

Respiratory System

True or False:

1. The major factor that stimulates the medulla oblongata and pons to produce respiration is not oxygen concentration, but rather the concentration of carbon dioxide in the blood.
2. The functional residual capacity (FRC) is the amount of air that remains in the lung after a normal tidal expiration; it is the sum of expiratory reserve volume and residual volume.
3. Compared to an atmospheric air, the alveolar air contains less of water vapor but greater amount of carbon dioxide.
4. Binding of the first oxygen molecule causes a conformational change in hemoglobin that allows the second molecule of oxygen to bind more readily, however at the tissue level, as the first oxygen molecule dissociates, it is harder for the next oxygen molecule to dissociate.
5. A large fraction—about 70 percent—of the carbon dioxide molecules that diffuse into the blood is transported to the lungs as dissolved state in plasma.
6. It is more difficult for a body to achieve the same level of oxygen saturation at high altitude than at low altitude, due to lower portion of oxygen (5%).

Short Answers:

7. Describe how the rise of concentration of carbon dioxide or hydrogen ions affects the respiration centers and the rate and depth of respiration.
8. Explain what happens to perfusion when ventilation to an alveolus is not sufficient.
9. What are the factors that may cause the **oxygen–hemoglobin dissociation curve** shift to the “RIGHT”?

10. Please complete the following chemical equation:



Enzyme: _____

11. Describe three ways in which carbon dioxide can be transported.

12. _____ are stimulated to produce the hormone _____ which stimulates the production of erythrocytes, resulting in a greater number of circulating erythrocytes in an individual at a high altitude over a long period.

Multiple Choice Questions:

13. _____ law states, given a constant temperature, a decrease in volume causes a(n) _____ pressure.

- a. Thomas', decrease in
- b. Gas, equalization of
- c. Boyle's, increase in
- d. Henry's, zero

14. When ventilation is not sufficient, which of the following occurs?

- a. The capillary constricts.
- b. The capillary dilates.
- c. The partial pressure of oxygen in the affected alveolus increases.
- d. The bronchioles dilate.

15. Gas moves from an area of _____ partial pressure to an area of _____ partial pressure.

- a. low; high
- b. low; low
- c. high; high
- d. high; low

16. A low partial pressure of oxygen promotes hemoglobin binding to carbon dioxide. This is an example of the _____.

- a. Haldane effect
- b. Bohr effect
- c. Dalton's law
- d. Henry's law

17. Which of the following occurs during the chloride shift?

- a. Chloride is removed from the erythrocyte.
- b. Chloride is exchanged for bicarbonate.
- c. Bicarbonate is removed from the erythrocyte.
- d. Bicarbonate is removed from the blood

18. Increased ventilation that results in an increase in blood pH is called _____.

- a. hyperventilation
- b. hyperpnea
- c. acclimatization
- d. apnea

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19. Which of the following would be an acute response of the respiratory system to exercise?

- a. Increase in maximum oxygen consumption
- b. Increase in muscular strength and endurance
- c. Increase in gas exchange at the alveolar and capillary levels
- d. Both A and C

20. What cell is responsible for producing surfactant to reduce surface tension?

- a. Epithelium from terminal bronchioles
- b. Type II alveolar cell
- c. Type I alveolar cell
- d. Both B and C.

21. At altitude the rate of diffusion of oxygen across the pulmonary and tissue capillaries is decreased resulting in a drastic decrease in hemoglobin saturation during exercise. Which one of the following would account for this decrease?

- a. Decrease in the partial pressure of oxygen in the ambient air
- b. Decrease in portion of oxygen in the ambient air
- c. Decrease in the oxygen equilibrium of the capillaries to the alveoli
- d. All of the above

22. Hyperventilation can lead to vasoconstriction as a result of

- a. A lack of sufficient oxygen
- b. A decrease in respiratory rate
- c. Reduced carbon dioxide
- d. Excess oxygen buildup

23. What structure covers the immediate surface of the lungs?

- a. Visceral Pleura
- b. The Intercostal membrane
- c. Parietal Pleura
- d. Surfactant

Digestive System

True or False

24. In the mouth, pharynx, esophagus, and anal canal, the epithelium is primarily a simple columnar epithelium where as in the stomach and intestines, it is a non-keratinized, stratified squamous epithelium.

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25. The entire length of the esophagus consists of both smooth and skeletal muscle fibers.
26. Auerbach's plexus (or myenteric plexus) innervates the GI tract and causes increased or decreased speeds of peristalsis.
27. Vitamin B12 is an essential vitamin that gets easily absorbed in the stomach.
28. Hydrochloric acid within the stomach is necessary to activate pepsinogen to pepsin.

