

The Respiratory System
Study Guide Questions - C22-HL

You need to provide answers to all the questions. There are 39 hot list question (>).

1. In physiology, respiration has different meanings. What are some of the different meanings associated with the term “respiration”?
2. > What are the functions of the respiratory system?
3. > What is the pathway traveled by air between the nasal cavity and alveoli?
4. How is external respiration differ from internal respirstion? (Fig 23-1)
5. What is the difference between the upper and lower respiratory tract? Where is the division between the two tracts? (the nares to the larynx is the URT designed to warm, add moisture, and remove dust-bacteria before air enters the LRT // LRT start at glottis of larynx and LRT transports air to the alveoli – LRT also warms, moistens, and removes dust-bacteria as air moves towards alveoli)
6. > What is the difference between the conducting division and the respiratory division of the respiratory system? (Fig 23-8)
7. What type of cells line the nasal cavity? What is the function and structure of the olfactory mucosa? What accessory structures of the nasal cavity are found in the lamina propria?
8. What is the function of the erectile tissue of the inferior choncha? Function? Why is it important?
9. What are the three divisions of the pharynx?
10. What happens to the larynx and epiglottis when you swallow?
11. What is the relationship between the vestibular folds and the vocal cords? What is the opening between the vocal cords called?
12. The common term used to describe the trachea is “windpipe”. How long is the trachea?
13. What is the function of the hyaline “C” rings in the tracea and the plates of hyaline around the bronchi tree?

14. > What type of cells cover the interior surface of the trachea? Why is it called the mucociliary escalator?
15. How many lobes are in the right and left lungs?
16. What is the cardiac impression? If you swallow food into the trachea which bronchi is it likely to pass into? Why?
17. What is the inferior end of the trachea called?
18. List the segments of the bronchial tree between the primary bronchi and the alveolus.
19. What is the difference between pulmonary arteries and bronchiole arteries? What is the origin of each artery?
20. Where do the C-shaped hyaline cartilage in the bronchiole tree stop?
21. What changes occur between the bronchioles, terminal bronchioles, and respiratory bronchioles? Significance?
22. > What is the structure of an alveolus? What cells make up the wall of the alveolus? What is the function of each cell type? (Fig 23-11 // Fig 23-12)
23. > What is the function of the dust cells? Another name for dust cells? Are these cells part of the alveolus wall?
24. > What is the function of the respiratory membrane? Structure?
25. Where is the intra-pleural cavity located? (between the visceral and parietal membranes) Location and function?
26. > What type of muscle is in the walls of the bronchiole tree and in the pulmonary circuit? Function? What do these tubular passageways carry?
27. What is the Valsalva maneuver? Significance?
28. > Where is the respiratory center located?
29. > What is the respiratory cycle? What are the two phases called? Length of each phase? Is it cycle passive or active? Explain.
30. > When at rest (i.e. quiet breathing), how much air is moved into the lungs? What is this volume called?

31. Where is the location of the ventral respiratory center, dorsal respiratory center, and the pontine respiratory center? What is the function of the respiratory center in quiet and forced respiration? (Fig 23.24)
32. What is the role of the medullary respiratory center in controlling normal quiet breathing and forceful breathing? (Fig 23-25)
33. > What type of receptors send signals to the respiratory control center? Where are these sensors located? (Fig 23-27)
34. >What molecule is the primary stimulus that activates both the central and peripheral chemoreceptors? (Fig 23-27)
35. How may pain, anxiety, and other emotions influence the respiratory cycle?
36. >What chemoreceptor is stimulated by low oxygen? When?
37. > Under what condition may oxygen inhibit the central chemoreceptors? The danger? (during hypoxic drive // high oxygen may inhibit DRG and stop inspiration)
38. > What are the characteristics of the following type of respiration: apnea, dyspnea, tachypnea, and bradypnea. (temporary interruption of breathing // difficulty in breathing // rapid respiratory cycle // slow respiratory cycle)
39. > What must happen to the intrapulmonary pressure for air to move into the lungs? How is this accomplished? Which skeletal muscles contract during quiet respiration? Forced respiration?
40. What is pneumothorax?
41. What is atelectasis?
42. > How will the epinephrine secreted by the adrenal gland and norepinephrine released from the sympathetic postganglionic fibers influence air flow in the bronchiole tree?
43. > How will histamine released from WBC or acetylcholine from parasympathetic neurons influence air flow in the bronchiole tree?
44. How does tuberculosis and black lung disease affect pulmonary function? Explain.
45. > What happens when hydrogen to hemoglobin in the systemic circuit? Where did the hydrogen ion come from? What RBC enzyme is responsible for the formation of the hydrogen ion?
46. > What is surfactant? When is surfactant produced? Significance?

