include all of the following EXCEPT:

1. Parotid glands
2. Stomach
3. Liver
4. Pancreas
5. Small Intestine

82. Each of the following statements about Brunner's glands is correct EXCEPT:

1. They are a characteristic component of the duodenal wall
2. They produce a serous secretion rich in digestive enzymes
3. They lie in the submucosal layer
4. They empty their secretions into the crypts of Lieberkuhn

83. The wall of the stomach:

1. Is covered on its outer surface by simple squamous epithelium
2. Is thrown into temporary folds called rugae when the stomach is empty
3. Is covered on its inner surface by a simple columnar epithelium
4. Has 3 layers of smooth muscle in its muscularis externa
5. All of the above

84. Saliva contains:

1. Amylase
2. Mucus
3. Immunoglobulins
4. Lysozyme
5. All of the above
6. Only a and b

85. Within the connective tissue of a portal triad, one might find a:

1. Branch of the hepatic artery
2. Bile duct
3. Branch of the hepatic portal vein
4. Lymphatic vessel
5. All of the above

86. Both exocrine and endocrine functions are performed by the:

1. Pancreas
2. Liver
3. Crypts of Lieberkuhn
4. Gastric glands
5. All of the above

_For the next 6 questions, use the following 4 choices.

Each may be used once, more than once, or not at all._

1. Hepatic portal vein
2. Hepatic artery
3. Both a and b
4. Neither a nor b

87. Contain(s) blood richest in nutrients

88. Contain(s) blood richest in oxygen

89. Contain(s) blood richest in the breakdown products of red blood cell destruction

90. Drain(s) into hepatic sinusoids

91. Receive(s) blood from the central veins

92. Contribute(s) majority of liver blood volume

93. As a sympathetic antagonist is injected iv, intestinal motility and secretion will _____.

94. As plasma [secretin] increases, stomach acid secretion will _____.

95. As plasma [CCK] increases, gastric motility will _____.

96. As plasma [gastrin] decreases, parietal cell secretion will _____.

97. As plasma [CCK] decreases, bile secretion _____.

98. What brain center controls deglutition?

99. What type of contraction propels food thru the esophagus?

100. How does atrophy of the gastric mucosa cause pernicious anemia?

101. How would removal of the terminal ileum cause pernicious anemia?

102. Most of the water you drink is absorbed in the:

1. Colon
2. Jejunum
3. Stomach
4. Kidney

103. What organ produces the enzyme trypsin?

1. Gallbladder
2. Liver
3. Pancreas
4. Spleen

104. In which test tube would protein digestion occur at the highest rate?

1. Tube containing pepsinogen and salivary amylase
2. Tube containing pepsinogen
3. Tube containing HCl
4. Tube containing HCl and intestinal amylase
5. Tube containing HCl and pepsinogen

Practice Questions on the Endocrine System

1. The endocrine system:
 1. Releases chemicals into the bloodstream for distribution throughout the body
 2. Releases hormones that can alter the metabolic activities of many different tissues and organs
 3. Produces effects that can last for hours, days, or even longer
 4. Can alter the gene activity of cells
 5. All of the above
2. Each of the following is an amino acid derivative EXCEPT:
 1. Epinephrine
 2. Melatonin
 3. Thyroxine
 4. TSH
3. When adenylyl cyclase is activated:
 1. cAMP is formed
 2. cAMP is degraded
 3. G proteins are replicated in a semiconservative fashion
 4. Steroid hormones enter the cell via receptor-mediated endocytosis
 5. None of the above
4. Which of the following hormones does not act via a second messenger system?
 1. Glucagon
 2. Epinephrine
 3. GH
 4. Testosterone
 5. ACTH

5. What hypophyseal structure receives signals from the hypothalamus via the hypophyseal portal system?

1. Follicular medulla
2. Adenohypophysis
3. Neurohypophysis
4. Pars intermedia
5. Suprachiasmatic nucleus

6. Low blood glucose typically results in the secretion of all of the following EXCEPT:

1. Glucagon
2. Thyroxine
3. hGH
4. PTH
5. 3 of the above

7. Which of the following is a function of glucocorticoids?

1. Increased inflammatory response
2. Increased blood [glucose]
3. Decreased lipolysis
4. Increased creatinine hydrolysis by osteocytes
5. Increased osteoclast activity

8. What hormone increases intestinal calcium absorption?

1. Calcitriol
2. Calcitonin
3. Parathormone
4. Pancreatic polypeptide
5. GnRH

9. Which of the following is a function of TSH?

1. Activation of thyroid follicular cells
2. Increase of iodine trapping in follicular cells
3. Increased thyroglobulin synthesis
4. Increased release of T₃
5. Increase release of T₄
6. All of the above
7. Only 4 of the above

10. The _____ cells of the pancreas secrete insulin.

1. F
2. Chief
3. Principal
4. Alpha
5. Beta
6. Delta

11. The general adaptation syndrome is activated by the:

1. Hypothalamus
2. Adrenal gland
3. Pituitary gland
4. Thyroid gland
5. Epinephrine release

12. Say you ate 25 sugar cubes and then drank a liter of Mountain Dew, which hormone might be secreted in large amounts as a result?

1. Insulin
2. Glucagon
3. Prolactin
4. GnRH
5. Somastinin

13. Somatostatin is secreted by the:

1. Pancreatic F cells
2. Pancreatic delta cells
3. Zona fasciculata
4. Parafollicular cells
5. Bronchial clara cells

14. A tumor in the adrenal zona glomerulosa may cause hypersecretion of the hormones in that region. Which of the following might you expect to find in a patient with such a tumor?

1. Increased blood sodium levels
2. Increased blood glucose levels
3. Decreased blood calcium levels
4. Increased dehydration
5. Increased ketoacidosis

15. Oxytocin is secreted by the:

1. Adenohypophysis
2. Neurohypophysis
3. Zona glomerulosa
4. Pars intermedia
5. Cervical stretch receptors

16. A lack or decrease in insulin hormone receptors on cells can result in:

1. Diabetes insipidus
2. Type I diabetes mellitus
3. Type II diabetes mellitus
4. Insulin-dependent diabetes mellitus
5. Gestational diabetes

17. Vasopressin is the same hormone as _____.

18. The general adaptation syndrome:
1. Is a mechanism to maintain homeostasis when under stress
 2. Resets the levels of controlled conditions in the body in response to stress
 3. Is part of the sympathetic response
 4. Reduces the amount of stress encountered
 5. None of the above
19. Which of the following characteristics is the same for the nervous and the endocrine systems
1. Target cells affected
 2. Latent period for onset of actions
 3. Duration of actions
 4. Mechanism of signalling
 5. None of the above
20. Hyposecretion of cortisol can cause:
1. Cretinism
 2. Diabetes mellitus
 3. Diabetes insipidus
 4. Addison's disease
 5. Grave's disease
21. During hyperglycemia, pituitary GH secretion will _____.
22. As blood [somatomedin] increases, pituitary GH secretion will _____.
23. As GH secretion increases, liver glycogenolysis will _____.
24. As GH secretion decreases, fat catabolism will _____.
25. As thyroid hormone levels increase, tissue O₂ consumption will _____.
26. As thyroid hormone levels increase, pituitary TSH secretion will _____.

27. As hypernatremia progresses, cortisol secretion will _____.

28. As hypoxia progresses, cortisol secretion will _____.

29. As cortisol secretion increases, blood [glucose] will _____.

30. As cortisol secretion increases, protein anabolism will _____.

31. As PTH levels increase, plasma [Ca^{2+}] will _____.

32. As plasma [Ca^{2+}] increases, calcitonin secretion will _____.

33. Stress causes the adrenal medulla to release:

1. Norepinephrine and ANP
2. Epinephrine and vasopressin
3. Epinephrine and norepinephrine
4. Epinephrine, norepinephrine and vasopressin

Heart Questions

1. The space in the middle of the thoracic cavity where the heart resides is the:
 1. Pericardial cavity
 2. Pericardium
 3. Pleural Cavity
 4. Mediastinum
 5. Dorsal Cavity

2. The foramen ovale in the fetal heart is located in the:
 1. Right atrium
 2. Left atrium
 3. Interventricular septum
 4. Interatrial septum
 5. Pulmonary trunk

3. Which blood vessel does NOT bring deoxygenated blood directly to the heart?
 1. Pulmonary vein
 2. Coronary Sinus
 3. Inferior Vena cava
 4. Superior Vena Cava

4. If communication between the SA node and the AV node became blocked, which will most likely occur?
 1. The rate of ventricular contraction will decrease
 2. Afterload will increase
 3. The rate of atrial contraction will decrease
 4. Stroke volume will increase to 5L/beat
 5. All of the above

5. If there is a blockage between the AV node and the AV bundle, how will this affect the appearance of the EKG?

1. PR interval would be smaller
2. QRS interval would be shorter
3. There would be more P waves than QRS complexes
4. There would be more QRS complexes than P waves
5. The T wave would be absent

6. What effect would compressing the inferior vena cava just below the diaphragm have on cardiac function?

1. Stroke volume would decrease
2. Cardiac output would decrease
3. Sympathetic stimulation of the heart would eventually increase
4. Heart rate would eventually increase
5. All of the above

7. A valve damaged by rheumatic fever fails to open completely. This is known as:

1. Stenosis
2. Heart Block
3. Ischemia
4. MI
5. Fibrillation

8. According to the Frank-Starling Law of the heart, CO is directly related to:

1. Ventricular muscle mass
2. Heart Rate
3. Amount of blood returning to the heart
4. ESV
5. Cardiac Reserve

9. The T Wave on an EKG represents:

1. Ventricular Depolarization
2. Ventricular Repolarization
3. Atrial Depolarization
4. Atrial Repolarization
5. Ventricular Systole

10. Cardiac output is equal to:

1. $HR \times SV$
2. HR/SV
3. $EDV - ESV$
4. $(EDV-SV) \times HR$
5. $HR \times BP$

11. During ventricular systole:

1. The atria are contracting
2. The AV valves are closed
3. The intraventricular pressure is less than the intraatrial pressure
4. The mitral valve is open
5. Blood is forced into the ligamentum arteriosum

12. Which of the following represents the outermost layer of the heart?

1. Epicardium
2. Parietal pericardium
3. Myocardium
4. Subendocardium
5. Endocardium

13. Increased sympathetic stimulation will cause HR to _____.

14. Moderate increase in preload will cause SV to _____.

15. Increased EDV will cause preload to _____.

16. Decreased cardiac contractility will cause SV to _____
and will cause CO to _____.

17. Decreased SV as with congestive heart failure will cause ESV to _____.
18. Increased ESV will cause EDV to _____ and Preload to _____.
19. Excessively increased EDV will cause SV to _____ and CO to _____.
20. Increased activation of Beta-1 receptors on the SA node will cause the number of QRS complexes per minute to _____.
21. Excessively high HR will cause PR interval to _____, ventricular fill time to _____, EDV to _____, preload to _____, and SV to _____.
22. Moderate to intense (but not maximal) exercise will cause HR to _____, SV to _____, and CO to _____.
23. Hypertension will cause afterload to _____ and that in turn will cause ESV to _____ and SV to _____.
24. As arterial BP increases, medullary cardioacceleratory area activity _____.
25. As atrial EDV increases, plasma ANP levels _____.
26. As HR decreases and VR remains constant, SV will _____.
27. As parasympathetic stimulation increases, CO _____.
28. As SV increases, PP _____.
29. As SV decreases, VR _____.

