Respiratory System Questions

1. Which of the following bones does NOT contain a paranasal sinus?
   a. Sphenoid
   b. Maxillary
   c. Ethmoid
   d. Nasal
   e. Frontal

2. Which of the following muscles contracts during quiet expiration?
   a. Diaphragm
   b. Internal intercostals
   c. External intercostals
   d. Pectoralis minor
   e. None of the above

3. Pulmonary surfactant:
   a. Prevents alveolar collapse
   b. Reduces alveolar surface tension
   c. Increases lung compliance
   d. Is secreted by type II alveolar cells
   e. All of the above

4. Which of the following factors decreases airway resistance?
   a. Increased parasympathetic nervous activity
   b. Epinephrine
   c. Histamine
   d. Accumulation of mucus within bronchioles
   e. None of the above

5. The smallest airways in the conducting zone are the:
   a. Pharynxes
   b. Alveolar ducts
   c. Pulmonary capillaries
   d. Bronchi
   e. Terminal bronchioles

6. Which of the following is NOT a function of the conducting zone of the respiratory system?
   a. Humidifying air
   b. Warming air
   c. Gas exchange
   d. Mucus secretion
   e. Filtration

7. Which of the following is a component of pulmonary gas exchange?
   a. Ventilation
   b. O_2 transport
   c. Diffusion of N_2 from alveoli to blood
   d. Diffusion of CO_2 from tissues to blood
   e. Production of ATP within cellular mitochondria

Respiratory System Questions

8. A rise in blood P_{CO_2} causes all of the following EXCEPT:
   a. An increase in the H^+ concentration
   b. A rise in bicarbonate concentration
   c. A rise in the concentration of carbaminohemoglobin
   d. A decrease in pH
   e. An increase in the affinity of hemoglobin for oxygen

9. During hyperventilation, which of the following would be expected to happen?
   a. An increase in the P_{O_2} of arterial blood
   b. An increase in the P_{CO_2} of arterial blood
   c. An increase in the acidity of arterial blood
   d. An increase in the bicarbonate concentration of arterial blood
   e. All of the above

10. Which of the following exerts the most control of respiratory rate?
   a. Ventral medulla oblongata
   b. Dorsal medulla oblongata
   c. Pons
   d. Midbrain
   e. Tectum

11. Which of the following is NOT a potential cause of metabolic acidosis?
   a. Severe vomiting
   b. Severe diarrhea
   c. Starvation
   d. Diabetic crisis
   e. Kidney disease

12. Which of the following is the most potent respiratory stimulus?
   a. Low plasma pH
   b. High plasma pH
   c. Low CSF pH
   d. Low CSF P_{O_2}
   e. High plasma P_{CO_2}

13. During inspiration, pressure will be lowest in which of the following?
   a. Alveolar duct
   b. Trachea
   c. Secondary bronchus
   d. Laryngopharynx
   e. Nasal cavity

14. In which of the following will the partial pressure of oxygen be the highest?
   a. Right atrium
   b. Inferior vena cava
   c. Pulmonary artery
   d. Femoral artery
   e. Mitochondria

Respiratory System Questions

15. Which of the following is TRUE?
    a. The space just superior to the epiglottis is known as the glottis.
    b. The anterior portion of the hard palate is made of the horizontal plates of the ethmoid bone.
    c. The entire pharynx is lined by respiratory epithelium
    d. The nasopharynx contains the palatine tonsil.
    e. None of the above

16. Which of the following reactions occur(s) in the pulmonary capillaries?
    a. $HHb + O_2 \rightarrow HbCO_2 + H^+$
    b. $HCO_3^- + H^+ \rightarrow H_2CO_3$
    c. $H_2O + CO_2 \rightarrow H_2CO_3$
    d. $HCO_3^- + Hb \rightarrow HbO_2$
    e. More than one of the above

17. Which of the following is the most SUPERIOR?
    a. Lung hilus
    b. Sigmoid colon
    c. Esophageal hiatus
    d. Gastric pits
    e. Carina

18. Which of the following refers to the exchange of carbon dioxide and oxygen between systemic tissues and systemic capillaries?
    a. Pulmonary ventilation
    b. External respiration
    c. Internal respiration
    d. Cellular respiration
    e. Acellular respiration

19. All of the following are functions of the respiratory system EXCEPT:
    a. Regulation of plasma pH
    b. Regulation of plasma [H+]
    c. Regulation of plasma Pco_2
    d. Regulation of plasma Po_2
    e. None of the above

20. Which of the following is TRUE?
    a. Anaerobic respiration involves the production of CO_2 and utilization of O_2
    b. Alveoli are found in both the conducting zone and the respiratory zone.
    c. 4 of the nasal conchae are part of the ethmoid bone.
    d. The maxillary sinuses are superior to the frontal sinus.
    e. The entire pharynx is lined by stratified squamous epithelium.

21. The nasal cavity is lined by:
    a. Simple stratified ciliated epithelium with goblet cells.
    b. Pseudostratified cuboidal epithelium without goblet cells.
    c. Pseudociliated columnar epithelium with goblet cells
    d. Semistratified columnar epithelium with cilia.
    e. Pseudostratified ciliated columnar epithelium with goblet cells.

Respiratory System Questions

22. Which of the following is the most INFERIOR?
    a. Epiglottis
    b. Cricoid cartilage
    c. Glottis
    d. False vocal cords
    e. True vocal cords

23. All of the following occur in the conducting zone EXCEPT:
    a. Exchange of oxygen and carbon dioxide
    b. Filtration of particles from inspired air
    c. Filtration of pathogens from inspired air
    d. Humidification of inspired air
    e. 2 of the above

24. Which of the following is TRUE?
    a. The last tracheal cartilage is referred to as the carina.
    b. There are more secondary bronchi on the left than on the right.
    c. The last bronchioles without alveoli are known as respiratory bronchioles.
    d. The anterior portion of the hard palate is composed of the horizontal plates of the palatine bones.
    e. The inferior portion of the nasal septum is referred to as the perpendicular plate of the ethmoid bone.

25. Which of the following is NOT TRUE?
    a. The Eustachian tubes link the nasopharynx and the middle ear cavities.
    b. During swallowing the uvula and soft palate prevent food and drink from entering the oropharynx.
    c. The number of alveolar ducts in the lungs is less than the number of alveoli in the lungs.
    d. The apex of the right lung is deep to the right clavicle.
    e. The lungs are lined by the visceral pleura.

26. Of which of the following is the respiratory membrane composed?
    1. Pulmonary capillary endothelium
    2. Type 1 alveolar cell membrane
    3. Respiratory epithelium

    a. 1, 2, and 3
    b. 1 and 2
    c. 2 and 3
    d. 1 and 3
    e. 3 only

27. Which of the following is ALWAYS TRUE?
    a. Intrapulmonary pressure > Atmospheric pressure
    b. Atmospheric pressure > Intrapulmonary pressure
    c. Intrapulmonary pressure > Intrapleural pressure
    d. Intrapleural pressure > Intrapulmonary pressure
    e. Intrapleural pressure > Atmospheric pressure

Respiratory System Questions

28. Surfactant is produced by _____ and acts to _____ alveolar surface tension.
    a. Type I alveolar cells – increase
    b. Type II alveolar cells – decrease
    c. Dust cells – increase
    d. Hepatic cells – decrease
    e. Carbonic anhydrase - decrease

29. Which of the following is TRUE?
    a. The elastic recoil of the lungs assists quiet expiration.
    b. Plasma levels of chloride will be higher in systemic veins than in systemic arteries.
    c. Approximately 20% of the oxygen in the bloodstream is dissolved in plasma.
    d. Approximately 80% of the carbon dioxide in the bloodstream is bound to hemoglobin and referred to as carbaminohemoglobin.
    e. An inability to generate carbonic anhydrase is the cause of infant respiratory distress syndrome.

30. Which of the following reactions is more likely to occur in pulmonary capillaries than in systemic capillaries?
    a. $HHb + O_2 \rightarrow HbO_2 + H^+$
    b. $H^+ + HbO_2 \rightarrow HHb + O_2$
    c. $HHb + CO_2 \rightarrow HbCO_2 + H^+$
    d. $HbCO_2 \rightarrow HCO_3^- + H^+$

31. Which of the following is TRUE?
    a. Pneumothorax can result in atalectasis
    b. Hemoglobin has a greater affinity for carbon monoxide than for oxygen
    c. The majority of CO_2 in the blood is in the form of HCO_3^-
    d. The chloride shift refers to the exchange of HCO_3^- and Cl^- between an RBC and the plasma
    e. All of the above

32. The ancient Greeks referred to the trachea as the *trachea arteria*, which translates as “rough airpipe.” The roughness is due to the _____ which function(s) by _____.
    a. Serosa; increasing the surface area for exchange
    b. Adventitia; increasing the surface area for exchange
    c. Trachealis; producing mucus
    d. Cartilaginous rings; preventing collapse.
    e. Goblet cells; phagocytosing bacteria

33. All of the following muscles would contract while trying to blow out a candle EXCEPT:
    a. Internal intercostals
    b. Rectus abdominus
    c. Transverse abdominus
    d. Latissimus dorsi
    e. Diaphragm

34. During which of the following activities would the stomach experience the greatest downward force?
    a. Quiet inspiration
    b. Forced inspiration
    c. Quiet expiration
    d. Forced expiration

Respiratory System Questions

35. Forced inspiration would require the involvement of the:

I. Phrenic nerve
II. Diaphragm
III. Ventral respiratory group

a. I, II, and III
b. I and II
c. I and III
d. II and III
e. I only

Use the following answers for the next 4 questions:

a. Thyroid cartilage
b. Epiglottis
c. Laryngopharynx
d. True vocal cords
e. None of the above

36. Elastic cartilage
37. Forms the Adam's apple
38. Covers the glottis during swallowing
39. Necessary for sound production

40. The transverse thoracis is a muscle that depresses ribs 2-6 when it contracts. Thus this muscle will most likely contract during:
a. Forced inspiration
b. Quiet inspiration
c. Forced expiration
d. Quiet expiration

41. Why is it more difficult to breathe in when the stomach is full?
a. Because the full stomach impedes the downward motion of the contracting diaphragm.
b. Because the full stomach impedes the downward motion of the relaxing diaphragm.
c. Because the full stomach prompts a decrease in gastric juice secretion.
d. Because the full stomach prompts an increase in gastric juice secretion.
e. Because the full stomach stimulates increased activity in the ventral respiratory group.

