

Unit Three Homework Assignment

Respiratory System Chapter (2025_3_7)

Mechanics of Breathing: (10.56 min)

1. What is breathing? Terms used to describe air movement?
2. What are the two serous membranes of the lungs called? What is between these membranes?
3. What skeletal muscle is at the base of the thoracic cavity? What happens when this muscle contracts?
4. What other structures may help expand the thoracic cavity?
5. What are important features about air in the mechanics of breathing?
6. What are the three regions of pressure important in the mechanism of breathing? What is the relative pressure in each area when no air is moving?
7. What happens when the diaphragm contracts? The changes in pressures in the three regions?
8. Is expiration passive or active? Explain why.

Surfactant and Surface Tension (4.27 min)

1. What is the functional unit of the lung?
2. What is lining the inside of this functional unit?
3. What causes the surface tension? As the unit gets smaller what happens to the surface tension?
4. What two forces contribute to elastic recoil?
5. What is the force called resisting elastic recoil? When is this force low?
6. What causes surface tension to be reduced? Produced where and by what?
7. What happens if there is no surfactant synthesis?
8. What happens if there is more surfactant?

Neural Regulation of Respiration (13 min)

1. What center in the upper pons control fine tuning of the respiratory rate? What does this structure do when the lung is fully expanded?
2. What center may cause prolonged inspiration if another center is damaged? Name both center's functions.
3. What is the significance of the central chemoreceptors? Monitor what?
4. What is the function of the dorsal respiratory group? What type of stimuli does this structure receive? From where? What type of signals does the DRG send and to where?
5. What is the function of the ventral respiratory group? What two complexes are part of the VRG? Functions of each? Which one is the pacemaker?
6. What is the function of the VRG nucleus retro ambiguus? Regulates what two muscles for inspiration?
7. Where are signals from the VRG go? What to nerves travel from the VRG into the thoracic cavity?
8. What is the normal respiratory rate?

Control of Respiration (7.48 min)

1. What two structures make up the medullary respiratory centers? Function of each?
2. What is the function of the pontine respiratory center?
3. What muscles cause inspiration?
4. How may the cerebrum affect breathing? By influence on what structure?
5. What are the two main centers used to regulate breathing in the medulla? Monitor what?
6. May skeletal muscles in your arm influence breathing? Explain
7. What two factors within the lung tissue may influence breathing?

Partial Pressures: Movement of Oxygen and Carbon Dioxide (3 min)

1. How do we express the amount of gas in air? Units used?
2. What is the PO_2 coming into the alveoli from the atmosphere?
3. What is the PCO_2 in the alveoli coming from the pulmonary capillaries?
4. What happens to the CO_2 when you expire?
5. What is the direction of diffusion of the oxygen and carbon dioxide?
6. What is the net diffusion at the venous side of the pulmonary capillary?
7. What is the direction of gas diffusion in the systemic circuit?

Everything You Need to Know About Ventilation Perfusion Ratios (6:37 min)

1. What determines the oxygen tension in the pulmonary vein?
2. Are all areas of the lung equally ventilated and perfused?
3. What is the partial pressure of oxygen and carbon dioxide in an alveoli when ventilation is equal to perfusion?
4. What happens to gas ratio if alveoli is perfused but not ventilated?
5. How many alveoli are in the human lung?
6. What part of the lung is better ventilated, apex or base?
7. What part of the lung is better perfused, apex or base?
8. What is better at the apex, ventilation or perfusion?
9. What is better at the base, ventilation or perfusion?

Carbon Dioxide Transport (8 min)

1. When is the carbon dioxide formed? Where?
2. What occurs when water and carbon dioxide is mixed? Occurs where?
4. What happens after carbonic acid is formed?
5. Where does the proton go?
6. Where does the bicarbonate go?
7. What is the chloride shift?
8. So, how is CO_2 transported in the blood?
9. What happens to the chemical reaction that occurred in the tissue of your body when the blood enters the lungs?
10. What would happen to your blood pH if you reduced your breathing?

How Red Blood Cells Carry Oxygen and Carbon Dioxide (3:47 min)

1. How are erythrocytes different than most cells (three things)?
2. What two structural proteins and corpuscle shape make RBC strong, flexible, and elastic?
3. What macromolecule is inside RBC? What is the significance of the heme component? How many?
4. How many oxygen molecules may bind to one hemoglobin molecule? Why?
5. Where is oxygen loaded and unloaded onto the hemoglobin?
6. Is most carbon dioxide transported by hemoglobin? If not then how? What enzyme is required?

Transport of Respiratory Gases (3:30 min)

1. How many haem groups are in a single hemoglobin molecule?
2. How many oxygen molecules may a hemoglobin molecule carry?
3. What is the chemical formula for oxyhemoglobin?
4. What happens to oxygen on the hemoglobin molecule when the partial pressure of oxygen in the blood is low?
5. What is the function of carbonic anhydrase?
6. How do protons (H^+) affect the oxygen bound to hemoglobin?
7. In what form is bicarbonate transported in the blood?
8. Why may you consider hemoglobin to be a buffer?
9. What is the Bohr effect?
10. At a partial PO_2 , will the percent saturation of oxyhemoglobin be greater in human fetal hemoglobin or human maternal hemoglobin?