Short Answers

29. Which layer of the alimentary canal contains numerous blood and lymphatic vessels and houses clusters of lymphocytes known as MALT? Be specific.
30. Name 4 digestive structures that are retroperitoneal:
31. How does the acidic content of chyme exiting stomach get neutralized?
32. For the hormones listed below, name the target organs and what it produces:

Gastrin →

Secretin →

Cholecystokinin →
33. The hardest substance in the body is _____.
34. During deglutition, _____ and _____ moves up to prevent food from entering nasopharynx while epiglottis closes over the _____ to prevent food from going into trachea.
35. During a kickboxing tournament, a person gets directly kicked in the mouth, knocking out all eight of his most anterior teeth. Which teeth did the player lose and how does this loss affect food ingestion?
36. Explain how the stomach is protected from self-digestion and why this is necessary.
37. Explain how nutrients absorbed in the small intestine pass into the general circulation.
38. Why does the pancreas secrete some enzymes in their inactive forms, and where are these enzymes activated?

Multiple Choice

39. Which of the following organs is supported by a layer of adventitia rather than serosa?

- a. Esophagus
- b. stomach
- c. small intestine
- d. large intestine

40. Which of these processes occurs in the mouth?

- a. ingestion
- b. mechanical digestion
- c. chemical digestion
- d. all of the above

41. Which of these processes occurs throughout most of the alimentary canal?

- a. ingestion
- b. propulsion
- c. segmentation
- d. absorption

42. Which of these ingredients in saliva is responsible for activating salivary amylase?

- a. mucus
- b. phosphate ions
- c. chloride ions
- d. urea

43. Which structure is located where the esophagus penetrates the diaphragm?

- a. esophageal hiatus
- b. cardiac orifice
- c. upper esophageal sphincter
- d. lower esophageal sphincter

44. Where does the majority of chemical digestion in the stomach occur?

- a. fundus and body
- b. cardia and fundus
- c. body and pylorus
- d. body

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45. Which of these is most associated with villi?
- a. haustra
 - b. lacteals
 - c. bacterial flora
 - d. intestinal glands
46. Which of these nutrients is absorbed mainly in the duodenum?
- a. glucose
 - b. iron
 - c. sodium
 - d. water
47. Gastric juice is secreted in response to the sight or smell of food. This is a ___ response.
- a. neuronal
 - b. chemical
 - c. parasympathetic
 - d. sympathetic
48. To reduce the acidity of food entering the duodenum, the pancreas releases
- a. insulin
 - b. trypsinogen
 - c. lipase
 - d. bicarbonate juice

Immune System

True or False:

49. The complement system consists of a set of small proteins that destroy pathogens in an enzyme cascade.
50. Lysozymes are protein-shredding enzymes released by cytotoxic T-cells that induce apoptosis.
51. HIV attacks helper T cells thus eventually decreasing CD4 counts low enough to cause AIDS.
52. The cells and signaling molecules that initiate inflammatory responses are the mast cells and the histamines.
53. The newborn infant who receives antibodies from its mother's milk has naturally acquired active immunity.

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54. Which structure allows lymph from the upper right limb to enter the bloodstream?

- a. thoracic duct
- b. right lymphatic duct
- c. right lymphatic trunk
- d. left lymphatic trunk

55. Enhanced phagocytosis of a cell by the binding of a specific protein is called _____.

- a. endocytosis
- b. opsonization
- c. anaphylaxis
- d. complement activation

56. The primary function of humoral immunity is

- a. to defend against fungi and protozoa.
- b. to reject transplanted tissues.
- c. to protect the body against cells that become cancerous
- d. to protect the body against extracellular pathogens.

57. Which of the following leads to the swelling of inflammation?

- a. increased vascular permeability
- b. anaphylactic shock
- c. increased blood flow
- d. complement activation

58. T cells that secrete cytokines that help antibody responses are called _____.

- a. Th1
- b. Th2
- c. regulatory T cells
- d. thymocytes

59. If a person has memory B cells against a certain pathogen, the person is

- a. likely to develop that disease and eventually die.
- b. not likely to develop the disease a second time.
- c. able to spread the disease to others easily through physical contact
- d. probably still sick with the disease

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60. Which class of antibody crosses the placenta in pregnant women?

- a. IgM
- b. IgA
- c. IgE
- d. IgG

61. When a person receives a vaccine, his or her body

- a. Receives antibodies against a specific pathogen.
- b. Produces memory cells that provide resistance to that pathogen.
- c. Produces antigens to fight the specific pathogen.
- d. Immediately begins fighting the infection caused by the pathogens.