43. Which of the following could cause an increase in respiratory rate?
a. Increased plasma Po_2
b. Increased plasma pH
c. Increased plasma $[H^+]$
d. All of the above
e. 2 of the above

42. **As a result of the movement of air into the alveoli**, alveolar pressure will:
a. Increase
b. Decrease
c. Not change

43. In respiratory acidosis, plasma pH will:
a. Increase
b. Decrease
c. Not change

Respiratory System Questions

44. A person that is hyperventilating will have a plasma pH that is _____ the plasma pH of a person who is hypoventilating.
    a. Greater than
    b. Less than
    c. The same as

45. Planet Pneumo has a total atmospheric pressure of 900 mmHg. Oxygen and carbon dioxide each constitute 30% of the atmosphere. Which gas would be found in higher concentration in the blood?
    a. Oxygen
    b. Carbon dioxide

46. Intrapleural pressure is normally _____ intrapulmonary pressure.
    a. More than
    b. Less than
    c. The same as

47. Epinephrine will _____ bronchioles causing resistance to _____ and airflow to _____.
    a. Dilate – decrease – increase
    b. Constrict – increase – decrease
    c. Dilate – increase – decrease
    d. Constrict – decrease - increase

48. Resistance to airflow in a bronchiole is _____ resistance to airflow in the trachea.
    a. More than
    b. Less than
    c. The same as

49. The majority of CO_2 is transported in the blood stream…
    a. As carbon monoxide
    b. Attached to the outer surface of RBCs
    c. Attached to the inner surface of RBCs
    d. Attached to hemoglobin
    e. As bicarbonate

50. The number of lobes in the right lung is _____ the number of lobes in the left lung.
    a. Greater than
    b. Less than
    c. The same as

51. The percentage of atmospheric gas composed of nitrogen is _____ the percentage of atmospheric gas composed of oxygen.
    a. Greater than
    b. Less than
    c. The same as

52. The diameter of a bronchus is _____ the diameter of a bronchiole.
    a. Greater than
    b. Less than
    c. The same as

Respiratory System Questions

53. The percentage of oxygen dissolved in plasma is _____ the percentage of oxygen transported as oxyhemoglobin.
    a. Greater than
    b. Less than
    c. The same as

54. When the diaphragm contracts, the pressure in the abdominal cavity will:
    a. Increase
    b. Decrease
    c. Not change

55. In order for inspiration to occur, atmospheric pressure must be _____ intrapulmonary pressure.
    a. Greater than
    b. Less than
    c. The same as

56. The rate at which O_2 detaches from hemoglobin when temperature is high is _____ the rate at which O_2 detaches from hemoglobin when temperature is low.
    a. Faster than
    b. Slower than
    c. The same as

57. Which of the following is NOT a GROSS structure of the lung?
    a. Apex
    b. Alveolus
    c. Base
    d. Root
    e. Hilus

58. Which of the following is NOT composed of hyaline cartilage?
    a. Thyroid portion of the larynx
    b. Cricoid portion of the larynx
    c. Vestibular fold of the larynx
    d. Anterior nasal septum
    e. C-shaped rings of the trachea

59. Which of the following muscles is LEAST involved in respiration?
    a. Diaphragm
    b. Pectoralis major
    c. External intercostals
    d. Internal intercostals
    e. Sternocleidomastoids

60. As blood travels from a pulmonary artery to a pulmonary vein, its plasma levels of bicarbonate will:
    a. Increase
    b. Decrease
    c. Not change

Respiratory System Questions

61. Which of the following is produced in greater amounts in the pulmonary capillaries than in systemic capillaries?
    a. Reduced hemoglobin
    b. Bicarbonate
    c. Carbaminohemoglobin
    d. Oxyhemoglobin
    e. Deoxyhemoglobin

62. All of the following are TRUE of the trachea EXCEPT:
    a. It's lined by pseudostratified ciliated epithelium.
    b. It contains a muscle known as the trachealis.
    c. It's posterior to the esophagus and anterior to the vertebral column.
    d. It divides into the 2 main bronchi in the mediastinum.
    e. It is inferior to the hyoid bone.

63. All of the following are TRUE EXCEPT:
    a. The posterior nasal septum is composed of the perpendicular plate of the ethmoid bone and the vomer.
    b. The maxillary sinuses produce mucus.
    c. The conchae increase the turbulence of airflow.
    d. The auditory tubes connect the nasal cavity to the inner ear cavities.
    e. The nasopharynx contains the pharyngeal tonsil.

64. As blood travels from the right ventricle all the way to the left atrium, the saturation levels of hemoglobin will:
    a. Increase
    b. Decrease
    c. Stay the same

65. Asthma can be characterized by mucous plugs that cause the lumens of bronchi to narrow. This narrowing would cause the resistance in those bronchi to:
    a. Increase
    b. Decrease
    c. Not change

66. Relaxation of the diaphragm causes thoracic volume to:
    a. Increase
    b. Decrease
    c. Not change

67. All of the following are TRUE EXCEPT:
    a. The left lung contains 1 fissure whereas the right lung contains 2.
    b. Type II alveolar cells produce the lung's surfactant.
    c. The relaxed diaphragm assumes a dome-shaped position.
    d. Terminal bronchioles contain alveoli.
    e. The root of the lung is adjacent to the lung's hilus.

68. During exercise, hemoglobin in systemic venous blood is likely to be ___ with oxygen.
    a. 25% saturated
    b. 75% saturated
    c. 100% saturated
    d. 150% saturated

Respiratory System Questions

69. Which of the following is the primary respiratory control center?
    a. Dorsal respiratory group
    b. Pontine respiratory group
    c. Apneustic center
    d. Ventral respiratory group
    e. Basal ganglia

70. All of the following are causes of metabolic acidosis EXCEPT:
    a. Diarrhea
    b. Vomiting
    c. Diabetes mellitus
    d. Starvation
    e. Renal disease

71. Type I alveolar cells are sites of:
    a. Gas exchange
    b. Surfactant production
    c. CCK production
    d. All of the above

72. All of the following is NOT TRUE?
    a. The left primary bronchus is longer and more horizontal than the right primary bronchus.
    b. Central chemoreceptors are located in the aortic arch.
    c. The inflation reflex refers to the phenomenon seen in infants where over stretching the lungs results in expiration.
    d. The formation of carbonic acid is catalyzed by carbonic anhydrase.
    e. Po_2 is higher in systemic arteries than in systemic veins.

73. Which of the following nerves stimulates the diaphragm to contract?
    a. Glossopharyngeal nerve
    b. Intercostal nerve
    c. Inferior diaphragmatic nerve
    d. Phrenic nerve
    e. Sciatic nerve

74. Kartagener syndrome is a rare genetic disorder in which cilia are unable to move. This would cause one's ability to move mucus thru the trachea to:
    a. Increase
    b. Decrease
    c. Not change

75. Infant respiratory distress syndrome is a common disorder affecting 10% of premature infants. In this disorder, alveoli are unable to expand and remain open after inspiration. A deficiency of _____ could cause this to occur.
    a. Surfactant
    b. Mature functional type II alveolar cells
    c. Mature functional type I alveolar cells
    d. Alveolar macrophages
    e. Both A and B

Respiratory System Questions

76. John breathed in a molecule of helium gas. As it traveled towards his alveoli, which of the following would it pass LAST?
   a. Lobar bronchus
   b. Segmental bronchus
   c. Trachea
   d. Glottis
   e. Terminal bronchiole

77. Carbon dioxide combines with hemoglobin to form:
   a. Deoxyhemoglobin
   b. Reduced hemoglobin
   c. Carbaminohemoglobin
   d. Carboxyhemoglobin
   e. None of the above

78. The walls of the alveoli are composed of two types of cells, type I and type II. The function of type II is to _____.
   a. Secrete surfactant
   b. Trap dust and other debris
   c. Replace mucus in the alveoli
   d. Protect the lungs from bacterial invasion
   e. None of the above

79. Which statement about CO_2 is INCORRECT?
   a. Its concentration in the blood is decreased by hyperventilation.
   b. Its accumulation in the blood is associated with a decrease in pH.
   c. More CO_2 dissolves in the blood plasma than is carried in the RBCs.
   d. CO_2 concentrations are greater in venous blood than arterial blood.
   e. All of the above are incorrect.

80. How is the bulk of carbon dioxide carried in blood?
   a. Chemically combined with the amino acids of hemoglobin as carbaminohemoglobin in the red blood cells
   b. As the bicarbonate ion in the plasma
   c. As carbonic acid in the plasma
   d. Chemically combined with the heme portion of hemoglobin
   e. None of the above

81. The respiratory membrane is a combination of _____.
   a. Respiratory bronchioles and alveolar ducts
   b. Alveolar and capillary walls and their fused basement membranes
   c. Atria and alveolar sacs
   d. Respiratory bronchioles and alveolar sacs
   e. None of the above

82. Which of the following muscles is LEAST involved in respiration?
   a. Diaphragm
   b. Pectoralis major
   c. External intercostals
   d. Internal intercostals
   e. Sternocleidomastoids

Respiratory System Questions

83. During expiration, pressure would be greatest in which of the following?
    a. Terminal bronchiole
    b. Respiratory bronchiole
    c. Trachea
    d. Larynx

84. Which of the following would have the highest Po_2?
    a. Blood in a systemic vein
    b. Muscle tissue
    c. Blood in a pulmonary artery
    d. Blood in a pulmonary vein

85. The greatest surface area for gas exchange occurs within the
    a. Larynx
    b. Bronchioles
    c. Trachea
    d. Alveoli
    e. Bronchi

86. Contraction of the diaphragm causes thoracic volume to _____ and intrapulmonary pressure to _____.
    a. Increase – increase
    b. Decrease – decrease
    c. Increase – decrease
    d. Decrease – increase

87. Histamine will _____ bronchioles causing resistance to _____ and airflow to _____.
    a. Constrict - increase – decrease
    b. Constrict - decrease – increase
    c. Dilate - increase – decrease
    d. Dilate - decrease – increase

88. Which of the following muscles would contract most vigorously if you tried to blow out a candle?
    a. Diaphragm
    b. External intercostals
    c. Rectus abdominus
    d. Serratus anterior

89. Pleural fluid does which of the following?
    a. Acts as a lubricant
    b. Helps hold the visceral and parietal pleural membranes together
    c. Acts as a surfactant
    d. Contracts during inspiration
    e. 2 of the above

90. The "chloride shift" refers to the:
    a. The exchange of chloride and hydrogen ions that occurs within the alveoli.
    b. The exchange of chloride and bicarbonate ions between erythrocytes and plasma
    c. An abnormal situation where chloride ions stimulate the ventral respiratory group.
    d. None of the above

Respiratory System Questions

91. The formation of reduced hemoglobin is most likely to occur in which of the following locations?
    a. Systemic capillaries
    b. Alveoli
    c. Pulmonary capillaries
    d. Pulmonary arteries

92. Peripheral chemoreceptors are located in the _____ and respond to _____.
    a. Abdominal aorta - plasma pH
    b. Ventral medulla - CSF pH
    c. Bronchioles - oxygen tension
    d. Carotid sinus - plasma H+

93. The partial pressure of oxygen in arterial blood is approximately
    a. 40 mmHg
    b. 45 mmHg
    c. 50 mmHg
    d. 70 mmHg
    e. 100 mmHg

~~94. Which of the following is NOT a function of the respiratory system?~~
    ~~a. Singing~~
    ~~b. Smelling~~
    ~~c. Gas exchange~~
    ~~d. All of the above~~
    ~~e. Just 2 of the above~~

95. Gas exchange between alveolar air and pulmonary capillary blood is referred to as internal respiration.
    a. True
    b. False

96. All structures of the conducting zone are superior to all structures of the respiratory zone.
    a. True
    b. False

97. In order for inspiration to occur, atmospheric pressure must be less than intrapulmonary pressure.
    a. True
    b. False

98. Cellular respiration occurs in mitochondria and its products include O_2, CO_2, and ATP.
    a. True
    b. False

99. Alveoli are the sites of gas exchange.
    a. True
    b. False

100. The parietal pleura covers the superior surface of the diaphragm.
    a. True
    b. False

101. The number of cilia in the respiratory zone is less than the number of cilia in the conducting zone.
    a. True
    b. False