30. Name the pacemaker of the heart.
31. What structure electrically isolates the atria from the ventricles?
32. Which portion of the heart's intrinsic conduction system has the lowest conduction velocity? Why is it slower here?
33. Are the AV valves open or closed during ventricular systole?
34. Which heart structure has the greatest rate of spontaneous depolarization?
35. Which great vessel delivers blood to the systemic circulation?
36. Which great vessel delivers blood to the lungs?
37. Shortly after (100ms to be precise) the QRS complex of the ECG:
 1. The mitral valve is _____
 2. The aortic valve is _____
 3. The pressure in the right atrium is _____ than the pressure in the right ventricle.
 4. The ventricular volume is _____ and the atrial volume is _____
39. Normal heart sounds are caused by which of the following events?
 1. Closure of the semilunar valves
 2. Contraction of the crista terminalis
 3. Contraction of ventricular musculature
 4. Closure of the AV valves
 5. All of the above
 6. 2 of the above

40. The left ventricular wall is thicker than the right ventricular wall in order to:
1. Accommodate a greater volume of blood
 2. Expand the thoracic cage during diastole
 3. Pump a greater volume of blood
 4. Pump blood with greater pressure
 5. Pump blood through a smaller valve
41. Blood within the pulmonary veins returns to the _____
42. Blood is carried towards myocardial capillaries by _____
43. If the vagal nerves to the heart were cut, the result would be that:
1. The heart would stop
 2. The heart rate would decrease
 3. The heart rate would increase
 4. Parasympathetic stimulation to the blood vessels would increase in an attempt to compensate
44. The foramen ovale:
1. Connects the atria in the fetal heart
 2. Is a condition in which the ductus arteriosus remains open
 3. Is a remnant of the fetal conus arteriosus
 4. Is a connection between the fetal pulmonary trunk and aorta
45. Which blood vessel of the heart receives highly oxygenated blood as a result of right ventricular systole?
1. Aorta
 2. Pulmonary Trunk
 3. Pulmonary Veins
 4. 2 of the above
 5. None of the above

46. The tricuspid valve is closed:
1. While the ventricles are in diastole
 2. While the ventricles are in systole
 3. By the movement of blood from the right atrium to the right ventricle
 4. By the movement of blood from the left ventricle to the left atrium
 5. All of the above
 6. 2 of the above
 7. None of the above
51. Which of the following depolarizes next after the AV node?
1. Atrial myocardium
 2. Ventricular myocardium
 3. Bundle branches
 4. Purkinje fibers
52. Given an EDV of 150mL and an ESV of 50mL, and a HR of 60bpm, then cardiac output is:
1. 600 mL/min
 2. 6 L/min
 3. 60000 mL/min
 4. None of the above
53. The statement "strength of contraction increases intrinsically due to increased stretching of the heart wall" is best attributed to:
1. Pouisseille's Law
 2. Bainbridge Reflex
 3. Frank-Starling Law
 4. Faraday's Law
 5. Henry's Law
54. The thickest layer of the heart wall is the _____.
55. _____ occurs when large amounts of inflammatory fluid seep into the pericardial cavity and compress the heart.

56. An increase in heart rate will cause preload to:
1. Increase
 2. Decrease
 3. Stay the same
57. A decrease in myocardial contractility will cause, EDV to:
1. Increase
 2. Decrease
 3. Stay the same
58. /True or False/ - Atrial systole is responsible for the majority of ventricular filling.
59. The majority of cardiac muscle cells are:
1. Striated
 2. Joined by intercalated discs
 3. Not autorhythmic
 4. All of the above
 5. 2 of the above
60. Increased activity of the cardioacceleratory center in the medulla oblongata will cause ESV to:
1. Increase
 2. Decrease
 3. Stay the same
61. During ventricular isovolumetric relaxation, the volume of blood in the atria is:
1. Increasing
 2. Decreasing
 3. Staying the same

62. Which of the following is true of the heart?
1. Its apex points towards the left hip and its base points toward the left shoulder
 2. 2/3 of its mass lies above the diaphragm and 1/3 lies below the diaphragm
 3. It is anterior to both the sternum and the vertebral column
 4. It is enclosed within the medial cavity of the thorax
63. The visceral layer of the serous pericardium is also known as the _____.
64. The internal walls of the ventricular chambers are marked by irregular ridges of muscle called _____.
65. Typically, the right ventricle has a stroke volume that is:
1. Less than the SV of the left ventricle
 2. More than the SV of the left ventricle
 3. Equal to the SV of the left ventricle
66. What valve separates the right atrium from the right ventricle?
67. A valve that does not close properly is said to be:
1. Stenosed
 2. Competent
 3. Incompetent
 4. Redundant
68. Which of the following is not true of cardiac autorhythmic cells?
1. They constitute 1% of the myocardium
 2. They contain a large # of contractile fibers
 3. They have the ability to spontaneously depolarize
 4. They can be found in the interventricular septum

69. The only electrical connection between the atria and the ventricles is the:
1. AV node
 2. AV delay
 3. AV valve
 4. AV bundle
70. Which of the following contains the least amount of parasympathetic innervation?
1. SA node
 2. AV node
 3. Ventricular myocardium
71. As EDV increases, SV will _____.
72. As HR increases, ventricular filling time will _____.
73. As afterload increases, ESV will _____ and SV will _____.
74. The T wave of an electrocardiogram indicates _____.
75. During atrial systole:
1. The tricuspid and bicuspid valves are closed but the semilunar valves are open
 2. The bicuspid valve is open but the mitral valve is closed
 3. Both semilunar valves and both AV valves are open
 4. Both AV valves are open and both semilunar valves are closed
76. As preload increases, ventricular myocardial contractility will _____.
77. Severing the left and right branches of the vagus nerve leading to the heart would cause cardiac output to _____.

78. A variety of events occur in the cardiac cycle when the semilunar valves are OPEN. Select the lettered answer that contains all the correct numbered events.

1. The ventricles have completed contraction
2. Blood is entering the pulmonary trunk
3. Blood is entering the left ventricle
4. The atria are in diastole
5. The ventricles are in systole
6. The AV valves are closed

1. 1,2,3,4,5, and 6
2. 1,2,4,5, and 6 only
3. 4 and 5 only
4. 4,5, and 6 only
5. None of the above

79. The "DUP" sound of the heart is due to:

1. Opening of the AV valves
2. Opening of the semilunar valves
3. Snapping shut of the AV valves
4. Snapping shut of the semilunar valves

80. As skeletal muscle activity decreases, EDV will _____.

81. Epinephrine will cause HR to _____ and SV to _____.

82. To decrease the SA node's rate of depolarization, one should electrically stimulate the _____ nerve.

83. IV infusion of epinephrine should cause:

1. Increased ESV
2. Decreased ESV
3. Increased vasodilation of blood vessels serving skeletal muscles
4. Increased myocardial contractility
5. C and d
6. B and d
7. B, c, and d

84. Immediately following the T wave in an ECG, aortic pressure will

_____.

85. Nitroprusside is a vasodilator. Does it increase or decrease the workload on the heart? Why?

Practice Questions on the Integumentary System

1. Which of the following is NOT a component of the epidermis of thin skin?
 1. Melanosomes
 2. Keratinized cells
 3. Capillaries
 4. Keratin
 5. All of the above

2. Keratohyalin granules are most apparent in which of the following layers of the epidermis?
 1. Stratum basale
 2. Stratum spinosum
 3. Stratum granulosum
 4. Stratum lucidum
 5. Stratum corneum

3. Mitotic activity in the epidermis can be observed in which of the following?
 1. Stratum basale only
 2. Stratum spinosum only
 3. Stratum basale and stratum spinosum
 4. Stratum spinosum and stratum granulosum
 5. Stratum basale and stratum granulosum

4. Which of the following cells has been implicated in playing a role in immunological reactions in the skin?
 1. Melanocyte
 2. Capillary epithelial cell
 3. Langerhans cell
 4. Hair follicle cell
 5. Arrector pili smooth muscle cell

5. Which of the following best describes sebaceous glands?

1. Apocrine
2. Holocrine
3. Merocrine
4. Endocrine

6. The basic tissue types found in the skin include:

1. Muscle
2. Nerve
3. Connective
4. Epithelium
5. All of the above
6. 2 of the above

/For the next 6 questions, use the following answer choices.

Answers can be used once, more than once, or not at all./

1. Epidermis
2. Dermis
3. Hypodermis
4. A, b, and c
5. A and b only
6. B and c only

7. Part(s) of the skin

8. Contain(s) blood vessels

9. Contains the largest number of adipocytes

10. May contain hair bulbs

/For the next 7 questions, use the following 4 answer choices.

Answers may be used once, more than once, or not at all./

1. Papillary dermis

2. Reticular dermis

3. Both a and b

4. Neither a nor b

11. Dense irregular connective tissue

12. Dense regular connective tissue

13. Location of Meissner's corpuscles

14. Contain(s) the capillaries that nourish the epidermis

15. Thicker layer

16. Contain(s) blood vessels

Practice Questions on the Lymphatic and the Immune System

1. The pharyngeal tonsils are found in the:
 1. Oropharynx
 2. Laryngopharynx
 3. Nasopharynx
 4. None of the above

2. T lymphocytes gain immunocompetence in the:
 1. Thymus
 2. Thymus for T-helper cells and Bone marrow for T-killer cells
 3. Thymus for T-killer cells and Bone marrow for T-helper cells
 4. Bone marrow

3. Antigen challenge usually occurs in the:
 1. Spleen and thymus
 2. Spleen and bone marrow
 3. Lymph nodes and thymus
 4. Spleen and lymph nodes
 5. Lymph nodes and bone marrow

4. Plasma cells and Helper T cells both secrete antibodies.
 1. This statement is true
 2. This statement is false

5. Vaccinations are an example of:
 1. Naturally-acquired active immunity
 2. Artificially-acquired active immunity
 3. Naturally-acquired passive immunity
 4. Artificially-acquired passive immunity

6. Only _____ and _____ are able to activate complement.

1. IgG and IgA
2. IgG and IgE
3. IgG and IgM
4. IgG and IgD

7. _____ are activated by antigen fragments complexed with MHC I proteins.

1. CD8 T cells
2. CD4 T cells
3. CD8 B cells
4. CD4 B cells

8. An endocardial cell from the mitral valve of the heart would be expected to exhibit:

1. Class I MHC proteins
2. Class II MHC proteins
3. Class III MHC proteins
4. None of the above

9. Which of the following antibodies is able to confer natural passive immunity?

1. IgD
2. IgE
3. IgG
4. IgM

10. The formation of an antigen-antibody complex can lead to:

1. Agglutination
2. Neutralization
3. Activation of complement
 1. I and II only
 2. II and III only
 3. I and III only
 4. I, II, and III

11. A single IgA dimer can bind _____ antigens.
12. An example of a primary lymphoid organ in humans is the:
1. Thyroid
 2. Bursa of Fabricius
 3. Thymus
 4. Pancreas
 5. 2 of the above are correct
13. Macrophages are examples of:
1. Antibody-secreting T lymphocytes
 2. Antigen-presenting cells
 3. Activated plasma cells
 4. All of the above
14. Which of the following are involved in B cell activation?
1. Antigen
 2. T-helper cell
 3. Cytokine
 4. All of the above
15. An IgG antibody and an IgM antibody that both bind to the same antigen will differ in their:
1. Constant regions
 2. Variable regions
 3. Residual regions
 4. All of the above
16. Perforins, lymphotoxins, and tumor necrosis factor are all released by:
1. T-helper cells
 2. T-suppressor cells
 3. T-killer cells
 4. All of the above
17. /True or False:/ The lag time of the secondary immune response is greater than the lag time of the primary immune response.

18. If Clare has no T-helper cells, she would have:

1. Impaired cell-mediated immunity
2. Impaired antibody-mediated immunity
3. Both a and b

19. Which of the following is true?

1. Specialized lymphatic capillaries are involved in fat absorption
2. There are lymphatic capillaries in bone marrow but not in the CNS
3. Lymphatic capillaries are less permeable than blood capillaries
4. Lymphatic vessels typically lack valves

20. Lymph formed in your right hand will eventually drain into the:

1. Left lymphatic duct
2. Right lymphatic duct
3. Thoracic duct
4. Celiac choli

21. Lymph enters the circulatory system at the junction of the:

1. Subclavian and external jugular veins
2. Subclavian and internal jugular veins
3. Subclavian and internal carotid arteries
4. Subclavian and external carotid arteries

22. Which of the following is NOT a lymphoid organ?

1. Spleen
2. Palatine Tonsil
3. Thyroid
4. Lingual Tonsil

23. Which of the following is TRUE of lymph nodes?

1. # of efferent lymphatic vessels leaving a lymph node >>> # of afferent lymphatic vessels entering a lymph node
2. Shrunken lymph nodes are always a sign of infection
3. The cortex of the lymph node can contain many B lymphocytes
4. There are approximately 30 lymph nodes in the entire body

24. Which of the following is TRUE of the spleen?
1. It's located on the right side of the stomach
 2. Its primary function is lymphocyte production
 3. A histological section of the spleen would typically contain more white pulp than red pulp
 4. It contains smooth muscle within its capsule
25. Peyer's patches are an example of:
1. GALT
 2. BALT
 3. MALT
 4. A and c
 5. B and c
26. Which of the following is true of lysozyme?
1. It's an enzyme that phagocytoses bacteria
 2. It's often found in secretions that also contain IgA antibodies
 3. It's found in saliva but not in lachrymal fluid
 4. It plays a large role in specific immunity
27. Which of the following are not phagocytes?
1. Dust cells
 2. Eosinophils
 3. Microglia
 4. Mast cells
 5. Plasma cells
28. Interferons:
1. Are released by cells that are NOT infected by a virus
 2. Cause nearby cells to synthesize a protein which inhibits protein production
 3. Are NOT released by B lymphocytes
 4. Are only released by cardiac muscle cells

