PAL Worksheet

Week 11 Problem Set 1

Respiratory Physiology/ Acid Base Balance

 Patient A is breathing 12 times/min with a tidal volume of 500 ml. Patient B is breathing 20 times/minute with a tidal volume of 300 ml. (Assume each has a dead space volume of 150 ml). Which patient has better alveolar ventilation? Explain.

2. For the following questions, mark each answer as either true or false:

Oxygen

- a. is mainly transported in the blood while bound to the hemoglobin in red blood cells.
- b. is as soluble as carbon dioxide in plasma.
- c. is the primary chemical drive for ventilation.

Carbon dioxide

- a. is primarily transported as a gas dissolved in the plasma. _____
- b. binds to hemoglobin in erythrocytes. _____
- c. may be considered an acid. _____

The PO_2 of the blood

- a. is a measure of the amount of oxygen dissolved in the plasma.
- b. is the most important factor determining the percent saturation of hemoglobin.
- c. is normal in anemia. _
- d. is an accurate indicator of the total oxygen content of the blood. _____
- e. determines PO₂ of the alveoli.

3. A person hyperventilates. What effect will this have on the total oxygen content of her blood? Explain.

4. How would hypoventilation/hyperventilation change the pH in the body? Explain. Be specific about sources of H+ if appropriate.

5. During exercise, blood gases do not change much (exercise hyperpnea). Explain how this is accomplished (there is more than one mechanism at play to match the increased metabolic activity).

So a swimmer hyperventilates before the dive they dive into the pool. They end up passing out in a few seconds, what happened?