Respiratory System Questions

102. During inspiration the diaphragm relaxes and moves inferiorly.
   a. True
   b. False

103. The respiratory membrane is composed of all of the following EXCEPT:
   a. Type I alveolar cells
   b. Type II alveolar cells
   c. Pulmonary endothelial cells
   d. Basement membranes
   e. 2 of the above

104. Mr. Maravich blew out the candle from 5 feet away. Which of the following muscles was not used to extinguish the flame?
   a. Internal intercostals
   b. Diaphragm
   c. Rectus abdominis
   d. Transverse abdominis
   e. External obliques

105. Stimulation of the phrenic nerve will cause the diaphragm to relax.
   a. True
   b. False

106. A large rise in lung compliance will make it difficult to:
   a. Inhale
   b. Exhale

107. The alveolar Po_2 and Pco_2 were each 100mmHg. The plasma Po_2 and Pco_2 were each 10mmHg. Which gas would dissolve in the plasma in greater amounts?
   a. Oxygen
   b. Carbon dioxide

108. During exercise, the % saturation of hemoglobin in the systemic veins is probably:
   a. 100%
   b. 90%
   c. 75%
   d. 25%

109. High levels of O_2 promote the formation of reduced hemoglobin.
   a. True
   b. False

110. Low pH promotes the formation of oxyhemoglobin.
   a. True
   b. False

111. Peripheral chemoreceptors are found in the aortic arch and carotid sinuses.
   a. True
   b. False

Respiratory System Questions

Use the following answer choices for items 112-269:

a. increase
b. decrease
c. stay the same

112. If ventilation decreases, plasma Pco_2 will:

113. If ventilation decreases, plasma pH will:

114. If ventilation increases, plasma HCO_3^- will:

115. As blood travels from a pulmonary artery to a pulmonary vein, its plasma levels of bicarbonate will:

116. As blood travels from the right ventricle all the way to the left atrium, the saturation level of hemoglobin will:

117. Relaxation of the diaphragm causes thoracic volume to:

118. Severe constipation will cause plasma pH to:

119. To compensate for a rise in plasma pH, respiratory rate will:

120. An inability to produce surfactant will cause lung compliance to:

121. As CSF pH decreases, the rate and depth of breathing will:

122. Epinephrine causes resistance in the bronchioles to:

123. As blood flows from the inferior vena cava all the way to the ascending aorta, its bicarbonate levels will:

124. As lung volume decreases, lung pressure will:

125. As you travel from the large bronchi to the bronchioles, the number of goblet cells will:

126. As air travels from the alveoli to the nares during expiration, its water content will:

127. As blood moves from the pulmonary trunk to the pulmonary veins, the partial pressure of carbon dioxide in that blood will:

128. As the thickness of the respiratory membrane increases, the rate at which O_2 molecules diffuse from alveolar air into capillary blood will:

129. As the diaphragm and external intercostals relax, intrapulmonary pressure will:

130. As exercise proceeds, the saturation of hemoglobin in the venous blood will:

131. The serratus posterior superior is a muscle that attaches to ribs 2-5 and elevates them when it contracts. Thus, contraction of the serratus posterior superior will cause intrathoracic pressure to…

132. The serratus posterior inferior is a muscle that attaches to ribs 8-12 and depresses them when it contracts. Thus, contraction of the serratus posterior inferior will cause intrapulmonary pressure to:

Respiratory System Questions

133. In response to metabolic acidosis, respiratory rate will:

134. Decreased compliance will cause tidal volume to:

~~135. Plasma Pco_2 in respiratory acidosis is _____ plasma Pco_2 in respiratory alkalosis.~~

136. If ventilation increases, plasma H+ will:

137. An increase in Pco2 will cause hemoglobin's affinity for oxygen to:

138. Forced inhalation will cause the pressure in the thoracic venae cavae to:

139. A lack of functioning type II alveolar cells would cause alveolar surface tension to:

140. In response to metabolic acidosis, respiratory rate will:

141. As blood flows from the inferior vena cava all the way to the ascending aorta, its bicarbonate levels will:

142. As lung volume decreases, lung pressure will:

143. As lung fibrosis increases, the efficiency of ventilation will:

144. As plasma [epinephrine] increases, resistance to airflow in the bronchioles will:

145. As volume increases, pressure will:

146. As anatomical dead space increases, efficiency of ventilation will:

147. When hemoglobin binds a second molecule of oxygen, its affinity for oxygen will:

148. As carbon monoxide intake increases, cellular ATP production will:

149. As plasma partial pressure of CO_2 increases, hemoglobin's affinity for oxygen will:

150. As core body temperature decreases, hemoglobin's affinity for oxygen will:

151. As lung compliance decreases, the plasma [HCO_3^-] of the pulmonary veins will:

152. As a red blood cell travels from pulmonary arterioles to pulmonary venules, the amount of Cl^- within it will:

153. As surfactant production decreases, alveolar surface tension will:

154. As blood flows from the radial artery to the radial vein, the partial pressure of oxygen in that blood will:

155. As plasma [histamine] increases, bronchiole diameter will:

156. As plasma Pco_2 increases, plasma pH will:

157. As the activity of the ventral respiratory group in the medulla oblongata increases, the amount of air inspired and expired per unit time will:

Respiratory System Questions

Being an intrepid and intelligent scientist, you've embarked on a series of experiments to determine the physiology of respiration. The next 3 questions will deal with your groundbreaking experiments. You've hooked your assistant, Otto, to a machine that monitors respiration rate, P_{CO_2}, P_{O_2}, and pH.

158. Your first experiment was to inject lactic acid into Otto's bloodstream. You would expect his plasma pH to _____ and his respiration rate to _____.

159. In your second experiment, you forced Otto to breathe in pure carbon dioxide. You noticed that his tissue P_{O_2} _____ and his plasma pH _____.

160. In your final experiment, you gave Otto a chemical (Acetazolamide) that prevented carbonic anhydrase from working. You noticed that in response to this, his plasma P_{CO_2} _____

161. Contraction of the diaphragm will cause intrapleural pressure to:

162. A hole in the wall of an alveolar sac in the left lung would cause the size of the left lung to:

163. As a red blood cell travels from the pulmonary trunk to the pulmonary veins, its chloride content will:

164. As blood travels from the pulmonary trunk to the pulmonary veins, its $[HCO_3^-]$ will:

165. During an asthma attack, airway resistance will:

166. An autoimmune disease that resulted in the destruction of Type II alveolar cells would cause lung compliance to:

167. The massive histamine release during anaphylactic shock will result in a(n) _____ in the alveolar P_{O_2}.

168. In emphysema, the total surface area of the respiratory membrane will:

169. As blood flows from the abdominal aorta eventually to the inferior vena cava, its P_{O_2} will:

170. Breathing in carbon monoxide will cause the body's ability to transport oxygen to:

171. During aerobic exercise the saturation of hemoglobin in venous blood will:

172. An increase in tissue lactic acid production will cause hemoglobin's affinity for oxygen to:

173. Hypercapnia will cause plasma pH to:

~~174. Increased activity of the dorsal respiratory group will cause the level of muscle contraction in the external intercostals to:~~

175. An increase in plasma P_{CO_2} will cause the activity of pH receptors in the medulla to:

176. At the beginning of expiration, intrapulmonary pressure will:

177. As you travel from the large bronchi to the bronchioles, the percentage of the airway wall that contains smooth muscle will:

Respiratory System Questions

178. A decrease in blood pressure will cause the rate of respiration to:

179. As plasma pH increases, hemoglobin's affinity for oxygen will:

180. As body temperature increases, hemoglobin's affinity for oxygen will:

181. In response to diaphragm contraction, intrapulmonary pressure will:

182. As parasympathetic activity increases, the resistance to airflow in the bronchioles will:

183. Cigarette smoking causes the function of tracheal cilia to:

184. For an ideal gas, as volume increases, pressure will:

185. As the rate and depth of pulmonary ventilation increases, blood pH will:

186. As plasma Pco_2 rises, the rate of respiration would most likely:

187. As surfactant production increases, alveolar surface tension will:

188. As plasma epinephrine increases, bronchiole diameter will:

189. As the diaphragm contracts, the difference between intrapulmonary pressure and atmospheric pressure will:

190. As volume decreases, pressure will:

191. As activity of the VRG increases, the volume of air expired will most likely:

192. Contraction of the diaphragm will cause alveolar pressure to:

193. Contraction of the pectoralis minor and external intercostals will cause intrapleural pressure to:

194. As air travels from the alveoli to the nasal cavity, its H_2O content will:

195. As air travels from the nasal cavity to the alveoli, its particle content will:

196. As blood travels from the right atrium to the left atrium, its Pco_2 will:

197. As air ENTERS the lungs during inspiration, intrapulmonary pressure will:

198. A decrease in thoracic volume will cause thoracic pressure to:

199. An increase in sympathetic nervous activity will cause resistance to airflow in the bronchioles to:

200. Histamine will cause the level of muscle contraction in bronchiole smooth muscle to:

201. A decrease in pH will cause hemoglobin's affinity for oxygen to:

202. As you travel down the respiratory tract from bronchi to alveolar sacs, the number of goblet cells present will:

Respiratory System Questions

203. As you travel down the respiratory tract from bronchi to alveolar sacs, the total cross-sectional area will:

204. During hyperventilation plasma levels of CO_2 decline. This would cause the activity of the vasomotor center to _____ and blood pressure to _____.

