

1. Which of the following is FALSE concerning the production and role of lung surfactant?
- A. It is part of a lipoprotein called dipalmitoyl phosphatidyl-choline.
  - B. It is synthesized by alveolar type II cells.
  - C. As the alveolar surface area decreases during the compression curve, the surfactant decreases the surface tension at a constant rate.
  - D. When surfactant density is decreased during expansion, surface tension initially rises rapidly, then slows down until it reaches the starting point.

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Correct Answer: C

2. Which of the following is NOT true concerning respiratory distress syndrome in premature infants?
- A. Their ability to synthesize DPPC is limited.
  - B. Higher pressures are required to ventilate the lungs.
  - C. Lung compliance is low.
  - D. Positive pressure respirators are often used to assist them in breathing.
  - E. Alveoli tend to overexpand and sometimes burst at the end of inspiration.

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Correct Answer: E

3. Which of the following is NOT true at FRC?
- A. It is about 75% TLC.
  - B. The elastic recoil of the chest wall is outward.
  - C. The elastic recoil of the lung is inward.
  - D. The relaxation pressure of the lung and chest wall combined is at atmospheric pressure.

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Correct Answer: A

4. If the lung were punctured, which of the following would happen?
- A. The lung would collapse on the side of the puncture.
  - B. Both the lung and the chest wall would collapse on the side of the puncture.
  - C. The relaxation pressure of the chest wall would increase until it surpassed the atmospheric.
  - D. The relaxation pressure of the chest wall would increase, but stop before it reached atmospheric pressure.

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Correct Answer: A

5. Which of the following is FALSE concerning the airflow in the lungs?
- A. During inspiration and expiration, the flow in the trachea and larger bronchi is turbulent.
  - B. Towards the middle of the bronchial tree, the flow is turbulent at the branches and laminar in between.
  - C. Near the end of the bronchial tree, the flow is laminar.
  - D. The acini have very small radii which significantly increases the total air flow resistance of the bronchial tree.

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Correct Answer: D

21. Which of the following is FALSE concerning airway resistance?
- A. Up to 50% is in the nose.
  - B. The maximum resistance in the bronchial tree occurs at the fourth generation.
  - C. In the later generations, the radii are smaller, increasing the total resistance at each successive generation.
  - D. Airway resistance can be increased by loss of tissue elasticity and contraction of bronchial smooth muscles.

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Correct Answer: C

6. Which of the following is FALSE concerning the effect of effort on airflow and volume during inspiration and expiration?
- A. During inspiration, greater effort always results in greater flow.
  - B. Peak expiratory flow occurs at the beginning of expiration.
  - C. At low and moderate lung volumes, the greater the effort above threshold, the greater the airflow in expiration.
  - D. Portions of the expiration curve are effort independent.

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Correct Answer: C

7. If the equal pressure point during expiration is in the lobar bronchi, which of the following is TRUE?
- A. Expiratory flow would be effort dependent.
  - B. Expiratory flow would be effort independent.
  - C. The bronchi beyond the equal pressure point would compress.
  - D. This situation would only occur during medium and low lung volumes.

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Correct Answer: A

8. Which of the following does NOT apply to the alveoli at the base of the lungs?

- A. They are less elastic than the alveoli at the apex.
- B. The pleural pressure is lower.
- C. At FRC they are less inflated than the alveoli at the apex.
- D. They are closed at RV.
- E. They have a greater volume change than alveoli at the apex during inspiration from FRC.

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Correct Answer: A

9. Which of the following is FALSE concerning the closing volume for the lung?

- A. Comes between Phase 3 and Phase 4 on the single breath N<sub>2</sub> washout curve.
- B. Marks the point where the alveoli at the apex close.
- C. Marks a sudden increase in nitrogen concentration in the expelled breath.
- D. Marks when the overinflated, poorly ventilated alveoli at the apex expel their air with high N<sub>2</sub> concentrations.

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Correct Answer: B

10. Which of the following is TRUE if a patient breathes slower than normal with increased tidal volumes?

- A. More resistive work is done.
- B. The total work done decreases.
- C. More elastic work is done.
- D. Compliance is decreased.

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Correct Answer: C

11. Which of the following is INCORRECT concerning the efficiency of breathing and the oxygen consumption of the respiratory muscles?

- A. Efficiency is defined as the ratio of mechanical work done to move air to the amount of metabolic energy used by the respiratory muscles.
- B. The respiratory system uses less than 3% of the body's total oxygen consumption at rest.
- C. Respiratory muscles are more efficient than large muscle groups.
- D. Emphysema increases the oxygen requirement for respiratory muscles.
- E. Hyperventilation can increase the oxygen consumption of respiratory muscles to 30%.

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Correct Answer: C

12. If the  $FIO_2$  is .21, the  $FEO_2$  is .16, the  $V_T$  is 0.5 L, and the frequency of breathing is 12. What is the  $VO_2$ ? The equations are  $VO_2 = V_I * (FIO_2 - FEO_2)$  and  $V_I = V_T * f$ .

- A. 3.0 L/min
- B. 0.75 L/min
- C. -0.75 L/min
- D. 0.3 L/min

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Correct Answer: D

13. In what situation would the gas exchange ratio be decreased compared to the respiratory quotient?

- A. During slowed breathing.
- B. Holding your breath.
- C. During hyperventilation.
- D. Impossible. The two are always equivalent.

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Correct Answer: C

14. A 140 lb woman would have approximately how much dead space in her lungs?

- A. 140 ml.
- B. 70 ml.
- C. 280 ml.
- D. 35 ml.

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Correct Answer: A