29. Which of the following is NOT associated with complement?
1. Bacterial Lysis
 2. Opsonization
 3. Release of histamine by basophils
 4. All of the above are associated with complement
30. During fever, the liver and spleen tend to sequester large amounts of _____.
31. In situation A, you have the # of body cells displaying class I MHC proteins. In situation B, you have the # of body cells displaying class II MHC proteins.
1. # in A > # in B
 2. # in A < # in B
 3. # in A = # in B
32. The thymus is an example of a _____ lymphoid organ.
33. In humans, B lymphocytes typically gain immunocompetence in the:
1. Thymus
 2. Bursa of Fabricius
 3. Bone Marrow
 4. 2 of the above
34. A B lymphocyte that expresses IgD antibodies on its surface but has yet to undergo antigen challenge would be said to be:
1. Immunocompetent and Naive
 2. Immunoincompetent and Naive
 3. Totipotent and Naive
 4. Immunoincompetent and Totipotent

35. Which of the following is NOT TRUE of the secondary immune response?

1. It's faster than the primary immune response
2. It's stronger than the primary immune response
3. The antibodies made during the secondary response have a decreased affinity for the antigen compared to those made during the primary response
4. It has a greater lag time than the primary response
5. 2 of the above

36. The number of antigen binding sites on an _____ antibody is 10.

37. The only antibody that can attack the Rh complexes on fetal red blood cells is the _____ antibody.

38. The manner in which an antigen-antibody complex is eliminated is determined by the particular:

1. Binding sites on the antibody's variable region
2. Binding sites on the antibody's constant region
3. Binding sites on the antigen's variable region
4. Binding sites on the antigen's constant region

39. T cells bearing the CD4 surface glycoprotein are known as Helper T cells and only bind to antigens linked to class II MHC proteins.

1. This statement is true
2. This statement is false because helper T cells display the CD8 glycoprotein
3. This statement is false because helper T cells only bind to antigens linked to class I MHC proteins

40. Which of the following is true of cytotoxic T cells?

1. They release a chemical similar to those released by NK cells
2. They can release tumor necrosis factor
3. In order to function, they require costimulation
4. All of the above
5. 2 of the above

41. The open theory of circulation best describes our current understanding of blood circulation through which of the following?
1. Thymus
 2. Tonsillar tissues
 3. Lymph nodes
 4. Spleen
 5. Peyer's patches
42. Which of the following is characteristic of the adult thymus?
1. Peyer's patches
 2. Skeletal muscle cells
 3. Abundant adipose tissue
 4. Large size
43. Which of the following is the largest lymphoid organ?
1. Lymph node
 2. Liver
 3. Spleen
 4. Thymus
 5. Appendix
44. Which of the following best describes the importance of the blood-thymus barrier?
1. Prevent T lymphocytes from leaving the thymus
 2. Prevent B lymphocytes from entering the thymus
 3. Prevent epithelial cells from entering the circulation
 4. Prevent exposure of developing T lymphocytes to circulating antigens
 5. Provide a low oxygen environment necessary for proper T lymphocyte development

45. One function carried out by all lymphoid tissues and organs is:

1. Filtration of lymph
2. Filtration of blood
3. Extramedullary erythropoiesis
4. Lymphocyte production
5. Lymphocyte destruction

46. Plasma cells:

1. Are extremely capable of protein synthesis
2. Are located in the medullary cords of lymph nodes
3. Derive from B lymphocytes
4. Are located in the red pulp cords in the spleen
5. All of the above

Use these 6 possible choices for the next 4 questions.

1. Lymphocytes
2. Macrophages
3. Reticular cells
4. Plasma cells
5. Antigen-presenting cells

47. Nonphagocytic cells that bind antigen to their surfaces and present them to lymphocytes for recognition and stimulation.

48. Derived from blood monocytes.

49. Secrete immunoglobulins.

50. Primary cellular component of the non-immune portion of the lymph nodes and spleen.

51. Which of the following are true of lymphatic capillaries? (You may select more than one.)
1. They typically carry erythrocytes
 2. They typically carry lymphocytes
 3. They are blind-ending tubules
 4. They contain valves
 5. They have fenestrations in their walls
 6. They are more permeable than blood capillaries
52. Which of the following is the typical site of T and B cell activation?
1. Red marrow
 2. Thymus
 3. Lymph nodes
 4. Lymph vessels
 5. All of the above
53. Lymph fluid returns to the general circulation by draining into the:
1. SVC
 2. IVC
 3. Cisterna chyli
 4. Azygos and hemiazygos veins
 5. Subclavian veins
54. Nonspecific immunity includes all of the following EXCEPT:
1. Immunoglobulins
 2. Complement
 3. Interferons
 4. Neutrophils
 5. Lysozyme
55. The most abundant immunoglobulin type is:
1. IgA
 2. IgM
 3. IgF
 4. IgG

56. Complement:

1. Interferes with viral replication
2. Is involved in antibody production
3. Aids in antigen presentation
4. Causes cell lysis
5. Increases HCG production

57. Which of the following is NOT a difference between IgG and IgM?

1. IgM is a pentamer while IgG is a monomer
2. IgM is found in lower amounts in the serum
3. IgG can cross the placenta while IgM cannot
4. IgG has 2 antigen-binding sites while IgM has 10
5. IgG is made by plasma cells while IgM is not

58. In a massive allergic reaction, venous return will _____.

59. Smoking can increase the likelihood of bronchitis because it causes a(n):

1. Decrease in respiratory cilia function
2. Decrease in secretion of lysozyme by alveolar type I cells
3. Increase in respiratory cilia function
4. Increase in secretion of lysozyme by alveolar type I cells

60. Birth control pills decrease vaginal acidity; thus, birth control pills can cause the amount of vaginal flora to _____.

61. Which of the following are NOT derived from monocytes

1. Kupffer cells
2. Langerhans cells
3. Dust cells
4. None of the above

62. The cellular organelle that contains the necessary enzymes for the digestion of phagocytosed material is the:
1. Peroxisome
 2. Glyoxisome
 3. Peroxizyme
 4. Lysosome
 5. Lysozyme
63. _____ are participants in non-specific immunity that attack virally infected cells.
64. Tissue injury causes a release of _____ which results in an increased number of circulating white blood cells.
1. Leukopoiesis-inhibiting factor
 2. Leukocytosis-stimulating factor
 3. Diapedesis-inhibiting factor
 4. Erythropoietin
 5. Thromboxane A2
65. _____ inhibits the production of viral _____.
1. Interferon; nucleic acids
 2. Interferon; proteins
 3. Complement; nucleic acids
 4. Complement; cell wall polysaccharides
 5. All of the above
66. The membrane attack complex causes bacterial lysis by:
1. Inhibiting glycolytic enzymes such as hexokinase
 2. Interfering with the distribution of ions across the plasma membrane
 3. Causing the transcription of genes that promote apoptosis
 4. Disrupting the pentose phosphate pathway
67. As the opsonization of a bacterium increases, the likelihood of it being phagocytosed will _____.

68. An increase in body temperature helps repel pathogens by:
1. Increasing the rate at which WBC's can be mobilized
 2. Accelerating repairs
 3. Inhibiting pathogen growth
 4. All of the above
69. _____ is a key component of our physical barrier to invasion because it is highly resistant to bacterial enzymes and toxins.
1. Clathrin
 2. Keratin
 3. Caratin
 4. Hyaline
70. Complement is involved with both specific and nonspecific immunity.
1. This statement is TRUE
 2. This statement is FALSE
71. In the absence of a viral invasion of the body, would you expect interferon to be released?
1. YES
 2. NO
72. Lymph differs from capillary blood in which of the following?
1. Location
 2. Protein content
 3. Cell content
1. I and II only
 2. I only
 3. I and III only
 4. I, II, and III

73. Lymphatic capillaries are:

1. Found in the abdominopelvic cavity
2. Involved in fat absorption
3. Highly permeable
4. All of the above
5. 2 of the above

74. The volume of lymph typically drained by the right lymphatic duct is GREATER than the volume of lymph typically drained by the thoracic duct.

1. This statement is TRUE
2. This statement is FALSE

75. All lymphoid organs are totally encapsulated.

1. This statement is TRUE
2. This statement is FALSE

76. As respiratory rate and depth increases, lymph flow rate will _____.

77. Splenic cords:

1. Consist of white pulp primarily
2. Are avascular
3. Primarily serve an immune function
4. Consist of a large number of macrophages perched upon reticular fibers

78. The thymus:

1. Of an adult has more adipose tissue than the thymus of an infant
2. Secretes thymosin and erythropoietin
3. Is involved primarily with B lymphocyte maturation
4. Is where T lymphocytes become immunocompetent
5. 2 of the above

79. The pharyngeal tonsil is:

1. Found beneath the tongue
2. Called the adenoids when enlarged
3. Found on the anterior wall of the nasopharynx
4. A totally encapsulated lymphoid organ
5. All of the above
6. 2 of the above

80. An aggregate of lymphoid follicles in the respiratory tract is an example of:

1. MALT
2. GALT
3. BALT
4. A and b
5. A and c

81. A(n) _____ is a molecule that is too small to cause an immune response on its own but becomes antigenic when coupled to another molecule.

82. Cellular immunity is primarily the function of:

1. B lymphocytes
2. T lymphocytes
3. A and b
4. Neither a nor b

83. Lymphatic vessels resemble arterioles more than they resemble veins.

1. This statement is TRUE
2. This statement is FALSE

84. The only unpaired lymphatic trunk is the:

1. Lumbar
2. Bronchomediastinal
3. Subclavian
4. Intestinal
5. Jugular

85. _____ is released from basophils and mast cells and causes _____.

1. Histamine; vasoconstriction
2. Histamine; vasodilation
3. Leukotriene; vasoconstriction
4. Leukotriene; vasodilation

Practice Questions on the Muscular System

1. Which of the following cell types is responsible for skeletal muscle regeneration?
 1. Myoepithelial cell
 2. Myofibril
 3. Satellite cell
 4. Myofibroblast
 5. Fibroblast

2. How many T-tubules lie within a single skeletal muscle sarcomere?
 1. 1
 2. 2
 3. 3
 4. 4

3. Sarcoplasmic reticulum is the name given to which of the following?
 1. Rough endoplasmic reticulum in smooth muscle cells
 2. Smooth endoplasmic reticulum in cells of the epimysium
 3. Smooth endoplasmic reticulum in all muscle cells
 4. Rough endoplasmic reticulum in cardiac muscle cells

4. The connective tissue layer that bundles skeletal muscle fibers into fascicles is the:
 1. Perichondrium
 2. Perineurium
 3. Perimysium
 4. Epimysium
 5. Endomysium

5. An overlap of actin and myosin filaments occurs in the:
 1. A Band
 2. I Band
 3. Z Line
 4. H Band
 5. M Line

6. In skeletal muscle, a triad refers to which of the following?
 1. A T tubule sandwiched between 2 dilated cisternae of the sarcoplasmic reticulum
 2. A Z line flanked by 2 A bands
 3. An A band flanked by 2 I bands
 4. An H zone flanked by 2 A bands
 5. A Z line flanked by 2 sarcomeres

7. Which of the following does not describe skeletal muscle fibers?
 1. Striated
 2. Typically voluntary
 3. Multinucleate
 4. Branched

8. Intercalated disks:
 1. Are found only in smooth muscle
 2. Are found in skeletal and cardiac muscle
 3. Are part of the neuromuscular junction in bipennate muscles
 4. Are located at the M line
 5. Contain desmosomes and gap junctions

9. Motor units:
 1. Are found only in cardiac muscle
 2. Are largest in muscles responsible for delicate movements
 3. Consist of a muscle fiber and all the nerves that supply it
 4. Consist of a motor neuron and all the muscle fibers it supplies
 5. Are the same as neuromuscular junctions

10. The cell type least likely to contain more than one nucleus is a(n):

1. Skeletal muscle fiber
2. Osteoclast
3. Cardiac muscle cell
4. Smooth muscle cell

/For the next 5 questions, use the following 4 choices.