205. As cerebrospinal fluid pH decreases, respiratory rate and depth will:

206. As plasma [H+] increases, the strength of the bond between hemoglobin and oxygen will:

207. In response to metabolic acidosis, respiratory rate and depth will:

208. Excessive diarrhea will cause plasma pH to:

209. If air enters the left pleural cavity the size of the left lung will:

210. At constant temperature, an increase in volume will cause pressure to:

211. Severe bronchoconstriction will cause airway resistance to:

212. During exercise minute ventilation will:

213. As plasma P_{CO_2} increases, plasma pH will:

214. A decrease in cerebrospinal fluid pH will cause respiratory rate to:

215. Injection of NaOH (a base) into the plasma will cause respiratory rate and depth to:

216. A decrease in plasma P_{CO_2} will cause cerebrospinal fluid pH to:

217. Increased activity of the ventral respiratory group will cause thoracic volume to:

218. Hypoventilation will cause plasma [HCO_3^-] to:

219. Ketogenic diets will cause plasma pH to:

220. Hyperventilation will cause plasma P_{CO_2} to:

221. Severe diarrhea will cause plasma pH to:

222. Testosterone causes the size of the thyroid cartilage to:

223. As you travel from primary bronchus to terminal bronchiole, the number of alveoli present will:

224. Bronchodilation will cause resistance to airflow to:

225. As blood flows from the left atrium to the right atrium in an adult, its P_{O_2} will:

226. As blood travels from the left pulmonary artery to the left pulmonary vein, its P_{CO_2} will:

227. As blood travels from a pulmonary artery to a pulmonary vein, the amount of HbO_2 it contains will:

Respiratory System Questions

228. As blood travels from a pulmonary artery to a pulmonary vein, the amount of bicarbonate in the plasma will:

229. As blood travels from a pulmonary artery to a pulmonary vein, its plasma chloride content would:

230. A decrease in CSF pH will cause respiratory rate to:

231. An increase in plasma P_{CO_2} will cause respiratory rate and depth to:

232. In response to metabolic alkalosis, respiratory rate and depth will:

233. Excessive vomiting can cause plasma pH to:

234. Hypoventilation can cause plasma pH to:

235. As blood flows from the pulmonary trunk to the left atrium, its P_{O_2} will:

236. As blood flows from the splenic artery to the inferior vena cava, plasma levels of bicarbonate will:

237. In response to a decrease in plasma [H+], respiratory rate and depth will:

238. As plasma P_{CO_2} rises, the pH of cerebrospinal fluid will:

239. An increase in sympathetic activity will cause bronchiole diameter to:

240. Excessive stretch of the lungs will cause the activity of inspiratory neurons in the medulla to:

241. As you travel from the primary bronchi to the bronchioles, the amount of cartilage present will:

242. An increase in intrapleural volume will cause intrapleural pressure to:

243. Contraction of the diaphragm will cause thoracic volume to:

244. Relaxation of the diaphragm will cause intrapulmonary pressure to:

245. As blood flows from a pulmonary arteriole to a pulmonary venule, its P_{CO_2} will:

246. As blood flows from a systemic arteriole to a systemic venule, its P_{O_2} will:

247. As blood flows from a pulmonary arteriole to a pulmonary venule, its hemoglobin saturation level will:

248. As P_{CO_2} increases, the affinity that hemoglobin has for oxygen will:

249. As pH increases, the affinity that hemoglobin has for oxygen will:

250. As blood flows from a systemic arteriole to a systemic venule, blood levels of carbaminohemoglobin will:

251. As blood flows from a pulmonary arteriole to a pulmonary venule, plasma levels of bicarbonate will:

252. As blood flows from a pulmonary arteriole to a pulmonary venule, plasma levels of chloride will:

Respiratory System Questions

253. Pulmonary edema caused by failure of the left side of the heart is the most common cause of an increase in the thickness of the respiratory membrane. Such an increase in thickness would cause the rate of gas exchange to:

254. As plasma Pco_2 increases, CSF pH will:

255. If ventilation rate and depth increases, plasma HCO_3^- will:

256. *Muller's maneuver* is an attempt at forced inspiration (just after forced expiration) made with a closed mouth and nose (or glottis). This would cause intrathoracic pressure to:

257. As air flows from the nostrils to the bronchi, its H_2O content will normally:

258. A decrease in thoracic volume will cause intrapulmonary pressure to:

259. As blood travels from the right ventricle all the way to the left atrium, the saturation levels of hemoglobin will:

260. When the diaphragm contracts, the pressure in the abdominal cavity will:

261. Severe constipation will cause plasma pH to:

262. To compensate for a rise in plasma pH, respiratory rate will:

263. As CSF pH decreases, respiratory rate will:

264. As air flows from the nares to the glottis, its temperature will typically:

265. If the function of the mucociliary escalator declined, the likelihood of acquiring a respiratory infection will:

266. In response to metabolic alkalosis, the rate of respiration will:

267. An increase in respiratory rate and depth would cause plasma levels of bicarbonate to:

268. As blood travels from the aorta to the superior vena cava, its Pco_2 will:

269. A decrease in the partial pressure of oxygen in alveolar air would cause the rate of oxygen diffusion across the respiratory membrane to:

Use the following answer choices for items 270-283.

a. greater/more than
b. less/fewer than
c. the same as

270. The % of blood oxygen dissolved in plasma is _____ the % of blood oxygen bound to hemoglobin.

271. The percentage of atmospheric gas composed of nitrogen is _____ the percentage of atmospheric gas composed of oxygen.

Respiratory System Questions

~~272. The symptoms associated with the primary response to an antigen are typically _____ the symptoms associated with the secondary response to an antigen.~~

273. The amount of gas exchange that occurs in a terminal bronchiole is _____ the amount of gas exchange that occurs in a respiratory bronchiole.

274. The rate at which O_2 detaches from hemoglobin when temperature is high is _____ the rate at which O_2 detaches from hemoglobin when temperature is low.

275. Po_2 of blood in a systemic artery is _____ the Po_2 of blood in a systemic vein.

276. The amount of ATP used by respiratory muscles during quiet inspiration is _____ the amount of ATP used by respiratory muscles during quiet expiration.

277. The amount of cartilage in the wall of a bronchiole is _____ the amount of cartilage in the wall of a tertiary bronchus.

278. The percentage of CO_2 dissolved in plasma is _____ the percentage of CO_2 transported as bicarbonate.

279. The pressure within the lungs just before inspiration is _____ the pressure within the pleural cavity just before inspiration.

280. The respiration rate in response to high plasma Pco_2 is _____ the respiration rate in response to low plasma Pco_2.

281. The rate at which O_2 detaches from hemoglobin when pH is low is _____ the rate at which O_2 detaches from hemoglobin when pH is high.

282. The respiratory rate in response to a drop in blood pressure is _____ the respiratory rate in response to a rise in blood pressure.

283. The total number of lobes in the lungs is _____ the total number of lobes on the liver.

---

284. What type of epithelium would you expect to find lining the lumen of the nasal cavity?
   a. Squamous ciliated epithelium without goblet cells
   b. Transitional epithelium with goblet cells
   c. Stratified squamous epithelium
   d. Pseudostratified epithelium
   e. None of the above

285. The groove inferior to a nasal concha is known as a:
   a. Meatus
   b. Papilla
   c. Eustachian groove
   d. Lithysis
   e. Suture

Respiratory System Questions

286. Consider the following statement: All laryngeal cartilages are made of hyaline cartilage. Which of the following is correct?
   a. The statement is true
   b. The statement is false because the thyroid cartilage is elastic cartilage
   c. The statement is false because the cricoid cartilage is fibrocartilage
   d. The statement is false because the glottis is elastic cartilage
   e. The statement is false because the epiglottis is elastic

287. Which of the following is TRUE?
   a. The trachea is reinforced by 60-80 C-shaped rings of cartilage
   b. The trachealis is the ligament that connects the anterior open portion of the tracheal cartiliginous rings
   c. The trachea is part of the respiratory zone
   d. The trachea is part of the conducting zone

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

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

290. Which of the following is TRUE?
   a. Intrapleural pressure is ALWAYS GREATER than intrapulmonary pressure
   b. Intrapulmonary pressure is ALWAYS GREATER than atmospheric pressure
   c. Intrapleural pressure is ALWAYS LESS than atmospheric pressure
   d. Intrapulmonary pressure is ALWAYS LESS than atmospheric pressure

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

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

293. The scalenes and sternocleidomastoids are predominantly involved in:
   a. Active inspiration
   b. Active expiration
   c. Quiet inspiration
   d. Quiet expiration

294. If John's vital capacity is 4.5L and his tidal volume is 525cc, then what is his inspiratory reserve volume?
   a. 3975mL
   b. 2075mL
   c. 1050mL
   d. Cannot be determined from the information given

295. What test measures the amount of gas expelled when one takes a deep breath and exhales maximally and rapidly?
   a. Forced expiratory volume test
   b. Forced vital capacity test
   c. Forced residual capacity test
   d. Forced internal thoracic volume assessment

Respiratory System Questions

296. Which of the following is NOT a component of the respiratory membrane?
   a. Plasma membrane of the alveolar cell
   b. Plasma membrane of the capillary endothelial cell
   c. Fused basement membranes of the alveolar and the capillary endothelial cell
   d. All of the above are members of the respiratory membrane

297. If alveolar Pco2 is high, the diameter of the local bronchiole will _____.

298. The binding of oxygen to hemoglobin is characterized as:
   a. Compliant
   b. Irreversible
   c. Reversible
   d. Noncompliant

299. 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 _____.

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

301. Air and food are routed into the proper channels by the:
   a. Trachea
   b. Pharynx
   c. Larynx
   d. Carina

302. Total lung capacity is equal to:
   a. Vital capacity x Tidal volume
   b. Functional residual capacity + Expiratory reserve volume
   c. Anatomical dead space + Alveolar dead space
   d. Residual volume + Vital capacity

303. Which of the following has the greatest surface area for exchange?
   a. Pulmonary veins
   b. Alveoli
   c. Respiratory bronchioles
   d. Terminal bronchioles

304. Select the correct statement about O2 transport in the blood.
   a. During normal activity, a molecule of Hb returning to the lungs contains one molecule of oxygen
   b. As pH decreases, oxygen's affinity for Hb increases
   c. A 50% oxygen saturation level of blood returning to the lungs might indicate a higher activity level than normal
   d. All of the above

305. Oxygen and carbon dioxide are exchanged through all cell membranes by _____.

306. 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.

307. The first structure of the respiratory zone is the _____.

308. The presence of air in the interpleural space is known as _____.

Respiratory System Questions

309. Which of these values would normally be the highest?
   a. Tidal Volume
   b. Inspiratory Reserve Volume
   c. Expiratory Reserve Volume
   d. Residual Volume
   e. Vital Capacity

310. Most CO2 is transported in the blood in the form of:
   a. Dissolved gas
   b. Carbaminohemoglobin
   c. Bicarbonate ion
   d. Carboxyhemoglobin

311. Rank the following in terms of diameter (from smallest to largest).
   a. Alveolar Duct
   b. Tertiary Bronchus
   c. Trachea
   d. Secondary Bronchus

312. Which of the following is true?
   a. The thyroid cartilage is the smallest of the laryngeal cartilages
   b. The cricoid cartilage is inferior to the thyroid cartilage
   c. The laryngeal prominence is part of the cuneiform cartilage
   d. The laryngeal prominence is larger in females than in males
   e. There are 4 pairs of cartilage and 1 unpaired cartilage in the larynx

313. Which of the following cells produce surfactant in lung alveoli?
   a. Endothelial cells
   b. Clara cells
   c. Type I cells
   d. Type II cells
   e. Dust cells

314. Progressing from the nasopharynx to the lung, alveoli are first encountered in which of the following?
   a. Trachea
   b. Bronchiole
   c. Terminal bronchiole
   d. Respiratory bronchiole
   e. Alveolar duct

315. Which of the following structures does not have cartilage associated with it?
   a. Bronchiole
   b. Bronchi (small)
   c. Bronchi (large)
   d. Trachea
   e. Larynx

316. Which of the following would not be seen in a cross-section of a trachea?
   a. Perichondrium
   b. Elastic cartilage
   c. Lamina propria
   d. Dense connective tissue
   e. Lymphoid nodules

Respiratory System Questions

317. Goblet cells are absent from which of the following regions of the respiratory system?
   a. Nasopharynx
   b. Larynx
   c. Trachea
   d. Bronchi
   e. Terminal Bronchioles

318. The loudness of a person's voice depends on:
   a. The thickness of the vestibular folds
   b. The length of the vocal folds
   c. The strength of the intrinsic laryngeal muscles
   d. The force with which air rushes through the glottis
   e. The thickness of the true vocal folds

319. Inspiratory capacity is:
   a. The total amount of air that can be inspired after a tidal expiration
   b. The total amount of exchangeable air
   c. Another name for functional residual capacity
   d. The amount of air inspired after a tidal inspiration
   e. A and c are correct

