

The Respiratory System  
Study Guide Questions - C23  
Tortora and Derrickson

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 divison between the two tracts?
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?
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 all 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 type of cells are in the alveolus? Their functions? (Fig 23-11 // Fig 23-12)
23. >What is the function of the dust cells? Another name for dust cells?
24. >What is the respiratory membrane? Structure and function?
25. What is the intra-pleural cavity (pleural cavity)? Location and function?
26. What type of muscle is in the walls of the bronchiole tree and pulmonary blood vessels of the lungs? Function?
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? Passive or active?
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 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 may be stimulated by low oxygen? When?
37. >Under what condition may oxygen inhibit the central chemoreceptors? The danger?
38. >What are the characteristics of the following type of respiration: apnea, dyspnea, tachypnea, and bradypnea.
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 epinephrine from the adrenal gland and norepinephrine from sympathetic 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. >How do hydrogen bonds affect lung function? What is surfactant? When is surfactant produced? Significance?
46. >What are the four respiratory volumes? You should be able to draw and label a chart to show these volumes. (Fig 23-16)
47. What is the difference between respiratory volumes and respiratory capacities? Define total lung capacity and vital capacity.
48. >If you breathe in 500 ml of air, how much of this air actually reaches the alveoli?
49. What is the alveolar ventilation rate? How do you determine AVR?
50. >What is the difference between anatomical dead space and physiologic dead space?
51. What is the difference between obstructive and restrictive lung diseases?

52. What is the significance of Dalton's law? What are the main four gasses in air? What is partial pressure?
53. >What is the concentration gradient for oxygen and carbon dioxide between the pulmonary and systemic environments (external vs tissue)? (Fig 23-17)
54. > How is carbon dioxide and oxygen transported in the blood? (Fig 23-18)
55. >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)
56. >What happens to gasses during systemic and alveolar gas exchange? Be able to associate these terms with your explanation: (carbonic anhydrase, chloride shift, protons, bicarbonate, venous reserve)
57. >Where is carbonic anhydrase located? What is its function?
58. >What cation causes oxygen to be unloaded from hemoglobin?
59. >What is the significance of the chloride shift?
60. >What variables affect gas exchange? Which way will the oxygen dissociation curve move for variables that cause more oxygen to be released from hemoglobin?
61. >What is ventilation? What is perfusion? What is the significance of the ventilation- perfusion coupling mechanism?
62. If mucous blocks a bronchiole, what will happen to blood flow in this area?
63. How many oxygen molecules may be carried by one hemoglobin molecule? How many oxygens would you expect to see in the pulmonary artery? How many oxygens would you expect to see in the pulmonary vein?
64. Why is carbon monoxide a dangerous poison?
65. How is acidosis and alkalosis related to hypercapnia and hypocapnia?
66. What are the corrective homeostatic responses to acidosis and alkalosis?
67. > 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?

68. >What is hypoxia? Define the following terms : (hypoxemic hypoxia, ischemic hypoxia, anemic hypoxia, histotoxic hypoxia)
69. What is chronic obstructive pulmonary disease?
70. >What is the difference between bronchitis and asthma? Which condition is reversible?
71. >What is the Hering-Breuer Reflex?
72. >What is the irritant reflex?
73. > What is the significance of ventilation and perfusion regulation within the lung?