Answers may be used once, more than once, or not at all./

1. Epimysium
2. Perimysium
3. Endomysium
4. None of the above

11. Surrounds individual myofilaments

12. Surrounds whole named muscles

13. Surrounds individual fascicles

14. Surrounds individual muscle fibers

15. The connective tissue wrapping around a muscle that is continuous with tendons is the:

1. Perimysium
2. Endomysium
3. Epimysium
4. Ectomysium

16. In muscle tissue, neurotransmitter receptors are located:

1. In synaptic vesicles
2. On the motor neuron axon terminals
3. In the synaptic cleft
4. On the motor end plate

17. An action potential is:

1. A migrating region of membrane potential reversal
2. A flow of electrons along the sarcolemma
3. A nucleophilic reaction between Na and K ions
4. Something that is only caused by acetylcholine

18. Acetylcholinesterase:

1. Produces acetylcholine
2. Is the acetylcholine receptor in muscle tissue
3. Is responsible for smooth but not skeletal muscle contraction
4. Degrades the neurotransmitter which is found in the neuromuscular junction

19. Tetanus toxin causes convulsive paralysis by:

1. Blocking acetylcholine from binding to the muscarinic acetylcholine receptor
2. Inhibiting acetylcholinesterase
3. Causing motor neurons to release massive amounts of acetylcholine
4. Blocking acetylcholine from being released by motor neurons

20. A person suffering from nerve gas exposure is given atropine to counter the effects because:

1. Atropine will bind to and electrophilically inactivate the nerve gas
2. Atropine blocks the nerve gas receptor
3. Atropine blocks the acetylcholine receptor which prevents the lingering excess ACh from having adverse effects
4. Atropine inactivates acetylcholinesterase

21. Which of the following is NOT TRUE?

1. All muscle tissue is contractile
2. Skeletal muscle is voluntary but smooth muscle is not
3. Superficial fascia holds skin to muscle
4. Muscles use the skeleton as leverage points as they push against bones to produce body movement

22. Skeletal muscle is described by all of the following EXCEPT:
1. Striated
 2. Voluntary
 3. Multinucleate
 4. Autorhythmic
 5. Contractile
23. The walls of hollow organs and some blood vessels contain this type of muscle tissue.
1. Striated
 2. Skeletal
 3. Cardiac
 4. Voluntary
 5. Smooth
24. Which of the following is unique to cardiac muscle tissue?
1. Involuntary
 2. Striated
 3. Non-striated
 4. Contains actin AND myosin
 5. Contains intercalated disks
25. Approximately, what percentage of heat is generated by muscle tissue?
1. 15%
 2. 35%
 3. 65%
 4. 85%
 5. 95%
26. A muscle fascicle is a bundle of:
1. Myofibrils
 2. Sarcomeres
 3. Fibers
 4. Muscles
 5. Muscle cells
 6. 2 of the above

27. The smallest contractile unit in a skeletal muscle fiber is a _____.

28. The major regulatory proteins in muscle tissue are:

1. Myosin and tropomyosin
2. Myosin and actin
3. Actin and rhodopsin
4. Troponin and tropomyosin
5. Calmodulin and keratin

29. Which of the following actions is caused by skeletal muscle?

1. Vasoconstriction
2. Vasodilation
3. Pupillary dilation
4. Eye movements
5. Heartbeat

30. Which of the following does NOT occur in a muscle during a contraction?

1. Thick and thin filaments interact
2. Muscle fibers stretch
3. Thick and thin filaments "slide" past one another
4. Muscle fibers shorten

31. This process aids in skeletal muscle relaxation after contraction.

1. Ca^{2+} is released from intracellular storage sites
2. Motor neurons send electrical signals to muscle fibers
3. Acetylcholinesterase synthesizes acetylcholine
4. Troponin binds Ca^{2+}
5. None of the above

32. The stiffness of muscle tissue in rigor mortis partially results from excessive:
1. ACh activity on muscle
 2. Ca²⁺ release in muscle
 3. Lactic acid build up
 4. Fiber contraction
 5. All of the above
33. A single motor neuron may innervate as few as 3 fibers in the muscles of the:
1. Brachial region
 2. Eye
 3. Anterior cervical region
 4. Gingiva
 5. Calf
34. When an AP reaches the presynaptic terminal of the motor neuron:
1. Calcium is released into the muscle fiber
 2. ACh is released into the synaptic cleft
 3. AChase is released into the synaptic cleft
 4. Calcium is released from the motor neuron nucleus
35. Lack of AChase in the synaptic cleft would result in:
1. Excessive, continuous stimulation of the muscle fiber
 2. Relaxation of the muscle fiber
 3. Increased Na⁺ synthesis by the muscle fiber
 4. Inability of the motor neuron to conduct further action potentials
36. The toxin curare blocks the ACh receptors on muscle tissue. This would result in:
1. Increased stimulation of the muscle fiber
 2. Increased contractile strength of the muscle fiber
 3. Nonconsecutive eccentric contractions
 4. Excessive contractions
 5. Inability of muscle to respond to the motor neuron stimulus

37. Jogging, swimming, and aerobics all have this effect on skeletal muscle tissue.
1. Increased # of mitochondria per muscle cell
 2. Increased # of muscle fibers
 3. Increased # of motor units
 4. Decreased # of skeletal muscle fibers
 5. None of the above
38. Muscular dystrophy is a congenital disorder characterized by:
1. Skeletal muscle degeneration
 2. Excessive convulsions
 3. Compulsive muscle spasms
 4. Smooth muscle hypertrophy
39. Anabolic steroids have all these effects EXCEPT:
1. Muscle protein synthesis
 2. Increased muscular strength
 3. Increased number of muscles in the body
 4. Possible liver cancer
 5. Possible testicular atrophy
40. Which of the following statements regarding aging and the muscular system is true?
1. Aging is associated with decreased myoglobin production
 2. Effects of aging can be nearly reversed
 3. The satellite cells will differentiate into motor neurons when an individual is advanced in age
 4. Youngsters have more adipocytes in muscle tissue than the elderly

/In the following 4 questions, choose whether the characteristic applies to single unit smooth muscle and/or to multi-unit smooth muscle./

41. Gap Junctions
42. Pacemaker potential
43. Fiber recruitment
44. ANS innervation

Practice Questions on the Nervous System

1. Which of the following statements is TRUE?
 1. Peripheral nerve is similar to smooth muscle in terms of the connective tissue investment
 2. Most nerves contain afferent and efferent fibers and thus carry both motor and sensory signals
 3. Nodes of Ranvier are most easily seen in cross-section of peripheral nerve
 4. None of the above

2. Which of the following cells is responsible for myelin formation in the peripheral nervous system?
 1. Astrocyte
 2. Oligodendrocyte
 3. Schwann cell
 4. Microglial cell
 5. Satellite cell

3. The perineurium is the connective tissue layer:
 1. Surrounding an entire nerve
 2. Surrounding individual axons in the CNS
 3. Surrounding individual axons in the PNS
 4. Surrounding fascicles of axons in the CNS
 5. Surrounding fascicles of axons in the PNS

4. The peripheral nervous system includes the:
 1. Somatic nervous system
 2. Brain
 3. Spinal cord
 4. Nuclei

5. The system that controls smooth muscle, cardiac muscle, and gland activity is the:

1. Somatic nervous system
2. Autonomic nervous system
3. Skeletal division
4. Sensory nervous system

6. A neuron with many short dendrites and a single long axon is a:

1. Multipolar neuron
2. Bipolar neuron
3. Unipolar neuron
4. None of the above

7. Most sensory neurons are _____ neurons.

1. Unipolar
2. Bipolar
3. Multipolar
4. Efferent
5. A and b
6. A and c
7. B and c

8. Cells found in the choroid plexus that secrete cerebrospinal fluid are:

1. Astrocytes
2. Microglia
3. Ependymal cells
4. Oligodendrocytes
5. Schwann cells

9. The most likely type of fiber that would carry the impulse for a withdrawal reflex would be a(n):

1. A fiber because they carry the strongest action potentials
2. A fiber because they carry APs the fastest
3. B fiber because they carry APs the fastest
4. C fiber because they carry the strongest APs

10. Axons within nerves may have which of the following associated with them?

1. Schwann cells
2. Nodes of Ranvier
3. Oligodendrocytes
4. A and b
5. All of the above

11. Action potentials are conducted more rapidly in:

1. Small diameter axons than large diameter axons
2. Large diameter axons than small diameter axons
3. Unmyelinated axons than myelinated axons
4. Axons that lack a wrapping of Schwann cells

12. Clusters of nerve cell bodies within the PNS are called

_____.

13. Gray matter contains primarily:

1. Myelinated fibers
2. Neuron cell bodies
3. Schwann cells
4. All of the above

14. Arrange the following connective tissue structures from the outermost to the innermost.

1. Endoneurium
2. Epineurium
3. Perineurium

15. Neurotransmitters are stored in vesicles that are located primarily in specialized portions of the:

1. Soma
2. Axon
3. Dendrite
4. Perikaryon

16. An inhibitory neuron could affect the neuron with which it synapses by:

1. Producing an IPSP within the neuron
2. Hyperpolarizing the neuron
3. Increasing K⁺ efflux from the neuron
4. Increasing Cl⁻ influx into the neuron
5. All of the above
6. 2 of the above

17. Summation:

1. Is caused by a combining of several local potentials
2. Can occur when 2 action potentials arrive simultaneously at 2 different presynaptic terminals
3. Can occur when 2 action potentials arrive in very close succession at a single presynaptic terminals
4. All of the above

18. Which of the following organelles is responsible for the appearance of Nissl bodies in the cell bodies of motor neurons?

1. Smooth endoplasmic reticulum
2. Rough endoplasmic reticulum
3. Golgi apparatus
4. Mitochondria
5. Basal bodies

19. Which of the following structures is a component of a reflex arc?

1. Afferent neuron
2. Efferent neuron
3. Sensory receptor
4. Effector organ
5. All of the above

20. A convergent circuit:
1. Is a positive feedback system that produces many action potentials
 2. Is a negative feedback system that produces IPSPs
 3. Occurs when multiple neurons synapse onto few neurons
 4. Cannot be affected by a sodium channel blocker
 5. All of the above
21. The output of a convergent circuit could be:
1. An IPSP
 2. An EPSP
 3. An action potential
 4. All of the above
22. Which of the following is TRUE of the perineurium?
1. It's a fascia surrounding many bundles of nerve fibers
 2. It's a layer of connective tissue surrounding a single bundle (fascicle) of nerve fibers
 3. It's a thin layer of reticular fibers covering individual nerve fibers
 4. It's an artery-rich fascia covering the external coat of nerves
23. Which of the following is TRUE of the sympathetic nervous system?
1. It's voluntarily controlled via the forebrain
 2. It's voluntarily controlled via the reticular formation
 3. It uses different neurotransmitters at the ganglion and at the synaptic cleft
 4. It's a subdivision of the somatic nervous system
24. Santiago Ramon y Cajal proposed that neurons were dynamically polarized. By this he meant that excitation only spread in one direction along a neuron. In which part of the neuron did he imagine that the excitation began and in which direction did it spread?
25. Can neuroglial cells transmit action potentials from one nerve cell to another?

26. What is the difference between grey and white matter of the CNS?

27. What are the events whose frequency is being modulated to transmit information through the nervous system?

In the rabbit CNS, you discover a neuron which, when stimulated, makes the animal irritable. This cell only receives 2 synaptic inputs, from sensory neurons in each of the ears. When each ear is scratched separately, the animal is relaxed. When the ears are scratched at the same time, the animal becomes irritable.

28. Is this an example of spatial or temporal summation?

29. You then discover that carrots contain a hormone, which opens potassium channels in neurons. What effect do you think that eating carrots would have on irritability in rabbits?

In many patients who've had a stroke, portions of the CNS become damaged, leading to behavioural or cognitive abnormalities. What kind of behavioural or cognitive problems would you expect to observe in patients with damage to the following brain areas.