320. Which of the following changes occur as conducting tubes become smaller?
   a. Cartilage rings are replaced by irregular cartilage plates
   b. Mucosal epithelium thickens
   c. Smooth muscle disappears
   d. Goblet cells increase
   e. All of the above

321. The nose serves all the following functions except:
   a. Passageway for air movement
   b. Olfaction
   c. Warming inspired air
   d. Filtering inspired air
   e. Removing water from inspired air

322. Tidal volume is air:
   a. Remaining in the lungs after forced expiration
   b. Exchanged during normal breathing
   c. Inhaled after quiet inspiration
   d. Forcibly expelled after normal expiration

323. Most inspired particles (e.g., dust) fail to reach the lungs because of the:
   a. Ciliated mucous lining in the nose
   b. Abundant blood supply to the nasal mucosa
   c. Porous structure of the conchae
   d. Contraction of the epiglottis
   e. 2 of the above

Respiratory System Questions

324. Most oxygen carried in the blood is:
   a. In solution with the plasma
   b. Combined with plasma proteins
   c. Chemically combined with a heme group
   d. Carried as HCO3-
   e. Bound to the amino acid valine on the beta chain of hemoglobin

325. The number of lobes in the right lung is _____ the number of lobes in the left lung.
   a. Greater than
   b. Less than
   c. The same as

326. The length of the right primary bronchus is _____ the length of the left primary bronchus.
   a. Greater than
   b. Less than
   c. The same as

327. The percentage of oxygen dissolved in plasma is _____ the percentage of oxygen transported as oxyhemoglobin.
   a. Greater than
   b. Less than
   c. The same as

328. The total surface area of the lungs is _____ the total surface area of the colon.
   a. Greater than
   b. Less than
   c. The same as

329. During inspiration, atmospheric pressure is _____ intrapulmonary pressure.
   a. Greater than
   b. Less than
   c. The same as

330. Blood pH is typically between _____. Hyperventilation will cause it to _____.
   a. 7.2-7.3; increase
   b. 7.3-7.3; decrease
   c. 7.35-7.45; increase
   d. 7.35-7.45; decrease

331. Plasma Pco_2 in respiratory acidosis is _____ plasma Pco_2 in respiratory alkalosis.
   a. Greater than
   b. Less than
   c. The same as

332. Which of the following does NOT belong?
   a. Trachea
   b. Nasal cavity
   c. Alveolus
   d. Pharynx
   e. Bronchus

Respiratory System Questions

333. Which of the following is NOT a component of the skeletal framework of the nose?
   a. Left nasal bone
   b. Right nasal bone
   c. Left maxillary bone
   d. Frontal bone
   e. Left zygomatic bone

334. Select the correct statement about O_2 transport in the blood.
   a. During normal activity, a molecule of hemoglobin returning to the lungs contains one molecule of oxygen
   b. As pH decreases, oxygen's affinity for hemoglobin increases
   c. Increased BPG levels in the RBC enhance oxygen loading
   d. A 50% oxygen saturation level of blood returning to the lungs might indicate a higher activity level than normal
   e. As pH increases, oxygen's affinity for hemoglobin decreases

335. The most important receptors for respiration regulation are:
   a. Located in the brachial artery
   b. Most sensitive to changes in plasma P_{CO_2}
   c. Affected by changes in CSF pH
   d. Not found in the brainstem
   e. Only located in atrial anastomoses

336. Which of the following is an INCORRECT association?
   a. Anoxia – Deficiency of O_2
   b. Dyspnea – Labored breathing
   c. Apnea – Excessively high breathing rate
   d. Pleurisy – Inflammation of the pleura
   e. Bronchitis – Inflammation of the bronchi

337. In order for inspiration to occur, intrapulmonary pressure must be higher than atmospheric pressure.
   a. The above statement is TRUE
   b. The above statement is FALSE

Identify the following 5 items by using the answer choices below.

a. Nose
b. Nasal Cavity
c. Pharynx
d. Larynx
e. Trachea

338. Structure formed in part by alar and septal cartilages
339. Contains olfactory epithelium
340. Contains the adenoids as well as areas with stratified squamous epithelium
341. Contains elastic cartilage as well as hyaline cartilage
342. Contains the openings to tubes that allow for equalization of air pressure in the middle ear with atmospheric pressure

Respiratory System Questions

343. Which of the following is TRUE of the nasal cavity?
   a. It is a site of gas exchange
   b. It has bony ridges called conchae on its medial wall
   c. It contains 2 auditory tubes
   d. It is lined by pseudostratified ciliated columnar epithelium
   e. None of the above

344. Which of the following is closest to the hyoid bone?
   a. Frontal sinus
   b. Thyroid cartilage
   c. Cricoid cartilage
   d. Carina
   e. Ethmoid sinus

345. Which of the following is TRUE?
   a. The right primary bronchus is longer than the left primary bronchus.
   b. The apex of the lung is just deep to the 5th rib.
   c. The trachea lacks cartilage on its anterior surface.
   d. There are fewer secondary bronchi on the left than on the right.

346. Carbon dioxide is mostly transported in the blood:
   a. Dissolved in the plasma
   b. Bound to the heme portion of hemoglobin
   c. Bound to the globin portion of hemoglobin
   d. Within bicarbonate ions
   e. Attached to oxygen via a disulfide bridge

347. All of the following are causes of metabolic acidosis EXCEPT:
   a. Diabetes mellitus
   b. Excessive vomiting
   c. Renal disease
   d. Starvation

348. Which of the following is NOT TRUE?
   a. The hemoglobin in systemic veins is usually 75% saturated with oxygen.
   b. The formation of carbonic acid is catalyzed by carbonic anhydrase.
   c. The formation of scar tissue in the lungs increases their compliance.
   d. The hemoglobin in pulmonary veins is usually 100% saturated with oxygen.

349. Gas exchange between plasma and tissue fluid is _____ respiration.
   a. Internal
   b. External
   c. Systemic
   d. Cellular

350. During inspiration, pressure in the trachea is _____ pressure in the alveoli.
   a. Greater than
   b. Less than
   c. The same as

Respiratory System Questions

351. Which of the following does NOT enter or exit the lung at its hilum?
   a. Arteries
   b. Veins
   c. Bronchioles
   d. Lymphatic vessels

352. Which of the following is NOT lined by the parietal pleura?
   a. Lungs
   b. Superior surface of the diaphragm
   c. Lateral thoracic wall
   d. Anterior thoracic wall

353. During swallowing the epiglottis moves _____ to cover the opening to the _____.
   a. Down – larynx
   b. Up – larynx
   c. Down – nasopharynx
   d. Up – nasopharynx

354. During inspiration which of the following would be passed LAST by an oxygen molecule?
   a. Tertiary bronchus
   b. Carina
   c. Oropharynx
   d. True vocal cords

355. Which of the following is the SMALLEST?
   a. Total number of bones that contain paranasal sinuses
   b. Total number of lung lobes
   c. Total number of tertiary bronchi
   d. Total number of bones that make up the hard palate

356. The amount of air remaining in the lungs at the end of maximal expiration is known as the:
   a. Functional vital capacity
   b. Tidal volume
   c. Expiratory reserve volume
   d. Residual volume
   e. Expiratory capacity

357. Which of the following would occur as a result of severe hypercapnia?
   1. Activation of peripheral CO_2 receptors
   2. Activation of central pH receptors
   3. Activation of peripheral pH receptors
   4. Increase in respiratory rate and depth
   5. Increase in heart rate

   a. 1 and 4
   b. 1, 4, and 5
   c. 1, 2, 3, and 5
   d. 1, 2, and 4
   e. 1, 2, 3, 4, and 5

Respiratory System Questions

358. Pain and emotions have NO effect on respiration rate or depth.
   a. This statement is TRUE
   b. This statement is FALSE

359. Which of the following cell types are NOT matched with a correct location?
   a. Dust cells - alveoli
   b. Type II alveolar cells – trachealis muscle
   c. Chondrocytes – cartilaginous rings of the trachea
   d. Pseudostratified ciliated columnar epithelial cells – nasal cavity
   e. Goblet cells – tracheal mucosa

360. The nutrient blood supply of the lungs is supplied by the:
   a. Pulmonary arteries
   b. Descending aorta
   c. Pulmonary veins
   d. Ligamentum arteriosum
   e. Bronchial arteries

361. During inspiration, a molecule of oxygen would pass thru:
   a. The laryngopharynx before the oropharynx
   b. A tertiary bronchus before the pharynx
   c. A respiratory bronchiole before an alveolar duct
   d. The trachea before the glottis
   e. None of the above are correct

362. Breathing through one's mouth rather than through one's nose would cause:
   a. A decrease in the humidification of the inspired air
   b. The inspired air to arrive at the lungs at a higher temperature
   c. The amount of particular matter that entered the trachea to be lower
   d. An increase in the water content of the air reaching the alveoli
   e. None of the above

363. Keith was born with an abnormal trachea in which the cartilaginous rings completely encircle the trachea rather than being C-shaped. As a result, Keith:
   a. Is unable to synthesize tracheal mucus
   b. Will have a decreased ability to inspire air when the atmospheric pressure is 760mmHg
   c. Will have difficulty swallowing
   d. Will be unable to filter inspired air
   e. Will be unable to sense changes in plasma pH because his carotid chemoreceptors will be physically compressed

364. In which of the following would you find stratified squamous epithelium?
   a. Oropharynx but not the nasopharynx
   b. Nasopharynx but not the oropharynx
   c. Oropharynx but not the laryngopharynx
   d. Laryngopharynx but not the oropharynx
   e. None of the above

Respiratory System Questions

365. Which of the following is TRUE of inspiration?
   a. It is an entirely voluntary process
   b. It involves neurons in the brainstem and skeletal muscle in the thorax
   c. It is usually passive and occasionally active
   d. In order for it to occur, intrapulmonary pressure must be less than intrapleural pressure
   e. 2 of the above

366. The total volume of air that one can inhale is known as the inspiratory reserve volume.
   a. The above statement is TRUE
   b. The above statement is FALSE

367. Cellular respiration is responsible for:
   a. High Po_2 in the systemic tissues
   b. Low Po_2 in the alveoli
   c. High Pco_2 in the systemic tissue
   d. High Po_2 in the alveoli
   e. None of the above

368. Which of the following is TRUE?
   a. Gas exchange occurs primarily in the conducting zones, e.g., the alveoli
   b. The external nose lacks cartilage
   c. A cross section of the soft palate would contain significant amounts of osseous tissue
   d. Nasal conchae increase the time required for air to pass through the nasal cavity
   e. The pharynx is lined entirely by respiratory epithelium

369. Type I alveolar cells are:
   a. Simple cuboidal and secrete surfactant
   b. Simple cuboidal and do not secrete surfactant
   c. Simple squamous and secrete surfactant
   d. Simple squamous and do not secrete surfactant
   e. Either simple squamous or transitional

370. The exchange of gases between alveolar air and the blood is:
   a. Cellular respiration
   b. Aerobic respiration
   c. Internal respiration
   d. External respiration
   e. Anaerobic respiration

371. Curare is a drug that can prevent skeletal muscles from contracting. Thus, curare would have a greater effect on one's ability to breathe out than on one's ability to breathe in.
   a. The above statement is TRUE
   b. The above statement is FALSE

372. Which of the following muscles are NOT involved in inspiration?
   a. Diaphragm
   b. Scalenes
   c. Sternocleidomastoids
   d. Internal intercostals
   e. 2 of the above

Respiratory System Questions

373. Which of the following is TRUE?
   a. All laryngeal cartilages are hyaline cartilage
   b. The largest of the laryngeal cartilages is the cricoid cartilage
   c. The epiglottis functions to prevent the entry of food and liquid into the trachea
   d. Terminal bronchioles are the last portion of the conducting zone
   e. 2 of the above

374. The plasma [oxygen] is the primary determinant of ventilation rate.
   a. The above statement is TRUE
   b. The above statement is FALSE

375. Surfactant:
   a. Protects the surface of the lungs from resident roundworms
   b. Phagocytizes small particulates.
   c. Replaces mucus in the alveoli.
   d. Helps prevent the alveoli from collapsing.
   e. Is not found in healthy lung tissue.

