**PHYSIOLOGY EXAM 4 2002**

1. Which one of the following does NOT contribute to the high rate of diffusion found in normal lungs?
   1. High velocity of gas flow in the terminal bronchioles
   2. Large alveolar membrane surface area
   3. Small alveolar membrane thickness
   4. Branching of airways into many parallel pathways
2. The functional residual capacity (FRC):
   1. Is approximately 6 liters.
   2. Is the volume of gas which remains in the lungs following a maximal expiration.
   3. Serves to minimize the changes in PA02 and PAC02 which occur during the ventilatory cycle.
   4. All of the above.
3. The unstressed volume of the lung:
   1. Is equal to the unstressed volume of the thorax
   2. Is equal to the residual volume
   3. Is the volume of the lung when there is a pneumothorax
   4. None of the above
4. When the amount of pulmonary surfactant is deficient:
   1. The work of breathing will be reduced
   2. Pulmonary surface tension will be greater than normal
   3. Lung compliance will be greater than normal
   4. The FRC will be greater than normal
5. The chance of airway collapse is increased when:
   1. Lung compliance is increased
   2. Intrathoracic pressure becomes more positive
   3. Airway resistance increases
   4. All of the above
6. What is the partial pressure of oxygen of fully saturated air when a person is on a mountain peak where the barometric pressure is 500 mmHg?
   1. 47 mm Hg
   2. 95 mm Hg
   3. 453 mm Hg
   4. 500 mm Hg
7. Alveolar ventilation can be increased by decreasing the:
   1. Dead space volume
   2. Frequency of ventilation
   3. Tidal volume
   4. Residual volume
8. Which one of the following alveolar partial pressure combinations indicates that a person is hypoventilating?
   1. PACO2 = 40 mm Hg, PAO2 = 40 mm Hg
   2. PACO2 = 20 mm Hg, PAO2 = 105 mm Hg
   3. PACO2 = 40 mm Hg, PAO2 = 100 mm Hg
   4. PACO2 = 60 mm Hg, PAO2 = 80 mm Hg
9. An increase in *VCO2*, while the frequency of ventilation and the tidal volume are held constant will:
   1. Increase the stimulation of the central and peripheral chemoreceptors
   2. Increase the PaCO2
   3. Increase the amount of carbon dioxide dissolved in the plasma
   4. All of the above
10. The administration of pure oxygen to a patient will:
    1. More than double the amount of oxygen dissolved in plasma
    2. More than double the percent saturation of hemoglobin with oxygen
    3. More than double the oxygen content of the blood
    4. All of the above
11. Which one of the following is true?
    1. PAO2 = Ppul cap O2
    2. PAO2 = PaO2
    3. PACO2 = PVCO2
    4. PiO2 = PAO2
12. The administration of pure oxygen would be most beneficial to a person who:
    1. Is anemic
    2. Has an increased thickness of her alveolar membrane
    3. Has a large intrapulmonary shunt
    4. Is normal
13. As the red cell enters the pulmonary capillary
    1. The affinity of hemoglobin (Hb) for O2 decreases
    2. The Hb P50 increases
    3. The oxyhemoglobin curve shifts to the left
    4. HCO3- leaves the red cell
14. Which one of the following is true about carbon monoxide (CO)?
    1. The affinity of hemoglobin for CO is much greater than the affinity of hemoglobin for O2
    2. CO is colorless and odorless
    3. Hb bound to CO is bright red
    4. All of the above
15. In which region is the V/Q ratio of the lung closest to 1.0, while a person is standing?
    1. The airways
    2. The apex of the lungs
    3. The middle of the lung
    4. The base of the lungs
16. Which one of the following is greater at the apex of the lung than at the base of the lung?
    1. PAO2
    2. PACO2
    3. Pulmonary blood flow
    4. Compliance
17. If you inhale and exhale through a long tube, while not changing the tidal volume or the frequency of ventilation
    1. Alveolar ventilation will be decreased
    2. PAC02 will decrease
    3. PAO2 will increase
    4. All of the above
18. Which one of the following directly stimulates the central chemoreceptors?
    1. The hydrogen ion (H+)
    2. CO2
    3. 02
    4. All of the above
19. The carotid bodies are more important than the central chemoreceptors in maintaining the PaC02 within a few mm Hg of 40:
    1. True
    2. False
20. The peripheral chemoreceptors:
    1. Are located on the surface of the cerebral cortex.
    2. Decrease alveolar ventilation in response to hypoxia
    3. Decrease alveolar ventilation in response to acidosis
    4. Are responsible for the increase in alveolar ventilation seen at high altitude
21. A small amount of venous admixture:
    1. Can be produced in part by alveoli in which impaired diffusion exists
    2. Causes an A-a gradient to exist for carbon dioxide
    3. Cannot exist while a person breathes pure oxygen
    4. Reduces the A-a gradient for oxygen
22. The administration of pure oxygen to a patient with a large intrapulmonary shunt will change which one of the following the most?
    1. The A-a gradient for oxygen
    2. The arterial oxygen content
    3. The blood flow through the shunt
    4. The A-a gradient for carbon dioxide
23. A patient with severe emphysema will:
    1. Have lower than normal pulmonary compliance
    2. Need to perform forced expirations during each breath
    3. Have little chance of airway collapse
    4. Have a smaller than normal functional residual capacity
24. The equal pressure point will be moved closer to the lungs by:
    1. Decreased lung compliance
    2. Increased thickness of the walls of the airways
    3. Decreased airway resistance
    4. Increased force of expiration
25. A person with increased airway resistance will have a lower than normal:
    1. frequency of ventilation
    2. tidal volume
    3. work of breathing
    4. total lung capacity