30. Hypothalamus

31. Cerebellum

32. Superior colliculus

33. The somatic nervous system is part of the:

1. Sympathetic nervous system
2. Parasympathetic nervous system
3. Autonomic nervous system
4. 2 of the above
5. None of the above

34. Effector organs of the ANS include all of the following EXCEPT:
1. Medulla oblongata
 2. Arteriolar smooth muscle
 3. Heart
 4. Visceral smooth muscle
 5. Glands
35. Some of the nerves that innervate lymph nodes have been discovered to be adrenergic (i.e., they release norepinephrine). This suggests that the:
1. Parasympathetic nervous system may influence lymph node activity
 2. Parasympathetic nervous system does NOT influence lymph node activity
 3. Sympathetic nervous system must exert the only nervous control of lymph nodes
 4. Sympathetic nervous system may influence lymph node activity
36. The effector pathway of the ANS generally contains ____ neuron(s).
1. 1
 2. 2
 3. 3
 4. 4
37. All preganglionic autonomic neurons secrete:
1. Epinephrine
 2. Acetylcholine
 3. Nicotine
 4. Dopamine
38. All postganglionic neurons bear these receptors.
1. Alpha adrenergic
 2. Beta adrenergic
 3. Nicotinic
 4. Muscarinic

39. The parasympathetic nervous system affects all of these organs EXCEPT:

1. Heart
2. Pupillary smooth muscles
3. Salivary glands
4. Adrenal glands

40. Sympathetic stimulation of the iris causes:

1. Astigmatism
2. Pupillary constriction
3. Pupillary dilation
4. Vitreous secretion
5. Decreased glucose reduction in iris smooth muscle

41. Cone cells are photoreceptors that respond to:

1. Low light levels
2. Red light ONLY
3. Light reflected from distant objects
4. Light with wavelengths greater than 2500nm
5. Colored light

42. The region where the lens focuses the image onto the retina is the:

1. Optic nerve
2. Fovea
3. Pupil
4. Blind spot
5. Infundibulum

43. The fluid that fills the posterior chamber of the eye is the:

1. Lachrymal fluid
2. Lacrimal fluid
3. Aqueous humor
4. Choroid humor
5. Vitreous humor

44. The major light absorbing pigment in retinal photoreceptors is:
1. Rhodopsin
 2. Cone opsin
 3. Melanin
 4. Asparagine
 5. Mesophyll
45. Photoreceptors release more neurotransmitters in (bright light - darkness/).
46. The brain and the spinal cord comprise the _____ nervous system. All nerves of the body residing outside of the brain and spinal cord comprise the _____ nervous system.
47. Sensory neurons are _____ neurons while _____ neurons carry motor impulses. The most common type of neuron is the _____ which communicates from one neuron to another.
48. The branch of the ANS that induces the "fight or flight" response is the _____ division.
49. The cells that support, protect, and nourish the neurons are the _____.
50. The cell body of a neuron is known as the _____.
51. Long extensions off neuronal cell bodies that conduct impulses away from the cell body are _____.
52. The dark granular substance inside neuronal cell bodies is called _____ and is composed of dense collections of _____ which are the sites of _____.
53. _____ are cells that electrically insulate axons in the CNS. The insulation is composed of _____.

54. _____ is a CNS disease where the _____ of motor neurons is degenerating or being destroyed, which interferes with neuronal impulses. This is a progressive disease that causes widespread motor deficits.
55. _____ cells are specialized epithelial cells in the CNS that produce cerebrospinal fluid.
56. Positively charged ions are known as _____ while negatively charged ions are _____.
57. On the inner surface of a resting neuron's cell membrane, there is an accumulation of _____.
58. In electrical terms, potential is synonymous with _____.
59. An excitable cell is one that can quickly and dramatically change its membrane potential. 2 examples of excitable cells are _____ and _____.
60. The typical neuron resting membrane potential measures approximately _____.
61. A neuronal impulse may also be called a(n) _____ which indicates that it is a "moving" region of "voltage change" that migrates along the neuronal cell membrane.
62. There is a greater concentration of _____ ions accumulating on the outer surface of resting neuronal membranes than on the inner surface.
63. The 2 ways an ion may passively travel thru a membrane are through _____ channels and gated channels which are typically _____-gated or _____-gated.

64. The Na⁺/K⁺ pump operates by pumping _____ ions out of the cell while pumping _____ ions into the cell.
65. Voltage-gated ion channels open in response to changes in the _____.
66. Neurotransmitters bind to specific _____ on the neuronal cell surface. This binding will trigger the opening of ion channels that cause a temporary change in the local membrane potential. Such a transient, local change is called a _____.
67. When cations flow into a neuron, the membrane potential becomes _____ positive and _____ negative.
68. Voltage-gated sodium channels are triggered to open when the resting membrane potential reaches about _____ which is referred to as the _____ potential.
69. A massive sodium influx causes _____.
70. _____ is an example of a drug that blocks the opening of Na⁺ channels, thus blocking the initiation of neuronal action potentials.
71. After the first phase of the action potential, the _____ channels become inactivated while the _____ channels begin to open. This occurs when the membrane potential reaches about +30mV. The opening of these channels results in K⁺ _____. This is known as _____.
72. The refractory period of an AP causes that region of the membrane to be _____ to another stimulus. This ensures that APs migrate in only one direction, namely, away from the _____.
73. Overall, 2 important factors drive the movement of Na⁺ and K⁺ across cell membranes. These are the _____ gradient and the _____ gradient.

74. For any given neuron, all APs are of the same intensity. This is referred to as the _____ principle. In order to alter the perceived intensity of a given stimulus, the _____ of APs is increased.
75. APs travel fastest in axons that have a _____ diameter and are _____. The fastest neuronal axon fibers are A type fibers which carry _____ and _____ motor signals. The slowest fibers are the C-type fibers which are of _____ diameter and are _____.
76. At the axon terminals, voltage-gated _____ channels open in response to the arriving AP. This triggers _____ to fuse with axon terminal membrane and release the _____ into the _____.
77. Most neurons in the CNS communicate with _____ of other neurons.
78. The small extensions off the neuronal cell bodies that receive stimuli are the _____.
79. Small, variable-intensity, transient changes in membrane potential that move the potential closer to threshold are known as _____. While small, variable-intensity, transient changes that move the potential farther from threshold are _____.
80. _____ is a common inhibitory neurotransmitter in the CNS.
81. Movement of Cl⁻ into a neuron would make a neuron _____ likely to fire an AP.
82. A sympathetic preganglionic fiber is (/myelinated, unmyelinated/), (/short, long/), and (/cholinergic, adrenergic/).
83. From which segments of the spinal cord do sympathetic preganglionic neurons originate?

84. /True or False/; Sympathetic ganglia are NOT paravertebral.

85. Sympathetic postganglionic fibers are long, myelinated and adrenergic. (/True or False/)

86. Norepinephrine is released by most postganglionic sympathetic neurons. Name the exceptions - i.e., the ones that release acetylcholine.

For each of the following, indicate the branch of the efferent nervous system, the neurotransmitter, and all of the following effector organ responses. (No need to consider receptors in any ganglia.)

87. Increased blood flow to skeletal muscles

88. Decreased pupil diameter

89. Skeletal muscle contraction

90. Decreased heart rate

91. Sweating

92. Saliva secretion

93. Increased intestinal secretions

94. Decreased intestinal motility

95. Decreased diameters of respiratory airways

96. Consider the concept of dual innervation and the fact that an ANS effector pathway has 2 neurons. If you administer atropine (a muscarinic antagonist) i.v. followed by a high dose of ACh, you see an increase in heart rate. Where is the ACh acting?
97. You administer ACh to patient and observe the change in heart rate. You then administer hexamethonium (a nicotinic antagonist) followed by the same dose of ACh and observe no change in the original response to the ACh. Why not?
98. As the frequency of action potentials on a preganglionic sympathetic nerve increases, the frequency of action potentials on a postganglionic nerve _____.
99. During a fight-or-flight response, the diameter of the pupil of the eye _____.
100. Parasympathetic activity causes the activity of the gastrointestinal organs to _____.
101. Chlorine entry into a cell as a result of binding of glycine will result in an...
102. If a neuron synapses on a striated muscle, would it be myelinated?

Practice Questions on the Reproductive System

1. The main hormone released by the corpus luteum is _____.
2. The hormone that acts on Leydig cells is _____.
3. _____ is the main hormone produced by granulosa cells.
4. /True or False:/ The cremaster muscles actively regulate the number of sperm made on a daily basis.
5. Human egg and sperm are similar in that:
 1. About the same number are produced per month
 2. They have the same degree of motility
 3. They have the same number of chromosomes
 4. They are about the same size
6. The testosterone-producing cells of the testes are called:
 1. Sertoli cells
 2. Granulosa cells
 3. Spermatogonia
 4. Leydig cells
7. The testicular cells most involved with the construction of the blood-testes barrier are the:
 1. Sertoli cells
 2. Granulosa cells
 3. Spermatogonia
 4. Leydig cells
8. The soft mucosal lining of the uterus is the _____.
9. The anterior pituitary hormone that triggers ovulation is:
10. The fetus develops and grows in the _____.

11. The external sac enclosing the testes is the _____.
12. _____ is the release of the secondary oocyte from the ovary.
13. The corpora cavernosa are(n):
14. The female homologue of the scrotum is the _____.
15. Ejaculation is a _____ response whereas erection is a _____ response.
16. An oocyte surrounded by one layer of squamous follicle-like cells is most likely a:
1. Primordial follicle
 2. Primary follicle
 3. Secondary follicle
 4. Graafian follicle
17. An antrum is characteristic of _____ follicles.
1. Secondary
 2. Graafian
 3. Primary
 4. Primary, secondary, and Graafian
 5. Secondary and Graafian
18. /True or False:/ An ectopic pregnancy occurs when a secondary oocyte is fertilized in and implants in the uterine tube.
19. The rounded region of the uterus superior to the entrance of the uterine tubes is the:
1. Ampulla
 2. Fundus
 3. Corpus
 4. Isthmus
 5. Superior flexure

20. Primary oocytes are:

1. Haploid
2. Diploid
3. Polyploid
4. Aneuploid

21. Consider the following 3 tubes. Which is the correct order sperm travels through them.

1. Epididymis
2. Oviduct
3. Ejaculatory Duct

1. 1,3,2
2. 3,1,2
3. 2,1,3
4. 2,3,1

22. During menstruation, the stratum _____ is sloughed off.

23. /True or False:/ Days 1-5 of the menstrual cycle is the proliferative phase.

24. The corpus luteum secretes progesterone which negatively feeds back and inhibits the release of:

1. ABP and ICSH
2. LH and ICSH
3. LH and FSH
4. FSH and TSH

25. Which of the following is correct relative to the female anatomy?

1. The vaginal orifice is the most dorsal of the 3 openings in the perineum
2. The urethra is between the vaginal orifice and the anus
3. The anus is between vaginal orifice and the urethra
4. The urethra is the more ventral of the 2 openings in the vulva

26. The normal diploid number of human chromosomes is _____.

27. Sertoli cells produce:

1. Mucus
2. Androgen-binding protein
3. Testosterone
4. FSH
5. LH

28. Spermatogenesis BEGINS in the:

1. Epididymis
2. Uterine horn
3. Rete testes
4. Seminiferous tubules
5. Seminal vesicles

29. The site of oogenesis is the:

1. Ovary
2. Ovum
3. Oocyte
4. Oviduct
5. Ovarian lacunae

30. In the 1st phase of the menstrual cycle:

1. Oogonia differentiate into primary oocytes
2. The thickness of the stratum basalis decreases dramatically
3. The Graafian follicle ruptures
4. The dominant follicle is opsonized
5. None of the above

31. During ovulation, all of the following occur EXCEPT:

1. Rupture of the Graafian follicle
2. Estrogen production reaches its lowest point
3. FSH and LH plasma levels surge
4. Corpus luteum is formed

32. Which of the following would be the most likely site of fertilization?

1. Ovary
2. Uterine tube
3. Fundus of uterus
4. Cervix
5. Vagina

33. Human chorionic gonadotropin:

1. Begins to be produced 4 months after fertilization
2. Is produced by the prostate gland
3. Is produced by the corpus luteum
4. Is present ONLY if a successful fertilization has occurred
5. Signals that endometriosis has begun

Practice Questions on the Respiratory System

1. What type of epithelium would you expect to find lining the lumen of the nasal cavity?
 1. Squamous ciliated epithelium without goblet cells
 2. Transitional epithelium with goblet cells
 3. Stratified squamous epithelium
 4. Pseudostratified epithelium
 5. None of the above

2. The groove inferior to a nasal concha is known as a:
 1. Meatus
 2. Papilla
 3. Eustachian groove
 4. Lithysis
 5. Suture

3. Consider the following statement:/All laryngeal cartilages are made of hyaline cartilage/. Which of the following is correct?
 1. The statement is true
 2. The statement is false because the thyroid cartilage is elastic cartilage
 3. The statement is false because the cricoid cartilage is fibrocartilage
 4. The statement is false because the glottis is elastic cartilage
 5. The statement is false because the epiglottis is elastic cartilage

4. The medial opening between the vocal cords through which air passes during speech is known as the _____.

5. Which of the following is TRUE?

1. The trachea is reinforced by 60-80 C-shaped rings of cartilage
2. The trachealis is the ligament that connects the posterior open portion of the tracheal cartilaginous rings
3. The trachea is part of the respiratory zone
4. The trachea is part of the anatomical dead space

6. As you proceed from primary bronchus to terminal bronchiole, the number of cilia present will _____ and the number of goblet cells present will _____.