376. The function of the nasal conchae is to:
   a. Divide the nasal cavity into a right and a left side.
   b. Provide an opening into the pharynx.
   c. Provide a surface for the sense of smell.
   d. Create turbulence in the air so as to trap small particulates in mucus.
   e. Provide an opening to the outside of the body.

377. Functions of the nasal cavity include all of the following, EXCEPT:
   a. Filtering the air.
   b. Warming the air.
   c. Humidifying the air.
   d. Acting as a reservoir during coughing.
   e. Acting as a resonating chamber in speech.

378. The hard palate separates the:
   a. Nasal cavity from the larynx.
   b. Left and right sides of the nasal cavity.
   c. Nasal cavity and the oral cavity.
   d. External nares from the internal nares.
   e. Soft palate from the nasal cavity.

379. The larynx is composed of _____ cartilages.
   a. 2
   b. 3
   c. 6
   d. 9
   e. 12

380. The 'glottis' is:
   a. The inferior margin of the soft palate.
   b. A flap of elastic cartilage.
   c. The opening to the larynx.
   d. The opening to the pharynx.
   e. Part of the hard palate.

Respiratory System Questions

381. The elastic cartilage that shields the opening to the larynx during swallowing is the _____ cartilage.
   a. Thyroid
   b. Cricoid
   c. Corniculate
   d. Cuneiform
   e. Epiglottic

382. The cartilage that serves as a base for the larynx is the _____ cartilage.
   a. Thyroid
   b. Cuneiform
   c. Corniculate
   d. Cricoid
   e. Arytenoids

383. Secondary bronchi specifically supply air to the:
   a. Lungs.
   b. Lobes of the lungs.
   c. Lobules of the lungs.
   d. Alveoli.
   e. Alveolar ducts.

384. The following is a list of some of the structures of the respiratory tree:
   1. Secondary bronchi
   2. Bronchioles
   3. Alveolar ducts
   4. Primary bronchi
   5. Respiratory bronchioles
   6. Alveoli
   7. Terminal bronchioles

The order in which air passes through these structures is:
   a. 4, 1, 2, 7, 5, 3, 6
   b. 4, 1, 2, 5, 7, 3, 6
   c. 1, 4, 2, 5, 7, 3, 6
   d. 1, 4, 2, 7, 5, 3, 6
   e. 2, 4, 1, 7, 5, 3, 6

385. The 'respiratory membrane' consists primarily of:
   a. Pseudostratified ciliated columnar epithelium
   b. Moist cuboidal epithelium.
   c. Simple squamous epithelium.
   d. Ciliated squamous epithelium.
   e. Surfactant cells.

386. The actual sites of gas exchange within the lungs are:
   a. Bronchioles.
   b. Alveolar ducts.
   c. Pleural spaces
   d. Alveoli.
   e. Terminal sacs.

Respiratory System Questions

387. Air moves into the lungs because:
a. The gas pressure in the lungs is less than outside pressure
b. The volume of the lungs decreases with inspiration.
c. The thorax is devoid of neuroregulatory tissue.
d. Contraction of the diaphragm decreases the volume of the pleural cavity.
e. None of the above

388. The partial pressure of carbon dioxide in the interstitial space of peripheral tissues is approximately
a. 40 mmHg
b. 45 mmHg
c. 50 mmHg
d. 70 mmHg
e. 100 mmHg

389. Expiratory movements are produced by contraction of the _____ muscle(s).
a. Scalenes
b. Diaphragm
c. Internal intercostals
d. External intercostals
e. All of the above

390. In quiet breathing:
a. Inspiration and expiration involve muscular contractions.
b. Inspiration is passive and expiration involves muscular contractions.
c. Inspiration involves muscular contractions and expiration is passive.
d. Inspiration and expiration are both passive processes.
e. None of the above

391. Air and food are routed into the proper channels by the:
a. Trachea
b. Pharynx
c. Oropharynx
d. Larynx
e. Carina

392. The function of type II alveolar cells is:
a. Phagocytosis and clonal selection
b. Clonal selection and secretion of surfactant
c. Clonal selection
d. Phagocytosis
e. Secretion of surfactant

393. If a molecule of oxygen enters the respiratory zone. It must have just exited:
a. The exchange zone
b. A respiratory bronchiole
c. A terminal bronchus
d. An alveolar conduction zone
e. A terminal bronchiole

Respiratory System Questions

394. Intrapulmonary pressure is pressure within the:
   a. Pleural cavity
   b. Pleural effluvium
   c. Alveoli of the lungs
   d. Atmosphere
   e. None of the above

395. With the Bohr effect, more oxygen is released because:
   a. A decrease in pH strengthens the hemoglobin-oxygen bond
   b. A decrease in pH weakens the hemoglobin-oxygen bond
   c. An increase in pH strengthens the hemoglobin-oxygen bond
   d. An increase in pH weakens the hemoglobin-oxygen bond

~~396. Nerve impulses from the _____ will result in inspiration.~~
   ~~a. Dorsal respiratory group~~
   ~~b. Pontine respiratory control center~~
   ~~c. Pneumopneustic center~~
   ~~d. Broca's area~~
   ~~e. Preoptic nucleus of the hypothalamus~~

397. Which of the following changes occurs as the conducting tubes of the lungs become smaller?
   a. Cartilage rings are replaced by rings of osseous tissue
   b. Resistance to air flow decreases as tube diameter decreases
   c. Amount of smooth muscle increases
   d. The epithelium lining the tubes doubles its keratin content
   e. The number of goblet cells lining the tubes increases

398. Respiratory control centers are located in the:
   a. Midbrain and medulla
   b. Pons and medulla
   c. Pons and midbrain
   d. Midbrain and conus medullaris
   e. None of the above

399. If you were trying to inflate a balloon:
   a. Your diaphragm would contract
   b. Your external intercostals would contract
   c. Your internal intercostals would contract
   d. Your sartorius would contract
   e. Your psoas major would contract

400. Hypocapnia would cause an increase in the acidity of the plasma.
   a. The above statement is TRUE
   b. The above statement is FALSE

401. Which of the following factors would increase the amount of oxygen discharged by hemoglobin to peripheral tissues?
   a. Decreased temperature
   b. Decreased pH
   c. Increased tissue PO_2
   d. Decreased amounts of carbon dioxide
   e. All of the above

Respiratory System Questions

402. When the diaphragm and external intercostals muscles contract:
   a. Expiration occurs.
   b. Intrapulmonary pressure increases.
   c. Intrapleural pressure decreases.
   d. The volume of the lungs decreases.
   e. None of the above

403. Which of the following is NOT TRUE?
   a. The nostrils are also known as the external nares
   b. The nasal cavity is lined by pseudostratified ciliated columnar epithelium
   c. Nasal conchae act to decrease the speed of air flow by making air flow more turbulent
   d. The oropharynx contains the palatine tonsils
   e. The nasopharynx is lined by stratified squamous epithelium

404. Which of the following is TRUE?
   a. The epiglottis covers the glottis during swallowing
   b. The esophagus is anterior to the trachea
   c. The thyroid and cricoid cartilages are composed of elastic cartilage
   d. The trachea divides into the 3 primary bronchi in the mediastinum
   e. 2 of the above

405. Which of the following is part of the conducting zone?
   a. Alveolar duct
   b. Alveolar sac
   c. Pulmonary capillary
   d. Respiratory bronchiole
   e. Terminal bronchiole

406. Which of the following is NOT TRUE?
   a. Each alveolar sac is surrounded by elastic fibers and pulmonary capillaries
   b. Type II alveolar cells produce surfactant
   c. Blood vessels and nerves enter/exit the lung at its hilus
   d. The respiratory membrane contains 3 layers of simple squamous epithelium
   e. 2 of the above

407. Which of the following is TRUE?
   a. The visceral pleura lines the chest wall and superior diaphragm
   b. A decrease in venous Po_2 would be expected during exercise
   c. 5 molecules of oxygen can bind to each molecule of hemoglobin
   d. The conversion of water and carbon dioxide to carbonic acid is catalyzed by carbonic anhydrase
   e. 2 of the above

408. Which of the following is NOT TRUE?
   a. External respiration – exchange of CO_2 and O_2 between alveolar air and blood
   b. Anaerobic respiration – produces ATP but does not require O_2
   c. Nasal cavity – primarily lined by stratified squamous epithelium
   d. Conducting zone – includes the entire trachea
   e. Respiratory zone – includes alveolar ducts

409. The air entering the nasal cavity via the external nares usually --?-- compared to the air entering the nasopharynx via the internal nares.

Respiratory System Questions

a. Is lower in temperature
b. Has a greater water content
c. Has less particulate matter
d. Is higher in pH
e. Is lower in pH

410. Which of the following is INCORRECT?
a. Rhinitis – inflammation of the nasal cavity
b. Apnea – breathing cessation
c. Dyspnea – labored breathing
d. Cheyne-stokes breathing – breathing normal for a pregnant woman
e. Pleurisy – inflammation of the pleura

411. Which of the following is TRUE of the larynx?
a. The smallest laryngeal cartilage is the thyroid cartilage
b. The cricoid cartilage is the most superior of the laryngeal cartilages
c. The true vocal cords are inferior to the false vocal cords
d. Air does not normally pass through the glottis
e. All of the above

412. Which of the following is TRUE?
a. Smoking stimulates cilia development and motility
b. The trachea contains bone but no cartilage
c. The right primary bronchus is wider, shorter, and more vertical than the left.
d. Tertiary bronchi typically have larger diameters than the secondary bronchi.
e. O_2 is the only gas ever present in the alveoli of the lungs.

413. Which of the following is TRUE of the lungs?
a. They occupy the entire mediastinum
b. The 2 lungs share a single pleural cavity
c. Pulmonary arteries enter the lungs at the hilus
d. The majority of the lungs is composed of muscle tissue
e. Deep to the 12^{th} rib is the apex of the lung

414. Which of the following muscles are involved in breathing?
I. Diaphragm
II. Sternocleidomastoids
III. External intercostals
IV. Internal intercostals

a. I, II, III, and IV
b. I, II, and III
c. I, II, and IV
d. I, III, and IV
e. II, III, and IV

415. Which of the following is TRUE?
a. The trachea is part of the anatomical dead space

Respiratory System Questions

b. Gas exchange across the respiratory membrane is primarily active transport
c. $HbCO_2$ is known as saturated oxyhemoglobin
d. All of the above
e. None of the above

416. Cyanide poisoning interferes with mitochondrial function. Thus, cyanide would most greatly impact:
a. Pulmonary ventilation
b. External respiration
c. Internal respiration
d. Cellular respiration
e. Breathing

417. Which of the following does NOT occur in the conducting zone?
a. Warming of air
b. Humidification of air
c. Filtering of air
d. Gas exchange
e. Mucus production

418. Which of the following is NOT part of the respiratory zone?
a. Alveolus
b. Alveolar sac
c. Alveolar duct
d. Respiratory bronchiole
e. Carina

419. Which of the following is NOT TRUE?
a. The vomer forms part of the nasal septum.
b. The maxillary bone forms part of the hard palate.
c. Nasal conchae increase air speed through the nasal cavity.
d. Respiratory epithelium contains pseudostratified cells.
e. The internal nares connect the nasal cavity and the pharynx.

