1.

A. What is the main cause for peripheral chemoreceptors to be activated?

P02<60mm hg

B. What are two ways that this can happen

High altitude, Pulmonary Disease, Hypoventilation, and others

C. What are minor stimulants for peripheral chemoreceptors?

H+, C02

2. How is the majority of C02 transported in the body?

a. In the tissue

b. In RBC

c. In the plasma

d. Through air

3. Which of the following combinations would allow a person to inspire?

a. Dorsal Respiratory Group (DRG) is inhibited, Ventral Respiratory Group (VRG) is stimulated

b. DRG is stimulated, VRG is inhibited

c. DRG is stimulated, VRG is stimulated

d. DRG is inhibited, VRG is inhibited

4. Explain how low P02 stimulates the body to hyperventilate

   a. Low PO2 triggers K+ channels in glomus cells to close, causing the cell to depolarize. This causes voltage gated Ca+ channels to open, further depolarizing the cell until an action potential is sent to sensory neurons. These then send signals to the DRG which stimulates hyperventilation.

5. Which disease would a person climbing Mt. Everest most likely develop?

   a. Cardiac thrombosis

   b. Pulmonary thrombosis

   c. Pulmonary Edema

   d. Acidosis

   e. Alkalosis

6. Explain why the climber would be likely to develop this particular disease.

   a. At high altitude the hydrostatic pressure increases causing your body to constrict pulmonary veins to increase blood pressure. Because there is a high blood pressure in lungs, there is an increased amount of fluid pushed out of circulation in the pulmonary system. This fluid builds up inside the lungs causing pulmonary edema to develop.

7. What two purposes does the conversion of C02 to HC03 serve?

Transport of C02 and a buffer to keep the pH regulated

8. Explain why C02 forms HC03 and H+ in the systemic capillaries, but HC03 and H+ form C02 in pulmonary capillaries.

Use the following equation for explanation: $CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$

Because in the systemic capillaries there is an abundance of C02 so the reaction is shifted right. In addition, HC03 is transported out of the RBC using the chloride shift. Also H+ is bound by hemoglobin. All of these factors shift the reaction to the right, causing C02 to be converted to H+ and HC03-. But in the pulmonary capillaries there is very little C02 present, so the reaction shifts left and the HC03- and H+ are converted into C02.

9. What is the chloride shift and what does it accomplish?

Chloride is allowed into the RBC in exchange for HC03 leaving the cell. This allows more C02 to be transported out of the body.

10. What is a buffer, give an example.

A buffer is a weak acid and it's conjugate base that are able to keep the pH within a certain range. There are many examples, H2C03 and H+ +HC03- is one example.

11. During acidosis, which type of cells are activated, what is their location, and what do they do?

A. Intercalated type B cells, distal tubule, secrete H+ and reabsorb HC03-
B Intercalated type A cells, proximal tubule, secrete H+ and reabsorb HC03-
C.Intercalated type A cells, distal tubule, secrete H+ and reabsorb HC03-
D. Intercalated type B cells, distal tubule, secrete H+ and HC03-

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A. Alkalosis
B. **Hyperkalemia**
C. Hypokalemia
D. Cyanosis

13. Which of the following would not be a cause for alkalosis?

A. Hyperventilation
B. Vomiting for a long period of time
C. Taking an excess of Tums (antacids)
D. Hypoventilation