7. The smallest subdivision of the lung visible to the naked eye is the _____.

8. Increased parasympathetic activity causes the resistance to airflow in the bronchioles to _____.

9. Which of the following is TRUE?

1. Intrapleural pressure is ALWAYS GREATER than intrapulmonary pressure
2. Intrapulmonary pressure is ALWAYS GREATER than atmospheric pressure
3. Intrapleural pressure is ALWAYS LESS than atmospheric pressure
4. Intrapulmonary pressure is ALWAYS LESS than atmospheric pressure

10. According to Boyle's Law, as volume _____, pressure will decrease.

11. Contraction of the diaphragm and external intercostals causes thoracic volume to _____ which causes lung volume to _____ which causes intrapulmonary pressure to _____.

12. The scalenes and sternocleidomastoids are predominantly involved in:

1. Active inspiration
2. Active expiration
3. Quiet inspiration
4. Quiet expiration

13. As surfactant production decreases, lung compliance will _____.

14. If John's vital capacity is 4.5L and his tidal volume is 525cc, then what is his inspiratory reserve volume?

1. 3975mL
2. 2075mL
3. 1050mL
4. Cannot be determined from the information given

15. What test measures the amount of gas expelled when one takes a deep breath and exhales maximally and rapidly?

1. Forced expiratory volume test
2. Forced vital capacity test
3. Forced residual capacity test
4. Forced internal thoracic volume assessment

16. Which of the following is NOT a component of the respiratory membrane?

1. Plasma membrane of the alveolar cell
2. Plasma membrane of the capillary endothelial cell
3. Fused basal laminae of the alveolar and the capillary endothelial cell
4. All of the above are members of the respiratory membrane

17. If alveolar P_{CO_2} is high, the diameter of the bronchiole servicing that tissue will _____.

18. The binding of oxygen to hemoglobin is characterized as:

1. Compliant
2. Irreversible
3. Reversible
4. Noncompliant

19. When a bicarbonate ion exits a red blood cell, a chloride ion will enter in order to maintain charge balance. This is known as the _____

20. The dorsal respiratory group of the medulla oblongata is active during:

1. Quiet inspiration
2. Forced inspiration
3. Forced expiration
4. a and b
5. b and c

21. /True or False:/ Lowered plasma oxygen levels are the most powerful respiratory stimulant.

22. Air and food are routed into the proper channels by the:

1. Trachea
2. Pharynx
3. Larynx
4. Carina

23. Total lung capacity is equal to:

1. Vital capacity x Tidal volume
2. Functional residual capacity + Expiratory reserve volume
3. Anatomical dead space + Alveolar dead space
4. Residual volume + Vital capacity

24. Which of the following has the greatest surface area for exchange?

1. Pulmonary veins
2. Alveoli
3. Respiratory bronchioles
4. Terminal bronchioles

25. Select the correct statement about O₂ transport in the blood.
1. During normal activity, a molecule of Hb returning to the lungs contains one molecule of oxygen
 2. As pH decreases, oxygen's affinity for Hb increases
 3. A 50% oxygen saturation level of blood returning to the lungs might indicate a higher activity level than normal
 4. All of the above
 5. None of the above
26. Respiratory control centers are located in the _____ and _____.
27. Oxygen and carbon dioxide are exchanged through all cell membranes by _____.
28. The total pressure exerted by a mixture of gasses is (/equal to, greater than, lesser than/) the sum of the individual partial pressures of gases in the mixture.
29. The first portion of the respiratory zone is the _____.
30. /True or False:/ Internal respiration is O₂ loading and CO₂ unloading between the blood of the pulmonary capillaries and the air of the alveoli.
31. As alveolar dead space increases, alveolar ventilation will _____.
32. The presence of air in the interpleural space is known as _____.

33. Which of these values would normally be the highest?
1. Tidal Volume
 2. Inspiratory Reserve Volume
 3. Expiratory Reserve Volume
 4. Residual Volume
 5. Vital Capacity
34. Most CO₂ is transported in the blood in the form of:
1. Dissolved gas
 2. Carbaminohemoglobin
 3. Bicarbonate ion
 4. Carboxyhemoglobin
35. Rank the following in terms of diameter.
1. Alveolar Duct
 2. Tertiary Bronchus
 3. Trachea
 4. Secondary Bronchus
36. As plasma Pco₂ increases, plasma pH will _____.
37. As plasma Pco₂ increases, both the rate and depth of respiration will _____.
38. Which of the following is true?
1. The thyroid cartilage is the smallest of the laryngeal cartilages
 2. The cricoid cartilage is inferior to the thyroid cartilage
 3. The laryngeal prominence is part of the cuneiform cartilage
 4. The laryngeal prominence is larger in females than in males
 5. There are 4 pairs of cartilage and 1 unpaired cartilage in the larynx

39. Stimulating the cephalic end of a cut vagus nerve would cause respiration to:
1. Cease because of the lung stretch receptor reflex
 2. Increase in rate because of the increased activity of the dorsal respiratory group
 3. Increase in depth because of the increased sympathetic activity
 4. None of the above
40. Which of the following cells produce surfactant in lung alveoli?
1. Endothelial cells
 2. Clara cells
 3. Type I cells
 4. Type II cells
 5. Dust cells
41. Progressing from the nasopharynx to the lung, alveoli are first encountered in which of the following?
1. Trachea
 2. Bronchiole
 3. Terminal bronchiole
 4. Respiratory bronchiole
 5. Alveolar duct
42. Which of the following structures does not have cartilage associated with it?
1. Bronchiole
 2. Bronchi (small)
 3. Bronchi (large)
 4. Trachea
 5. Larynx

43. Which of the following would not be seen in a cross-section of a trachea?

1. Perichondrium
2. Elastic cartilage
3. Lamina propria
4. Dense connective tissue
5. Lymphoid nodules

44. Goblet cells are absent from which of the following regions of the respiratory system?

1. Nasopharynx
2. Larynx
3. Trachea
4. Bronchi
5. Terminal Bronchioles

45. The loudness of a person's voice depends on:

1. The thickness of the vestibular folds
2. The length of the vocal folds
3. The strength of the intrinsic laryngeal muscles
4. The force with which air rushes through the glottis
5. The thickness of the true vocal folds

46. Surfactant causes alveolar surface tension to _____

47. Inspiratory capacity is:

1. The total amount of air that can be inspired after a tidal expiration
2. The total amount of exchangeable air
3. Another name for functional residual capacity
4. The amount of air inspired after a tidal inspiration
5. A and c are correct

48. The most powerful respiratory stimulant in a healthy person is:

1. Decreased tissue [oxygen]
2. Increased plasma P_{CO_2}
3. Increased CSF pH
4. Decreased CSF pH

49. Which of the following changes occur as conducting tubes become smaller?

1. Cartilage rings are replaced by irregular cartilage plates
2. Mucosal epithelium changes
3. Smooth muscle content increases
4. All of the above
5. 2 of the above

50. A premature baby usually has trouble breathing. However the respiratory system is completely developed by:

1. 17 wks
2. 22 wks
3. 24 wks
4. 28 wks
5. 20 wks

51. The nose serves all the following functions except:

1. Passageway for air movement
2. Initiator of the cough reflex
3. Warming and humidifying inspired air
4. Cleansing inspired air
5. Providing resonance for speech production

52. Possible causes of hypoxemia include:

1. Decreased atmospheric oxygen content
2. Tracheal obstruction
3. Pneumonia
4. A and b are correct
5. A, b, and c are correct

53. Tidal volume is air:

1. Remaining in the lungs after forced expiration
2. Exchanged during normal breathing
3. Inhaled after quiet inspiration
4. Forcibly expelled after normal expiration

54. The RBC count increases after an individual spends significant time at higher altitude because:

1. Temperature is lower at higher altitudes
2. Basal metabolic rate is lower at higher altitudes
3. Basal metabolic rate is higher at higher altitudes
4. Atmospheric P_{O_2} is higher at higher altitudes
5. Atmospheric P_{O_2} is lower at higher altitudes

55. Most inspired particles (e.g., dust) fail to reach the lungs because of the:

1. Ciliated mucous lining in the nose
2. Abundant blood supply to the nasal mucosa
3. Porous structure of the turbinate bones
4. Contraction of the epiglottis
5. 2 of the above

56. Most oxygen carried in the blood is:

1. In solution with the plasma
2. Combined with plasma proteins
3. Chemically combined with a heme group
4. Carried as HCO_3^-
5. Bound to the amino acid valine on the beta chain of hemoglobin

57. When the inspiratory muscles contract:

1. The diameter of the thoracic cavity increases
2. The length of the thoracic cavity increases
3. The volume of the thoracic cavity is decreased
4. The diameter and length of the thoracic cavity both increase
5. None of the above

58. Damage to which of the following would result in cessation of breathing?

1. The pneumotaxic center
2. The medulla
3. Lung stretch receptors
4. The apneustic center
5. The pons

59. Which respiratory muscles would contract as you blew air into a balloon?

1. Diaphragm
2. Internal intercostals
3. External intercostals
4. All of the above

60. Which statement about CO₂ is incorrect?

1. Its concentration in the blood is decreased by hyperventilation
2. Its accumulation in the blood is associated with a drop in pH
3. More CO₂ dissolves in the blood plasma than is carried on RBCs
4. [CO₂]_{VENOUS} is greater than [CO₂]_{ARTERIAL}

61. The main inspiratory center of the brain is the _____. It signals the _____ (the main inspiratory muscle) to contract via the _____ nerve.

/For questions 62 and 63, consider the following substances:/

1. H⁺
2. CO₂
3. O₂
4. HCO₃⁻
5. Na⁺

62. Which of the above can cross the blood-brain barrier?

63. Which of the above directly affect(s) medullary chemoreceptors?

64. Diaphragm contraction causes the thoracic volume to _____ and the thoracic pressure to _____.

65. The most important receptors for respiration regulation are:

1. Located in the brachial artery
2. Most sensitive to changes in P_{O_2}
3. Affected by changes in pH
4. Not found in the medulla

66. As plasma pH decreases, hemoglobin's O_2 affinity will _____.

67. As ACH is injected iv, bronchiole diameter will _____.

68. You begin to hyperventilate! What happens to your plasma P_{CO_2} ?
What about your plasma pH?

69. In the above question, what acid-base imbalance will likely result, prior to compensation?

70. As blood flows through the pulmonary capillaries, Cl^- in the plasma will _____.

71. Which of the following are functions of components of the respiratory system?

1. Warming and moistening of inhaled air
2. Delivering oxygen to and removing carbon dioxide from the blood
3. Assisting in the maintenance of blood pH
4. All of the above
5. 2 of the above

72. Which of the following occurs during inspiration?

1. Diaphragm contracts and flattens
2. Intrathoracic pressure does not change
3. External intercostals relax
4. Thoracic volume decreases

73. As pulmonary edema progresses during congestive heart failure, the rate of O₂ diffusion in the lung..
74. As pleural space pressure increases, lung volume...
75. As the presence of dipalmitoylphosphatidylcholine (a surfactant) in the alveoli decreases, lung compliance...
76. As exhalation proceeds, alveolar wall tension...
77. In a fit of anger, you jab your A&P instructor with a syringe full of 1M NaOH. You sit back and watch with delight as he doubles over. You notice that his respiration has changed? How did it change and why?