420. Which of the following is NOT TRUE?
a. The nasopharynx is connected to the middle ear cavity.
b. The oropharynx is lined by stratified squamous epithelium.
c. Most of the larynx's 6 cartilages are elastic.
d. The epiglottis covers the glottis during swallowing.
e. The false vocal cords are superior to the true vocal cords.

421. Which of the following is TRUE?
a. Movement of O_2 from the alveolus into the blood is known as internal respiration.
b. The respiratory bronchioles are part of the conducting zone.
c. The perpendicular plates of the maxillae are superior to the inferior nasal conchae.
d. The majority of the nasal cavity and nasopharynx is lined by respiratory epithelium.
e. Paranasal sinuses are sites of gas exchange.

422. Which of the following is NOT TRUE?
a. The auditory tubes connect the nasopharynx to the middle ear cavities.
b. The laryngopharynx contains the true and false vocal cords.
c. The oropharynx is lined by stratified epithelium.
d. The largest laryngeal cartilage is the thyroid cartilage.
e. The epiglottis is composed of elastic cartilage.

Respiratory System Questions

423. Which of the following is FARTHEST from the internal nares?
a. Uvula
b. Pharyngeal tonsil
c. Ileocecal valve
d. Islets of Langerhans
e. Glottis

424. An individual who had O-shaped rings of tracheal cartilage would have difficulty:
a. Licking a lollipop.
b. Drinking a Miller Lite.
c. Whistling.
d. Smiling.
e. Swallowing an entire hamburger.

425. Which of the following is TRUE?
a. The last tracheal cartilage contains a projection known as the carina.
b. The lumen of the trachea is primarily lined by esophageal epithelium.
c. The right primary bronchus is narrower, longer, and more horizontal than the left primary bronchus.
d. There are more secondary bronchi on the left than on the right.
e. All bronchioles without alveoli are terminal bronchioles.

426. Which of the following is NOT found in BOTH the respiratory and digestive tracts?
a. Smooth muscle
b. Goblet cells
c. Stratified epithelium
d. Simple epithelium
e. Cilia

427. Which of the following contain simple squamous epithelium?
a. Alveoli
b. Alveolar ducts
c. Alveolar sacs
d. Respiratory bronchioles
e. All of the above

428. Arranging the following in the order through which an O_2 molecule would most likely pass during external respiration.

1. Erythrocyte plasma membrane
2. Alveolar cell membrane
3. Fused basal laminae
4. Surfactant
5. Endothelial cell membrane

a. 1-2-3-4-5
b. 4-2-3-5-1
c. 2-3-5-4-1
d. 2-5-3-4-1
e. 4-3-2-4-1

Respiratory System Questions

429. Which of the following is TRUE?
   a. The base of the lung is just deep to the clavicle.
   b. On the lateral side of each lung is an indentation called the hilus.
   c. Pleural fluid helps the visceral and parietal pleurae adhere to one another.
   d. Atmospheric pressure is always lower than intrapleural pressure.
   e. None of the above

430. During inspiration:
   a. Atmospheric pressure > Intrapulmonary pressure
   b. Intrapleural pressure > Intrapulmonary pressure
   c. Intrapulmonary pressure > Atmospheric pressure
   d. Atmospheric pressure = Intrapulmonary pressure
   e. Intrapulmonary pressure = Intrapleural pressure

431. Which of the following is an accessory muscle of expiration?
   a. External intercostal
   b. Rectus abdominus
   c. Sternocleidomastoid
   d. Pectoralis minor
   e. Internal anal sphincter

432. Difficulty in expelling CO_2 due to emphysema could cause:
   a. Pyloric stenosis
   b. Respiratory acidosis
   c. Respiratory alkalosis
   d. Appendicitis
   e. Abnormally high plasma pH

433. Which of the following is the most ANTERIOR?
   a. Nasopharynx
   b. Pharyngeal tonsil
   c. Internal nares
   d. Nasal conchae
   e. External nares

434. Which of the following functions by increasing air turbulence within the nasal cavity?
   a. False vocal cords and true vocal cords
   b. Nasal conchae
   c. Horizontal plate of the palatine bone
   d. Uvula
   e. Oropharynx

435. On a dry 50° day, as air travels from the outside environment through the entire conducting zone, its:
   a. Temperature will increase
   b. Oxygen levels will quadruple
   c. Water content will decrease
   d. Carbon dioxide levels will triple
   e. All of the above

Respiratory System Questions

436. What type of epithelium lines the trachea?
   a. Ciliated cuboidal
   b. Simple squamous
   c. Stratified squamous
   d. Pseudostratified ciliated columnar
   e. All of the above

437. Which of the following is made of elastic cartilage?
   a. Hyoid bone
   b. Cricoid cartilage
   c. Glottis
   d. Epiglottis
   e. Adam's apple

438. Which of the following is FARTHEST from the nasal cavity?
   a. Opening to the auditory tube
   b. Palatine tonsils
   c. True vocal cords
   d. False vocal cords
   e. Epiglottis

439. Inflammation of the epiglottis can result in total airway obstruction. How would this affect the P_{O_2} of the alveoli?
   a. It would increase and then increase further.
   b. It would depend on whether P_{CO_2} changed as well.
   c. It would not change.
   d. It would decrease.
   e. None of the above.

440. Which of the following characteristics of the trachea facilitates expansion of the esophagus?
   a. The lining of the trachea is ciliated.
   b. The trachea contains mucous glands and goblet cells.
   c. The trachea contains C-shaped rings of cartilage.
   d. The trachea terminates at the carina and splits into the 4 primary bronchi.
   e. All of the above

441. Which of the following is the GREATEST?
   a. Number of nasal conchae in the nasal cavity
   b. Number of secondary bronchi on the right
   c. Number of secondary bronchi on the left
   d. Percentage of respiratory bronchioles that contain alveoli
   e. Percentage of terminal bronchioles that contain alveoli

442. As one travels from the trachea to a bronchiole:
   a. Cartilage content will increase
   b. Number of ciliated cells will increase
   c. Number of goblet cells will decrease
   d. Amount of stratified epithelium will increase
   e. None of the above

Respiratory System Questions

443. Which of the following is NOT TRUE?
   a. Surfactant raises alveolar surface tension.
   b. The respiratory membrane is the site of gas exchange between the alveoli and the blood.
   c. The left lung has 2 lobes and 1 fissure
   d. The apex of the lung is just deep to the clavicle.
   e. The superior surface of the diaphragm is covered by the parietal pleura.

444. Which of the following would be most likely to cause lung collapse?
   a. If atmospheric pressure was greater than alveolar pressure.
   b. If alveolar pressure was greater than atmospheric pressure.
   c. If intrapulmonary pressure was greater than intrapleural pressure.
   d. If intrapleural pressure was greater than intrapulmonary pressure.
   e. Both A and B are correct.

445. Which of the following would occur if you tried to blow out 100 candles at once?
   a. Contraction of the diaphragm.
   b. Contraction of the rectal muscularis externa.
   c. Contraction of the sternocleidomastoids and pectoralis minor.
   d. Contraction of the internal intercostals and the rectus abdominus.
   e. All of the above.

446. A(n)_____ in thoracic pressure occurs during _____.
   a. Increase; inspiration
   b. Increase; expiration
   c. Decrease; inspiration
   d. Decrease; expiration
   e. 2 of the above are correct.

447. Which of the following would cause an increase in airway resistance?
   a. Binding of epinephrine to bronchiole smooth muscle.
   b. Relaxation of bronchiole smooth muscle.
   c. Contraction of bronchiole smooth muscle.
   d. Increased sympathetic nervous activity.
   e. All of the above.

448. In which of the following would the P_{O_2} be the greatest?
   a. Pulmonary artery
   b. Inferior vena cava
   c. Superior vena cava
   d. Mitochondria of a muscle cell performing anaerobic respiration.
   e. Pulmonary vein

449. During intense aerobic exercise, you would expect:
   a. Plasma P_{CO_2} to decrease.
   b. Saturation of hemoglobin in systemic veins to increase.
   c. Saturation of hemoglobin in systemic veins to decrease
   d. Hemoglobin's affinity for oxygen to increase.
   e. All of the above

Respiratory System Questions

450. As a red blood cell travels from a systemic arteriole to a systemic venule, its:
   a. Oxygen content will increase.
   b. Oxygen content will stay the same.
   c. Chloride content will increase.
   d. Chloride content will stay the same.
   e. None of the above.

451. Which of the following is NOT a cause of metabolic acidosis?
   a. Diarrhea
   b. Vomiting
   c. Untreated diabetes mellitus
   d. Renal disease
   e. Excess alcohol ingestion

452. The larynx:
   a. Directly links the laryngopharynx to the gastroesophageal junction.
   b. Has 6 unpaired and 3 paired cartilages
   c. Is lined entirely by simple squamous epithelium
   d. Is superior to the carina and just posterior to the esophagus
   e. None of the above

453. Which of the following is TRUE?
   a. If bronchiolar resistance increased, a smaller than normal pressure gradient is required to achieve the same airflow as in a normal bronchiole.
   b. The maxillary sinuses are the most superior of all the paranasal sinuses.
   c. The superior surface of the diaphragm is lined by parietal pleura.
   d. The right lung is usually smaller than the left lung.
   e. Respiratory epithelium is the ONLY type of epithelium found in the upper respiratory tract.

454. Immediately after the creation of an opening through the thoracic wall into the pleural cavity,
   a. Air flows through the hole and into the pleural cavity
   b. Air flows through the hole and out of the pleural cavity
   c. Air flows neither in nor out
   d. The entire visceral pleura juts out through the hole

455. Enlargement of the _____ can interfere with normal breathing and the passage of air through the auditory tubes.
   a. Pharyngeal tonsil
   b. Parotid tonsil
   c. Carina
   d. Epiglottis
   e. Cecum

456. The amount of O_2 released from hemoglobin at a cell whose P_{O_2} is 40 mmHg when plasma pH is 7.4 is _____ than the amount of O_2 released from hemoglobin at a cell whose P_{O_2} is 40 mmHg when plasma pH is 7.2.
   a. More than
   b. Less than
   c. The same as

Respiratory System Questions

457. The force required to stretch a high compliance lung is _____ the force required to stretch a low compliance lung.
   a. More than
   b. Less than
   c. The same as

458. The P_{O_2} of the blood:
   a. Is directly related to the amount of O_2 dissolved in the plasma.
   b. Has no relation to the saturation of hemoglobin.
   c. Is always lower than the P_{CO_2} of the blood.
   d. Is higher in the veins than in the arteries.
   e. Determines the P_{O_2} of the alveoli.