62. Which type of immune response is most *directly* effective against bacteria?

- a. natural killer cells
- b. complement
- c. cytotoxic T cells
- d. helper T cells

63. The lymphatic system

- a. removes excess fluid from tissues
- b. defends the body against microorganisms and other foreign substances
- c. absorbs fats from the digestive system
- d. all of the above

Short Answers

64. Describe how secondary B cell responses are developed.

65. What are the major differences between the lymphatic and cardiovascular system?

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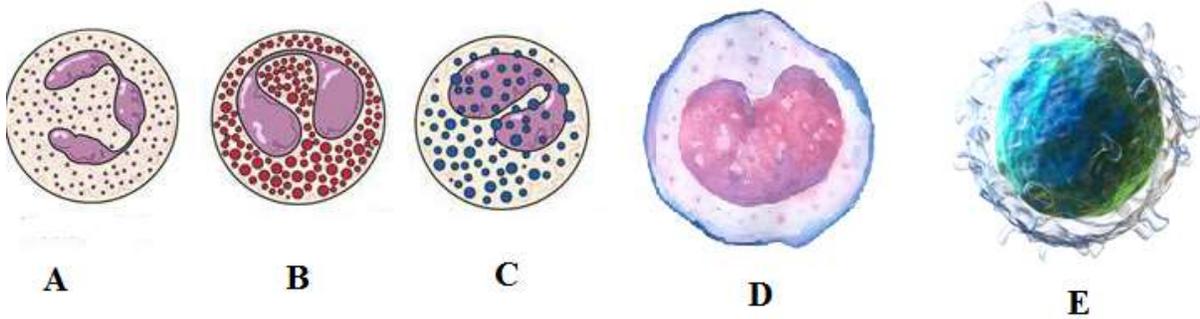
For the description provided, name the disorder/disease:

66. An inherited disorder causing thick, sticky mucus to build up in the lungs
67. Cessation of breathing for 10 seconds or longer during sleep
68. Lung infection with build-up of fluids
69. Malignancy of pulmonary tissue
70. Allergens trigger release of histamine and other inflammatory chemicals causing intense bronchoconstriction
71. Alveolar walls break down and surface of lungs are reduced
72. The autoimmune destruction of beta cells in the pancreas
73. A chronic disease thought to be caused the destruction of myelin covers of nerve cells in the brain and spinal cord.
74. With this condition, people are more susceptible to opportunistic infections and have CD4 T Cell count below 200 cells/microliter.
75. Overstimulation of thyroid by Thyroid Stimulating Immunoglobulin causing hyperthyroidism.

Identify the term for the following pattern of breathing:

76. Temporary cessation of breathing
77. Normal, relaxed, quiet breathing
78. Accelerated respiration
79. Labored, gasping breathing, shortness of breath
80. Increased rate and depth of breathing in response to exercise
81. Dyspnea while lying down
82. Increased pulmonary ventilation in excess of metabolic demand

Following questions refer to the pictures below: letters can be used more than once.



83. Chief immune cell, either B or T cells

84. Granulocyte

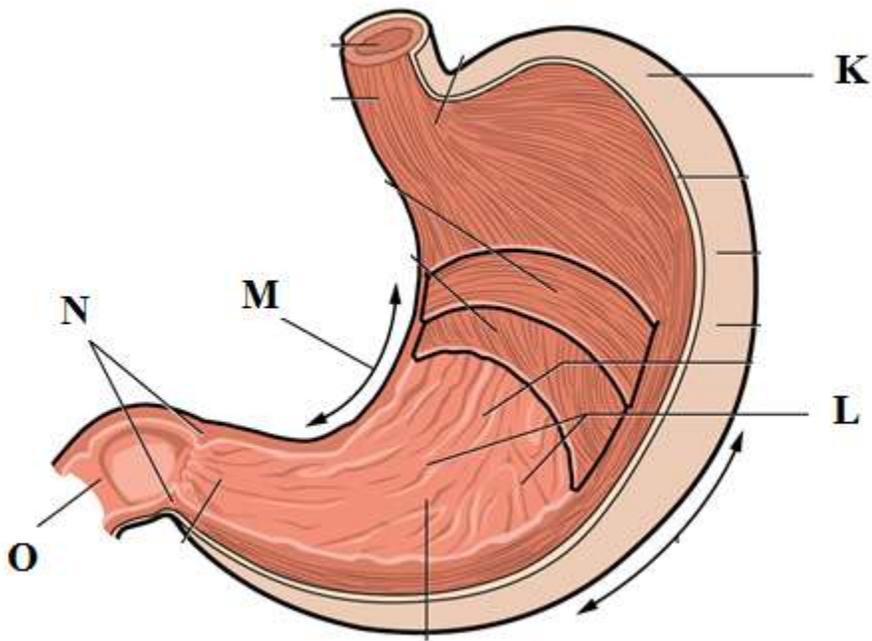
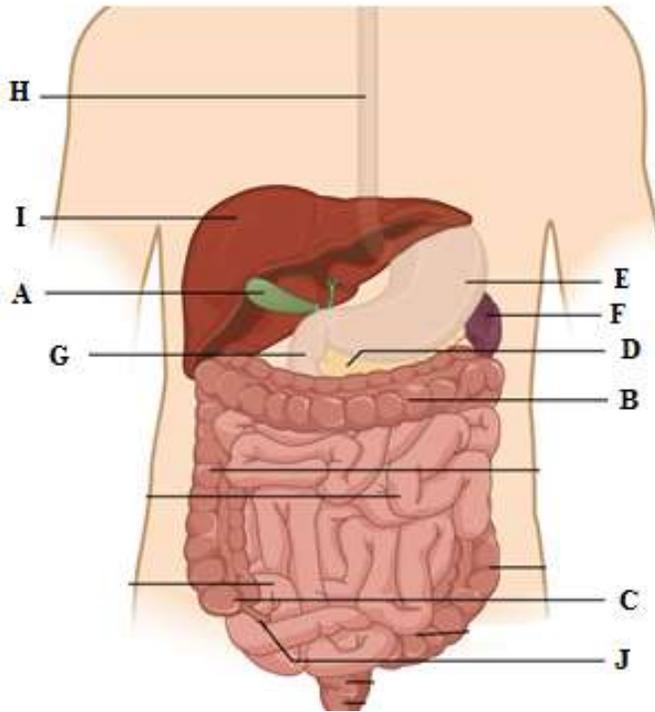
85. Phagocyte