Practice Questions on the Skeletal System

1. Which of the following cell types is responsible for synthesizing the organic component of cartilage matrix?
 1. Chondrocytes
 2. Osteoblasts
 3. Osteocytes
 4. Chondroclasts
 5. 2 of the above

2. Which of the following hormones acts to stimulate osteoclast activity and thus increase bone resorption?
 1. Growth Hormone
 2. Parathyroid Hormone
 3. Calcitonin
 4. Insulin
 5. Creatinine

3. Which of the following statements about bone is TRUE?
 1. Bone is the hardest tissue in the body
 2. Bone is a dynamic tissue which changes in response to hormonal demands
 3. Bone has an organic component of hydroxyapatite
 4. Bone contains 95% of the body's calcium in the form of hydroxyapatite crystals

4. Which of the following is NOT a characteristic of bone tissue?
 1. Periosteum
 2. Calcium phosphate crystals
 3. Lacunae that contain 2-4 cells each
 4. None of the above

5. The matrix of hyaline cartilage consists of all of the following

EXCEPT:

1. Collagen fibers
2. Chondrocytes
3. Proteoglycans
4. Lacunae
5. Perichondrium

6. The organic component of bone matrix is produced by:

1. Chondrocytes
2. Chondroblasts
3. Osteoblasts
4. Osteocytes
5. Osteoclasts

7. Which of the following statements about osteoblasts is TRUE?

1. Osteoblasts are quiescent, inactive bone cells
2. Osteoblasts secrete osteoid, which contains only the inorganic component of bone matrix
3. Osteoblasts respond to parathyroid hormone
4. Osteoblasts maintain contact with each other via cytoplasmic processes known as canaliculi

8. Which of the following cells is primarily responsible for bone resorption?

1. Osteoblast
2. Osteocyte
3. Osteoclast
4. Chondrocyte
5. Chondroblast

9. Which of the following cell types extend cytoplasmic processes through canaliculi?

1. Osteoclasts
2. Osteocytes
3. Osteoblasts
4. Endothelial cells
5. Fibroblasts

10. Which of the following is absent in fibrocartilage?

1. Matrix
2. Chondrocytes
3. Collagenous fibers
4. Lacunae
5. Perichondrium

11. Removal of the organic component of bone matrix makes the bone...

1. Lose its shape
2. Stretchable but not flexible
3. Flexible but not stretchable
4. Smaller
5. More fragile and more readily breakable

12. Which of the following can be found in cartilage but not bone tissue?

1. Lacunae
2. Protein fibers
3. Blood vessels
4. Chondroitin

13. These cells are located in bone tissue:

1. Chondroblasts
2. Osteocytes
3. Fibroblasts
4. Chondrocytes
5. More than one of the above

14. The dense connective tissue covering the outer surface of bone diaphyses is known as the:

1. Perichondrium
2. Periosteum
3. Endosteum
4. Epiosteum
5. Exofibrum

15. Which of the following bones is considered a sesamoid bone?

1. Clavicle
2. Humerus
3. Patella
4. Femur
5. Popliteal

16. These 2 components of bone are responsible for its hardness and pliability.

1. Osteoclasts and collagen
2. Mineralized salts and osteocytes
3. Mineralized salts and collagen
4. Collagen and elastin
5. Collagen and metastatin

17. A fracture in the shaft of a long bone would be a break in the:

1. Epiphysis
2. Metaphysis
3. Diaphysis
4. Arthrosis
5. Atalaphysis

18. Yellow marrow consists of _____ tissue.

19. Chondroblasts produce _____.

20. _____ carry blood vessels along the long axis of a bone.
1. Volkmann's canals
 2. Canaliculi
 3. Lacunae
 4. Foramina
 5. Haversian canals
21. The cell type that maintains the previously formed bone matrix is the:
1. Osteoclast
 2. Osteocyte
 3. Osteoblast
 4. Fibrocyte
22. Soft connective tissue membranes between the cranial bones at birth are:
1. An indication of microcephaly
 2. Frontal sinuses
 3. Epiphyseal plates
 4. Cribiform plates
 5. Fontanelles
23. Endochondral and intramembranous are 2 mechanisms of:
1. Bone remodeling
 2. Embryonic skeletal ossification
 3. Negative feedback
 4. Cartilage resorption
24. Which of the following is NOT a cranial suture?
1. Epiphyseal
 2. Lambdoidal
 3. Coronal
 4. Sagittal
 5. Squamous

25. The 2 pairs of bones that make up the hard palate are the right and left:

1. Zygomatic and temporal
2. Palatine and maxillae
3. Maxillae and zygomatic
4. Maxillae and mandibular

26. The 2 bones that make up the posterior nasal septum are the:

1. Nasal and lacrimal
2. Lacrimal and vomer
3. Vomer and ethmoid
4. Ethmoid and sphenoid

27. Which of the following is the most life-threatening?

1. Deviated nasal septum
2. Sinusitis
3. Damaged cribriform plate
4. Cleft palate
5. Ruptured bursae

28. Articulation is another word for _____.

29. Which of the following bones is NOT part of the cranium?

1. Sphenoid
2. Palatine
3. Ethmoid
4. Occipital

30. Which of the following is NOT part of the axial skeleton?

1. Femur
2. Sternum
3. Mandible
4. Sacrum

31. The /Hunchback of Notre Dame/ probably suffered from:
1. Scoliosis
 2. Kyphosis
 3. Lordosis
32. Incomplete closure of the vertebral column results in _____.
33. The thickened cartilage cushions of the knee that absorb compression are known as the:
1. Menisci
 2. Bursae
 3. Hovae
 4. Ligaments
 5. Synovia
34. Which of the following does NOT describe synovial joints?
1. Bones held together by cartilage
 2. Joint surfaces covered with articulating cartilage
 3. Presence of a joint cavity
 4. 2-layered joint capsule
 5. Most freely moveable of joints
35. A ligament running along the side of the knee joint is a _____.
36. Which of the following is LEAST likely to require arthroscopic surgery?
1. Removal of a torn meniscus in the knee
 2. Removal of torn articular cartilage in the knee
 3. Repair of a torn lateral collateral ligament in the knee
 4. Repair of a torn ACL in the knee
37. Haversian canals contain _____.

38. This hormone decreases blood calcium levels.

1. Acetylcholine
2. Glucagon
3. Parathormone
4. Calcitonin

39. Which of the following characteristics of cartilage distinguishes it from most other connective tissues?

1. Its extracellular matrix contains collagen
2. Its predominant cell type is a mesenchymal derivative
3. Its predominant cell type secretes both fibers and ground substance
4. It lacks blood vessels
5. It functions in mechanical support

40. Fibrocartilage

1. Contains large numbers of elastic fibers
2. Seldom contains isogenous groups of chondrocytes
3. Is the cartilage type found in the epiphyses of long bones of children
4. Is structurally intermediate between dense connective tissue and cartilage
5. Contains NO collagen

41. All of the following facilitate the distribution of nutrients and oxygen to osteocytes EXCEPT:

1. Gap junctions
2. Cytoplasmic extensions
3. Bone matrix
4. Haversian canals
5. Canaliculi

42. Each of the following is TRUE of Volkmann's canals EXCEPT:

1. They enclose extensions of osteoblasts
2. They form connections between haversian canals
3. They carry blood vessels
4. They are found in compact bone
5. They may be found in the diaphyses of adult long bones

43. Each of the following statements about epiphyseal plates is correct EXCEPT:

1. They are responsible for lengthening of long bones
2. They appear only after the formation of the secondary ossification center
3. They ossify prematurely in children lacking sufficient growth hormone
4. They are composed mainly of elastic cartilage
5. They exhibit the various stages of endochondral bone formation

/For the next 12 questions, use the following 5 choices.

Answers may be used once, more than once, or not at all./

1. Hyaline cartilage
2. Elastic cartilage
3. Fibrocartilage
4. All of the above
5. None of the above

44. Primary skeletal tissue in the fetus

45. Contains predominantly reticular fibers

46. No identifiable perichondrium

47. Most widely distributed cartilage type in the body

48. Contains abundant collagen

49. Is yellowish when fresh

50. Articular cartilage

51. Predominant cartilage type in the external ear

52. Found in the intervertebral disk

53. Chondrocytes differentiate from fibroblasts or fibroblast-like cells

54. Cartilage of epiphyseal plates

55. Derives from mesenchyme

Practice Questions on Tissue Basics

1. Which of the following is a unicellular gland that is typically found in mucosal epithelium?
 1. Neuroepithelial cell
 2. Myoepithelial cell
 3. Goblet cell
 4. Friar cell
 5. Merkel cell

2. Which of the following cells is primarily responsible for the production of collagen and the amorphous ground substance in loose connective tissue?
 1. Adipocyte
 2. Fibroblast
 3. Mast cell
 4. Plasma cell
 5. Fibroepitheliocyte

3. Which of the following is/are used to classify epithelia?
 1. Number of cell layers
 2. Morphology of the cells comprising the apical layer
 3. Morphology of the cells comprising the basal layer
 4. Structure of the underlying connective tissue
 5. The embryonic germ layer of origin
 6. A and b are correct
 7. A and c are correct
 8. A, b, and d are correct

4. Which of the following connective tissue cells is derived from a B lymphocyte and is responsible for antibody production?
1. Adipocyte
 2. Fibroblast
 3. Macrophage
 4. Mast cell
 5. Plasma cell
5. Which of the following describes a secretory process in which no cell membrane components or cytosolic contents are lost?
1. Merocrine
 2. Apocrine
 3. Holocrine
 4. Endocrine
6. Which of the following statements about adipocytes in normal adults is not true?
1. They store lipid primarily in the form of triglyceride
 2. The adipocytes lack nuclei
 3. Each adipocyte has its own plasma membrane
 4. When present in large numbers, the adipocytes make up adipose tissue
 5. The nucleus lies in an eccentric position adjacent to the cell membrane
7. Which of the following statements is FALSE?
1. All epithelia are lined with specialized connective tissue
 2. The avascular nature of epithelia limits its size
 3. Epithelial sheets contain little extracellular material at the lateral surfaces of the individual cells
 4. 2 of the criteria for classifying epithelia are cell layer number and morphology of the cells at the free surface

8. The nuclei of columnar cells are positioned nearer to which of the following?
1. Free surface
 2. Microvilli
 3. Underlying connective tissue
 4. Glycocalyx
9. The most common type of exocrine gland is:
1. Apocrine
 2. Merocrine
 3. Endocrine
 4. Holocrine
10. Epithelia that consist of more than one layer is termed _____.
11. The matrix of connective tissue is composed of:
1. Cells, fibers, and ground substance
 2. Cells and fibers
 3. Fibers and ground substance
 4. Cells and ground substance
12. Small, hair-like structures (that are not extensions of the plasma membrane) on the surface of some epithelial cells are called:
1. Flagella
 2. Cilia
 3. Villi
 4. Plicae
 5. Microvilli
13. Which of the following heals quickest after an injury?
1. Bone
 2. Muscle
 3. Nerve
 4. Epithelium

14. Small depressions in which some connective tissue cells reside are known as:

1. Lumina
2. Foramina
3. Calculi
4. Lacunae
5. Icosedrae

15. Which suffix implies formation?

1. -blast
2. -lemma
3. -stasis
4. -ante

16. Which of the following is the odd tissue type?

1. Ligament
2. Rib
3. Biceps
4. Blood

17. A photomicrograph of a tissue shows cells in little holes, densely packed fibers and no blood vessels. This tissue is:

1. Dense regular connective tissue
2. Hyaline cartilage
3. Fibrocartilage
4. Muscle
5. Adipose tissue

18. The serous lining of the lung surface is the _____.

19. Which of the following is incorrect?

1. Cartilage heals slower than skin because cartilage is a deeper tissue.
2. The internal lining of the small intestine has a large surface area because of the presence of cilia
3. Adipose tissue is a type of connective tissue because it stores fat
4. 2 of the 3 statements are incorrect
5. All of the statements are incorrect

20. In pseudostratified columnar epithelium:

1. All nuclei lie at the same depth from the surface
2. All cells border on the lumen
3. All cells touch the basal lamina
4. All cells produce collagen and elastin
5. All of the above

21. Each of the following statements about the general features of epithelial tissues is correct, EXCEPT:

1. Epithelial tissues rest on basal laminae
2. Epithelial cells exhibit polarity
3. Epithelia are avascular
4. Epithelia lack nerve fibers
5. Epithelial cells attach to one another by specialized junctions

22. Holocrine secretion:

1. Occurs in sebaceous glands
2. Occurs in endocrine glands
3. Involves little or no loss of cytoplasm
4. All of the above
5. None of the above

23. The cell type mainly responsible for producing and maintaining all the components of connective tissue extracellular matrix is the:

1. Mesothelial cell
2. Fibroblast
3. Mast cell
4. Lymphocyte
5. Macrophage

24. Dense regular connective tissue:

1. Is composed primarily of fibroblasts
2. Is composed mainly of ground substance
3. Is the predominant tissue type in most organ capsules
4. Contains more mast cells than any other type of connective tissue
5. May be found in tendons

25. Functions of connective tissue include:

1. Immunologic protection
2. Tissue repair after injury
3. Structural support
4. Fuel storage
5. All of the above

/For the next series of questions, use the following 5 choices.

Answers may be used once, more than once, or not at all./

1. Epithelial tissue
2. Connective tissue
3. Nerve tissue
4. Muscle tissue
5. All of the above

26. Contains the widest variety of cell types

27. Secretion is not a major function of their cells

28. Basal cells are polarized and their surface rests on a basal lamina

29. Contains cells capable of amoeboid movement
30. Covers body surfaces and lines hollow organs
31. Extracellular matrix predominates
32. Cells have specializations on their apical surfaces, including cilia, stereocilia, and microvilli

/For the next 5 questions, use the following 5 choices.