459. Ventilation rate in response to metabolic alkalosis is _____ ventilation rate in response to metabolic acidosis.
   a. Greater than
   b. Less than
   c. The same as

460. The last respiratory passageway without alveoli is known as a:
   a. Respiratory bronchiole
   b. End-stage bronchiole
   c. Alveolar duct
   d. Respiratory bronchus
   e. Terminal bronchiole

461. If the _____ cells were unable to secrete surfactant, then alveolar surface tension would _____ and the likelihood of alveolar collapse would _____.
   a. Type I alveolar – increase – increase
   b. Type I alveolar – decrease – decrease
   c. Type II alveolar – increase – increase
   d. Type II alveolar – decrease – increase
   e. Pneumocytic – decrease – decrease

462. _____ is responsible for the rapid formation of carbonic acid within the red blood cell.
   a. HCO_3^-
   b. HCl
   c. Surfactant
   d. Carbonic anhydrase
   e. Carbaminohemoglobin

Correct these 5 false statements:

463. The exchange of oxygen and carbon dioxide between alveolar air and blood plasma is referred to as internal respiration.

464. The auditory tube links the nasopharynx to the inner ear.

465. Four bones contain paranasal sinuses that function in mucus production.

466. The lining of the nasopharynx is stratified squamous epithelium.

Respiratory System Questions

467. The Hering-Bruer reflex refers to the event where extreme stretching of the lung causes a reflex inhalation.

468. During inspiration, intrapulmonary pressure is always decreasing

469. The scalenes and sternocleidomastoids are accessory muscles of expiration

---

Fill in the blanks:

470. The medial indentation of the lung is known as the _____.

471. The most important respiratory stimulus is the _____ _____ of the cerebrospinal fluid.

472. The superior and middle nasal conchae are part of the _____ bone.

473. Stimulation of the _____ nerve will result in the contraction of the diaphragm.

Choose the larger quantity. Or write equal if they're the same.

474. a. Normal intrapulmonary pressure
b. Normal intrapleural pressure

475. a. Amount of ATP used up during quiet inspiration
b. Amount of ATP used up during quiet expiration

476. a. Surface tension in an alveolus lined with water molecules only
b. Surface tension in an alveolus lined with water molecules and surfactant molecules

477. a. Normal P_{O_2} of arterial blood
b. Normal P_{O_2} of cytoplasm

478. a. Normal P_{CO_2} of venous blood
b. Normal P_{O_2} of alveolar air

479. a. Saturation of hemoglobin at a P_{O_2} of 100mmHg
b. Saturation of hemoglobin at a P_{O_2} of 40mmHg

480. a. Amount of carbon dioxide bound to hemoglobin
b. Amount of carbon dioxide dissolved in plasma

481. a. Affinity of hemoglobin for oxygen at 95°F
b. Affinity of hemoglobin for oxygen at 99°F

482. a. Activity of ventral respiratory group during quiet expiration
b. Activity of the ventral respiratory group during forced inspiration

Respiratory System Questions

483. a. Number of cell layers that comprise the respiratory membrane
b. 2.5

484. a. Number of alveoli in a respiratory bronchiole 5mm in length
b. Number of alveoli in a terminal bronchiole 11.8mm in length

485. a. Number of lobes in the left lung
b. Number of secondary bronchi in the right lung

486. a. Normal tidal volume
b. Normal inspiratory reserve volume

487. a. Typical saturation of hemoglobin by oxygen in the venous blood
b. 5%

488. a. Number of goblet cells in a respiratory bronchiole
b. Number of goblet cells in the trachea

489. a. Humidification of air that occurs when breathing through the mouth
b. Humidification of air that occurs when breathing through the nose

490. a. Vital capacity
b. Total lung capacity minus residual volume

491. a. Typical % of body CO_2 dissolved in the plasma
b. Typical % of body CO_2 bound to hemoglobin

492. a. Typical pH of blood in the aorta
b. Typical pH of blood in the superior vena cava

493. a. Typical Po_2 of blood in the aorta
b. Typical Po_2 of blood in the inferior vena cava

494. a. Typical atmospheric pressure
b. Typical intrapleural pressure

495. a. Typical Pco_2 of blood in an arteriole
b. Typical Pco_2 of blood in a venule

496. a. Number of muscle fibers contracting during quiet expiration
b. Number of muscle fibers contracting during quiet inspiration

497. a. Normal intrapulmonary pressure
b. Normal intrapleural pressure

498. a. The percent of oxygen saturation of hemoglobin when the temperature is 37 degrees centigrade.
b. The percent of oxygen saturation of hemoglobin when the temperature is 40 degrees centigrade.

499. a. The number of lobes in the right lung
b. The number of lobes in the left lung

Respiratory System Questions

500. a. The percent of oxygen saturation of hemoglobin when the pH is 7.6.
b. The percent of oxygen saturation of hemoglobin when the pH is 7.2

501. a. Pressure in the larynx during expiration
b. Pressure in the pharynx during expiration

502. a. Number of skull bones with paranasal sinuses
b. Total number of nasal conchae

503. a. Surface area of the entire parietal pleurae
b. Surface area of the entire respiratory membrane

504. a. Intrapulmonary pressure
b. Intrapleural pressure

505. a. Number of secondary bronchi in the right lung
b. Number of secondary bronchi in the left lung

506. a. Po_2 of blood in the pulmonary artery
b. Po_2 of blood in the pulmonary vein

507. a. Distance from the true vocal cords to the carina
b. Distance from the false vocal cords to the carina

508. a. Thickness of the epithelium lining an alveolus
b. Thickness of the epithelium lining a terminal bronchiole

509. a. Amount of oxygen used during aerobic respiration
b. Amount of oxygen used during anaerobic respiration

510. a. Quantity of oxygen dissolved in plasma
b. Quantity of oxygen bound to hemoglobin

511. a. Percent saturation of hemoglobin the superior vena cava
b. Percent saturation of hemoglobin in the aorta

512. a. Distance from the opening of the auditory tube to the pharyngeal tonsil
b. Distance from the opening of the auditory tube to the glottis

513. a. Number of alveoli in the lungs
b. Number of osteocytes in the soft palate

514. a. Amount of surfactant produced by a 5mo fetus
b. Amount of surfactant produced by a 8mo fetus

515. a. Normal expiratory reserve volume
b. Normal tidal volume + normal inspiratory reserve volume

516. a. Amount of nitrogen in normal atmospheric air
b. Amount of oxygen in normal atmospheric air

Respiratory System Questions

517. a. Amount of O_2 dissolved in plasma
b. Amount of HCO_3^- dissolved in plasma

518. a. Po_2 of systemic veins
b. Po_2 of pulmonary veins

519. a. Normal percent saturation of hemoglobin in a pulmonary vein
b. Normal percent saturation of hemoglobin in the right ventricle

520. a. Partial pressure of carbon dioxide in the mitochondria of systemic tissues
b. Partial pressure of carbon dioxide in a systemic arteriole

521. a. Percentage of inspired air made up of nitrogen
b. Percentage of inspired air made up of oxygen

522. Surfactant production in a 4mo fetus
b. Surfactant production in a 8mo fetus

523. a. Number of skeletal muscle fibers contracting during quiet inspiration
b. Number of skeletal muscle fibers contracting during quiet expiration

524. a. Number of secondary bronchi in the left lung
b. Number of tertiary bronchi in the right lung

525. a. Number of cell membranes a molecule of oxygen passes as it travels from the interior of an RBC to the lumen of an alveolus
b. 2

526. a. Normal intrapleural pressure
b. Normal intrapulmonary pressure

527. a. Distance from the diaphragm to the cricoid cartilage
b. Distance from the diaphragm to the uvula

528. a. TOTAL number of nasal conchae in the body
b. TOTAL number of paranasal sinuses in the body

529. a. Pco_2 of the azygos vein.
b. Po_2 of the inferior vena cava.

530. a. Size of the lung when intrapleural pressure > intrapulmonary pressure
b. Size of the lung when intrapulmonary pressure > intrapleural pressure

531. a. Thoracic pressure when the diaphragm is relaxed
b. Thoracic pressure when the diaphragm is contracted

532. a. Solubility of oxygen in water.
b. Solubility of carbon dioxide in water

Respiratory System Questions

Short Answer Questions

533. Write out the equation for the formation of bicarbonate and hydrogen ions. What enzyme catalyzes this reaction? Where does this reaction occur primarily?

534. What are the components of the respiratory membrane? What event occurs there? How does its structure match its function?

535. What are 3 functions of respiratory epithelium? Why are the 3 functions necessary?

536. Explain why each of these persons has trouble supplying oxygen to their cells.
Someone without surfactant
Someone whose phrenic nerve is cut
Someone who has inactive bone marrow due to chemotherapy
Someone who has disseminated intravascular clotting in the pulmonary arterioles
Someone who has fluid in the alveoli due to pneumonia
Someone who has a malformed epiglottis due to a birth defect
Someone who has a stab wound perforating the body wall between the 5th and 6th ribs
Someone who has had both kidneys removed
Someone who has reduced lung compliance
Someone who has reduced lung elasticity

537. What effect will each of the following have on oxygen delivery to tissues? Why?
a. Alkalosis
b. Lack of iron in the diet
c. Hemoglobin with an increased O2 affinity
d. Acid injected into the cerebrospinal fluid
e. A person with long-term bronchitis is given a high dose of O2

538. Which of the following does NOT belong?
a. Terminal bronchiole
b. Respiratory bronchiole
c. Trachea
d. Larynx

Why? Remember it must be anatomical or physiological characteristic shared by the other 3.

539. What would an inability to produce surfactant do to the surface tension in the lungs? Why is that bad?

540. What are the primary functions of the conducting zone?

541. What is metabolic acidosis? What is a possible cause? How would respiration change in response?

542. The lungs are mostly elastic tissue and passageways. What are the roles of the passageways and the elastic tissue?

543. Explain in detail how a rise in plasma CO_2 would result in an increase in respiratory rate and depth. Be sure to include all body fluids, receptors, brain regions, chemical equations and enzymes that would play a role in this reflex.

544. **Explain** how contraction of the diaphragm would affect all of the following:

Respiratory System Questions

a. Intrapulmonary pressure
b. Atmospheric pressure
c. Lung volume
d. Interpleural volume
e. Interpleural pressure

545. Write out the equation for oxyhemoglobin formation within the pulmonary capillaries.

546. Trace the path that a molecule of carbon dioxide would follow as it traveled from the plasma in a pulmonary capillary all the way to the external atmosphere.

- Name every structure through which the molecule of carbon dioxide would pass.
- Note that some items have been partially completed for you.
- Note that some items have been totally completed for you.
- Do not abbreviate anything.

Pulmonary capillary

↓

_____**Membrane**

↓

Alveolus

↓

_____**Sac**

↓

_____**Duct**

↓

_____**Bronchiole**

↓

_____**Bronchiole**

↓

Lots of bronchioles and bronchi

↓

Tertiary/Segmental Bronchus

↓

_____

↓

_____

↓

Respiratory System Questions

_____

↓

_____

↓

Glottis

↓

_____**pharynx**

↓

_____**pharynx**

↓

_____**pharynx**

↓

_____**aperture**

↓

_____**cavity**

↓

_____

↓

External atmosphere