47. > What are the four respiratory volumes? You should be able to draw and label a chart to show these volumes. (Fig 23-16)
48. What is the difference between respiratory volumes and respiratory capacities? Define total lung capacity and vital capacity.
49. > If you breath in 500 ml of air, how much of this air actually reaches the alveoli?
50. > What is the alveolar ventilation rate? How do you determine AVR?
51. > What is the difference between anatomical dead space and physiologic dead space? (anatomical dead space is the air conduction part of the lungs // if you destroy parts of the gas exchange lung tissue then this loss is added to anatomical dead space to find physiologic dead space)
52. What is the difference between obstructive and resistant lung diseases?
53. What is the significance of Dalton's law? What are the main four gasses in air? What is partial pressure?
54. > How many oxygen molecules may one Hb carry? After Hb passes through a systemic capillary, how many oxygen molecules are unloaded during quiet breathing?
55. What is the concentration gradient for oxygen and carbon dioxide between the plumonary and systemic environments (external vs tissue)? (Fig 23-17) (oxygen = 159 mmHg atmosphere and 40 mmHg venous blood /// carbon dioxide = 0.3 mmHg atmosphere and 45 mmHg venous blood)
56. > How is carbon dioxide transported in the blood? (Fig 23-18)
57. > How is oxygen transported in the blood?
58. > What is the difference between pulmonary gas exchange and systemic gass exchange? What are the major events associated with the transport of oxygen and carbon dioxide between the pulmonary and systemic enviroment? (Fig 23-23)
59. > How do gas molecules diffuse during systemic and alveolar gas exchange? Be able to associate these terms with your explanation: (carbonic anhydrase, chloride shift, protons, bicarbonate, venous reserve)
60. > Where is carbonic anhydrase located? What is its function?
61. > What cation causes oxygen to be unloaded from hemoglobin?
62. > What is the significance of the cloride shift? Where and when does this occur?

63. > Which way will the oxygen dissociation curve move for variables that cause more oxygen to be released from hemoglobin? What variables affect gas exchange?
64. > What is ventilation? What is perfusion? What is the significance of the ventilation- perfusion coupling mechanism?
65. If mucous blocks a bronchiole, what will happen to blood flow in this area?
66. Why is carbon monoxide a dangerous poison?
67. How is acidosis and alkalosis related to hypercapnia and hypocapnia?
68. > What are the corrective homeostatic responses to acidosis and alkalosis?
69. Under normal conditions, the partial pressure of oxygen has little effect on respiration. However, in emphysema carbon dioxide concentration become so high that the central chemoreceptors no longer respond to carbon dioxide and respiration is now stimulated by low oxygen levels. What is this condition called? What is the danger of giving a person in this condition oxygen? (hypoxic drive // under hypoxic drive regulation giving oxygen may stop respiration)
70. What is hypoxia? Define the following terms : (ischemic hypoxia, anemic hypoxia, histotoxic hypoxia) --- (hypoxia is low oxygen concentration in the tissue space // ischemia is a reduced blood flow which may cause hypoxia // anemic hypoxia is low oxygen concentration due to either not enough RBC or RBC without enough hemoglobin // histotoxic hypoxia is caused by poison that interferes with oxygen transport)
71. What is chronic obstructive pulmonary disease?
72. What is the difference between bronchitis and asthma? Which condition is reversible? (both condition result in an increase in mucous production and narrowing of the bronchiales // asthma is reversible but each inflammatory episode causes addition of more scar tissue from fibroblast activity – after many episodes condition is not reversible and this is then known as bronchitis)
73. > What is the Hering-Breuer Reflex? (if lung tissue over inflated a reflex stops inspiration)
74. > What is the irritant reflex? (if you breath in particulate then a reflex stops inspiration)
75. > What causes emphysema? Result to lung tissue? Result to blood gasses? Which causes what type of “drive”? What hormone increases because of this disease?