Answers may be used once, more than once, or not at all./

1. Fibroblasts
 2. Lymphocytes
 3. Mast cells
 4. Plasma cells
 5. Macrophages
-
33. Primary function is the synthesis and secretion of antibodies
 34. Predominant cell type in connective tissue proper
 35. Contain granules filled with heparin and histamine
 36. Contain more lysosomes than the other listed cells
 37. Mature cells exhibit an elongated fusiform structure

Practice Questions on the Urinary System - Acid/Base, Electrolyte, and Water Balance

1. If you took a drug that inhibited the reabsorption of Na^+ in the PCT, you would:
 1. Have an increased urine output
 2. Have a decreased urine output
 3. Have a decreased plasma [bilirubin] and become jaundiced
 4. Have decreased absorption of fats and have grey-white feces
2. Podocytes make up the:
 1. Visceral layer of the nephron
 2. Visceral layer of the glomerulus
 3. Visceral layer of the renal capsule
 4. Visceral layer of the Bowman's Capsule
3. Glucose is:
 1. Filtered, reabsorbed, and secreted
 2. Filtered, and reabsorbed, but not secreted
 3. Filtered, and secreted, but not reabsorbed
 4. Filtered, and neither secreted nor reabsorbed
4. If MAP increased from 120 mmHg to 210 mmHg, GFR would most likely _____.
5. Typically, as GFR increases, the $[\text{Na}^+]$ of the filtrate reaching the DCT will _____.
6. What would happen to the GFR if the hydrostatic pressure exerted by the fluid in the capsular space increased?
 1. GFR would increase
 2. GFR would decrease
 3. GFR would not change

7. Place the following in the correct sequence from the initial formation of urine to its elimination from the body.
1. Major calyx
 2. Minor calyx
 3. Nephron
 4. Urethra
 5. Ureter
 6. Collecting duct
8. While the kidneys process about 180L of blood-derived fluids per day, the amount that actually leaves the body is:
1. 50%, or 90L
 2. 100%, or 180L
 3. 10%, or 18L
 4. 1%, or 1.8L
9. The _____ artery sits on the boundary between the cortex and the medulla of the kidney.
1. Lobar
 2. Interlobar
 3. Arcuate
 4. Segmental
10. The fluid in the capsular space is similar to plasma except that it does not contain a significant amount of:
1. Glucose
 2. Sodium
 3. H⁺
 4. Albumin
11. /True or False:/ Angiotensin II is a substance made by the body to lower blood pressure during stress.
12. /True or False:/ Glomerular filtration is an ATP-driven process.

13. Aldosterone causes:

1. Decreased K^+ in the urine
2. Increased Na^+ in the urine
3. Increased urine output
4. Decreased urine output

14. Creatinine is a:

1. Chemical that is typically not secreted
2. Substance typically found in greater amounts in renal arteries than in renal veins
3. Building block for complex carbohydrates
4. 2 of the above are correct

15. Which of the following is not one of the 3 external coverings of the kidney?

1. Renal capsule
2. Adipose capsule
3. Renal fascia
4. Renal adventitia

16. Consider the following statement: /In untreated diabetes mellitus, the [glucose]_Filtrate will be very high resulting in glucosuria. /

1. This statement is true
2. This statement is false

17. In humans, the thirst center is located in the:

1. Adrenal cortex
2. Pons
3. Hypothalamus
4. Medulla Oblongata
5. Thalamus

18. The longer the _____, the greater an animal's capacity to conserve water and to concentrate the solutes excreted in the urine.

19. Hormonal control of urinary excretion primarily affects:
1. Bowman's capsules
 2. DCTs and collecting ducts
 3. PCTs and Loops of Henle
 4. Urinary Bladder
20. As dehydration increases, the release of ADH from the posterior pituitary will _____.
21. The plasma protein concentration of a patient with untreated glomerulonephritis would be expected to be:
1. Greater than normal
 2. Less than normal
 3. Normal
22. Which of the following is NOT a function of atrial natriuretic peptide?
1. It acts to decrease aldosterone release from the adrenal cortex
 2. It acts to increase urine output
 3. It acts to increase blood pressure
 4. It acts to decrease ADH release
23. Parathyroid hormone acts to:
1. Decrease calcium absorption in the gut
 2. Decrease calcium reabsorption in the renal tubules
 3. Increase plasma calcium levels
 4. Increase osteoblast activity
24. 7.0 is the normal pH of the:
1. Blood in the renal artery
 2. Blood in the testicular vein
 3. Urine
 4. Fluid within a typical cell

25. The addition of a strong acid to the extracellular fluid would result in the increased formation of:
1. NaHCO_3^-
 2. H_2CO_3
 3. OH^-
 4. All of the above
26. The urinary bladder is lined by _____ epithelium.
27. Which of the following could cause excessive urine output?
1. Hyperaldosteronism
 2. Hypersecretion of ADH
 3. Hyperventilation
 4. Severe hypoinsulinemia (as associated with Type I Diabetes Mellitus)
28. The term alkaline reserve is used to describe the _____ buffer system.
1. Phosphate
 2. Hemoglobin
 3. Bicarbonate
 4. Protein
29. If MAP increased from 120mmHg to 154mmHg, GFR would most likely _____.
30. In an attempt to compensate for plasma acidosis:
1. Breathing rate and depth will increase
 2. Breathing rate and depth will decrease
 3. Breathing rate will increase and depth will decrease
 4. Breathing rate and depth will not change since only the renal mechanism can deal with acidosis

31. The pH of blood varies directly with:
1. HCO_3^-
 2. H^+
 3. Pco_2
32. What portion of the male urinary tract contains some stratified squamous non-keratinized epithelium?
1. Membranous urethra
 2. Prostatic urethra
 3. Spongy (penile) urethra
 4. All of the above
 5. None of the above
33. The micturition center is located in the:
1. Pons
 2. Medulla
 3. Cerebellum
 4. Basal Ganglia
34. The vasa recta creates the osmotic gradient in the kidney's medulla.
1. This statement is true
 2. This statement is false because the PCT creates the gradient
 3. This statement is false because the DCT creates the gradient
 4. This statement is false because the loop of Henle creates the gradient
35. /True or False/. The significant presence of red blood cells in the urine is normal and healthy
36. The main solute component of urine is:
1. Urea
 2. Glucose
 3. Agglutin
 4. Urobilinogen

37. Which of the following is INCORRECT?

1. Aldosterone stimulates the reabsorption of Na⁺
2. Aldosterone stimulates the secretion of K⁺
3. Aldosterone affects water reabsorption
4. Aldosterone is made in the hypothalamus and released from the anterior pituitary

38. The majority of reabsorption occurs in the:

1. Renal capsule
2. Proximal convoluted tubule
3. Collecting duct
4. Ascending limb of the loop of Henle

39. Which of the following is found in the renal medulla?

1. Renal pacemaker cells
2. Islets of Langerhans
3. DCT
4. Loop of Henle

40. Which of the following would NOT be secreted from the ISF into the filtrate?

1. Organic acids
2. Amino acids
3. Organic bases
4. Creatinine

41. Urine with a high concentration of C₆ H₁₂ O₆ is:

1. Normal because this compound is filtered and secreted but not reabsorbed
2. Normal because this compound is filtered and reabsorbed but not secreted
3. Abnormal because this compound is filtered and secreted but not reabsorbed
4. Abnormal because this compound is filtered and reabsorbed but not secreted

42. Which of the following is incorrect concerning ADH?
1. Its production is regulated by plasma osmolarity
 2. Its activity is affected by alcohol
 3. It acts on the collecting duct and decreases its permeability to water
 4. It is stored in the posterior pituitary

43. Which of the following is NOT a unit of the nephron?
1. Bowman's capsule
 2. PCT
 3. DCT
 4. Medullary papilla

44. Consider the following structures:
1. Bowman's capsule
 2. Collecting duct
 3. PCT
 4. DCT
 5. Loop of Henle

What is the order filtrate follows as it flows through the nephron?

45. The kidneys are located:
1. Retroperitoneally
 2. Only within the epigastric region
 3. Superior to the liver
 4. 2 of the above
 5. All of the above
46. Which of the following is a function of the kidneys?
1. Release of hormones
 2. Maintenance of plasma pH
 3. Maintenance of plasma [electrolyte]
 4. Gluconeogenesis
 5. All of the above
 6. 2 of the above

47. Which of the following is part of the renal corpuscle?
1. Glomerulus
 2. PCT
 3. DCT
 4. Collecting duct
48. The functional unit of the kidney is the _____.
49. Which of the following is NOT a stage in urine formation?
1. Glomerular filtration
 2. Glomerular secretion
 3. Tubular reabsorption
 4. Tubular secretion
50. Which of the following is not a means of regulating GFR?
1. Regulation via skeletal muscle
 2. Regulation via smooth muscle
 3. Hormonal regulation
 4. Neuronal regulation
51. Increased sympathetic stimulation of afferent arterioles results in:
1. Increased filtrate volume per unit time
 2. Decreased filtrate volume per unit time
 3. Increased GFR
 4. Decreased ANP release by macula densa cells
52. Renin is produced by the:
1. Mesangial cells
 2. Macula densa
 3. Principal cells of the DCT
 4. Juxtaglomerular cells

53. The function of the macula densa cells is to:
1. Prevent water reabsorption in the ascending limb of the loop of henle
 2. Add bicarbonate ions to the filtrate
 3. Secrete renin
 4. Monitor filtrate [NaCl]
 5. Secrete glucose
54. One function of ANP is to:
1. Increase afferent arteriole pressure
 2. Increase renal blood flow
 3. Enhance the effects of ADH
 4. Inhibit the effects of aldosterone
 5. Increase blood volume
55. If plasma [aldosterone] increases, Na⁺ excretion will _____.
56. If the diameter of the afferent arteriole < the diameter of the efferent arteriole than which of the following will result?
1. Decreased NFP
 2. Decreased glomerular BP
 3. Increased GFR
 4. Increased [Na] in the filtrate reaching the DCT
 5. 2 of the above
 6. All of the above
57. The most important function of the JG apparatus is to:
1. Secrete water into the filtrate
 2. Reabsorb Na⁺
 3. Generate bicarbonate ions to compensate for renal acidosis
 4. Secrete renin
 5. Secrete aldosterone
58. From the DCT, fluid will enter the _____.

59. In a patient who is dehydrated from vomiting and diarrhea, which is likely to be found in higher amounts in the plasma?
1. ADH
 2. Aldosterone
 3. ANP
 4. A and b
 5. A and c
60. All of the following are normally found in the urine EXCEPT:
1. Glucose
 2. Creatinine
 3. Na⁺
 4. Uric acid
 5. Urea
61. Damage to which of the following could result in the most drastic proteinuria?
1. PCT
 2. DCT
 3. Collecting Duct
 4. Peritubular capillaries
 5. Glomerular capillaries
62. If lactic acid is injected iv, then plasma bicarbonate ion levels will immediately _____.
63. During a sympathetic response, renin secretion will _____.
64. What is the renal mechanism to correct for respiratory alkalosis?
65. As a result of the compensation in the above question, what ion imbalance problem might develop? Why?

66. Excessive amounts of glucose in the urine (greater than 1-3mg per 100mL of urine) may indicate what disorder?

1. Diabetes insipidus
2. Diabetes mellitus
3. Bladder infection
4. Urinary tract infection

67. As renal afferent arteriole diameter increases, GFR...

68. As renal efferent arteriole diameter increases, GFR...

69. As plasma oncotic pressure increases, GFR...

70. When compared to the water permeability of the descending limb of the loop of Henle, the water permeability of the ascending limb is...

71. As plasma osmotic pressure increases above normal, renal collecting duct water permeability...

72. As plasma osmotic pressure decreases below normal, plasma ADH levels...

73. Decreased GFR results in an increased renal blood flow to correct this problem. Diagram this mechanism!

Click here for the answer. <img001.jpg>

For the next 6 questions, list the specific transport mechanism responsible for the movement of the following substances.

74. Movement of Na⁺ from the filtrate into the PCT cell

75. Movement of Na⁺ from the PCT cell into the interstitial fluid

76. Movement of Cl⁻ from the filtrate into the PCT cell

77. Movement of Cl⁻ from the PCT cell into the interstitial fluid

78. Movement of the amino acid glycine from the filtrate into the PCT cell

79. Movement of glycine from the PCT cell into the interstitial fluid