STUDY QUESTIONS - MODULES 11 - 14

1. Describe/discuss/explain what is meant by the term *conducting airways*.

2. Describe/discuss/explain the respiratory function(s) of the nose.

3. Describe/discuss/explain how (mechanism(s)) particulates in atmospheric air are removed before they reach the alveoli; describe/discuss/explain the fate of such particulates that do reach the alveoli.

4. What is the driving force for the movement of oxygen from alveolar air into the pulmonary capillaries?

5. Describe/discuss/explain how (mechanism(s)) air is moved from the atmosphere into the alveoli during inspiration, and from the alveoli to the atmosphere during expiration.

6. What are the physical factors pertaining to airways that determine airway resistance (to the flow of air)? Which, if any, of these factors is/are subject to physiological control?

7. Describe/discuss/explain how (increase/decrease/no change, mechanism(s)) forced expiration affects airway resistance.

8. What are the local factors that affect ventilation/perfusion matching? How do (what is the mechanism by which) these factors exert their effects?

9. With reference to respiratory physiology, what is FEV_1?

10. Distinguish between *anatomic dead space* and *physiologic dead space*.

11. Explain how (the mechanisms by which) oxygen is transported from atmospheric air to cells (in the body).

12. Explain how (the mechanisms by which) carbon dioxide is transported from cells in the body to atmospheric air.

13. Describe the effect(s) of increased temperature and acidity on the oxygen - hemoglobin saturation curve. Explain the physiologic significance of such effect(s).

14. Where (anatomically) is the controller for respiratory rate and depth?

15. Where (anatomically) are the sensors that provide input to the respiratory controller? What are the sensed variables?

Rev 0, 4/6/17 - adapted from Fall 2014
Rev 1, 11/19/18 - adapted from Spring 2017. Updated to 601
Rev 2, 12/4/18 - correct typo in header
Rev 3, 5/5/20 - add questions 21 - 23

16. Differentiate between pulmonary minute ventilation and alveolar minute ventilation.

17. With reference to respiratory physiology, differentiate between an anatomic shunt and a physiological shunt.

18. Write an equation for alveolar minute ventilation as a function of respiratory rate, tidal volume, and anatomic dead space for an adult at rest. Provide nominal "normal" values (or a range of values) for each parameter.

19. Does oxygen bound to hemoglobin affect the partial pressure of oxygen in the blood (yes/no)? Briefly explain your response.

20. What would be the effect on the at-rest breathing of a nominally "normal" adult if their nose was clamped closed and they were required to mouth-only breathe through a gas-impermeable cylindrical tube 2 inches in diameter and 3 feet long? Discuss/explain briefly.

21. Describe/disuss/explain the mechanism(s) by which a "low" blood pO_2 at the carotid bodies becomes an afferent signal that will affect respiration. Where does this afferent signal go to (location, structure, etc.)? A drawing/sketch might be helpful.

22. Describe/discuss/explain the feedback loops between an increase in pCO_2 in blood plasma and a change in ventilation. A flow chart/diagram would likely be helpful.

23. What is the signal that is detected by central chemoreceptors (in the medulla), that is the indicator of an increase in blood pCO_2?

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