86. Monocyte

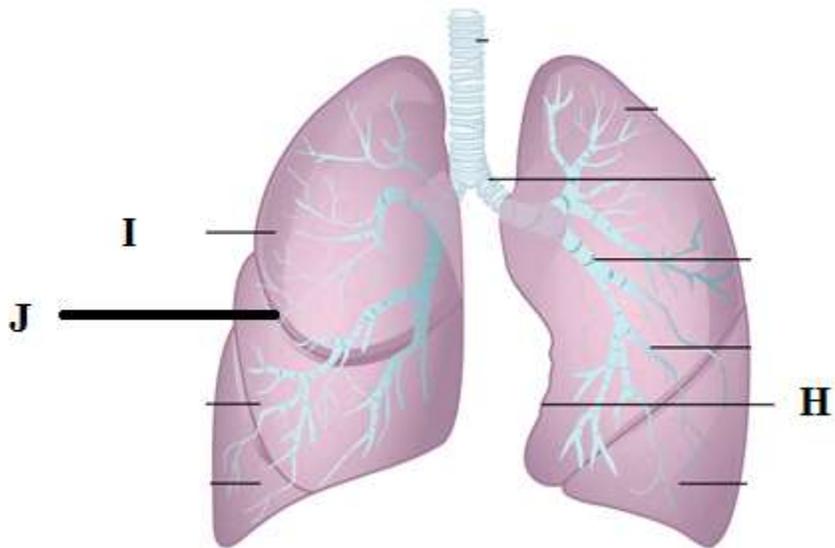
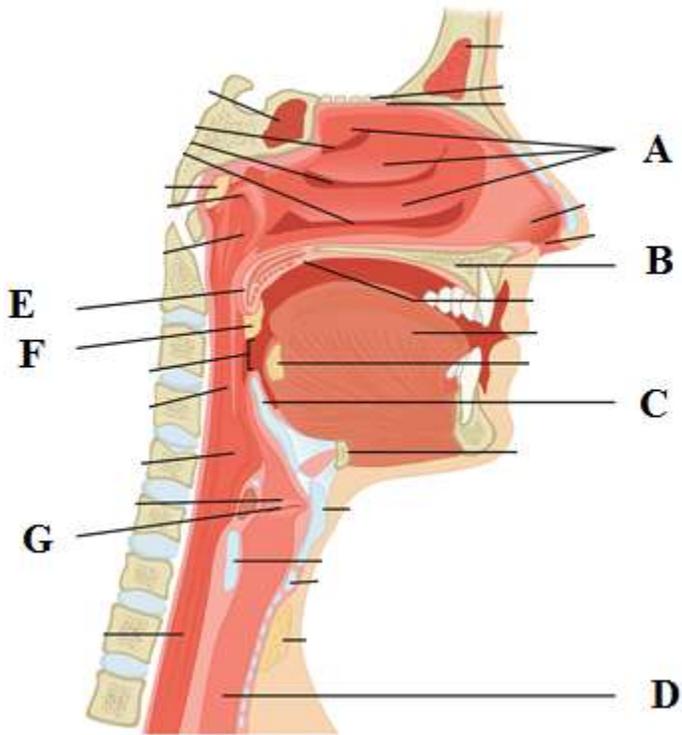
87. Secretes histamine

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Identify the following parts of the digestive system



Identify the following parts of the respiratory system



Identify following pictures: **Tie Break Only**

