Respiration

1. What are the four main processes of the respiratory system?
    a. Pulmonary ventilation
    b. External respiration
    c. Transport of respiratory gases in blood
    d. Internal respiration
2. What are the two portions of the airway? Describe each
    a. Conducting zone leads from external environment to exchange surface
    b. Respiratory zone is where gas exchange occurs
3. What are the two types of alveolar cells?
    a. Type 1 where gas exchange occurs
    b. Type 2 where surfactant is produced to decrease surface tension
4. What is the structure of the thoracic wall? Go from outside to inside.
    a. Thoracic wall, parietal pleura, intrapleural fluid, visceral pleura, lung
5. What is Dalton's law?
    a. Total pressure exerted by a mixture of gases is equal to the sum of pressures exerted by each individual gas
6. What is Boyle's law?
    a. P1V1=P2V2
    b. The pressure of a fixed number of gas molecules is inversely proportional to the volume of the container
7. Define intrapleural pressure
    a. The pressure in the intrapleural cavity, fluctuates with breathing but is always 4 mmHg less than the alveolar pressure
8. Define transpulmonary pressure
    a. Equal to the intrapleural pressure minus the alveolar pressure
9. Describe the process of inspiration.
    a. Volume of thoracic cage increases, diaphragm and inspiratory muscles contract causing an increase in lung volume, air flows from high pressure to low pressure
10. Describe the process of expiration.
    a. Volume of thoracic cage decreases causing a decrease in lung volume and increased pressure in the alveoli, air flows from high pressure to low pressure
11. What is lung compliance?
    a. The ability of the lung to stretch, the change in volume of the lung resulting from a change in transpulmonary pressure
    b. Equal to change in lung volume/ change in transpulmonary pressure
12. What is elastic recoil?
    a. The ability of the lungs to recover from being stretched
    b. With increased compliance there is increased stretchability of the lung and insufficient recoil
    c. With decreased compliance the lungs resist change in volume

13. What is the role of surfactant?
    a. It reduces the surface tension in lungs and prevents collapse of individual alveoli
14. What is the law of Laplace?
    a. Describes the relationship between pressure, surface tension, and the radius of the alveolus (P= 2T/r)
15. What effects airway resistance?
    a. System length
    b. Viscosity of substance flowing through lungs
    c. Radius of tubes in the system
16. Where does airway resistance have the largest effect?
    a. Medium sized bronchi
17. What is asthma?
    a. Disease characterized by intermittent episodes in which airway smooth muscle contracts, increasing airway resistance
    b. Results from chronic inflammation of airways
    c. Makes airway smooth muscle hyperresponsive
    d. Treat with anti inflammatory drugs and bronchodilator drugs
18. What are some chronic obstructive pulmonary diseases?
    a. Emphysema: caused by destruction and collapse of smaller airways
    b. Chronic bronchitis: excessive mucus production in bronchi and chronic inflammatory changes in small airways
19. What is tidal volume?
    a. Amount of air moved in and out of airways in a single cycle
20. What is inspiratory reserve?
    a. Additional air that can be inspired
21. What is expiratory reserve?
    a. Additional air that can be expired
22. What is vital capacity?
    a. Total of inspiratory reserve, tidal volume, and expiratory reserve
23. What is residual volume?
    a. Air remaining in the lungs after maximum voluntary expiration
24. How does the majority of oxygen travel in the blood?
    a. Bound to hemoglobin
25. What is cooperative binding
    a. This just means that the more oxygen bound to hemoglobin, the easier it is for the next oxygen molecule to bind
26. What two factors do the amount of oxygen bound to hemoglobin depend on?
    a. Pressure of oxygen in the plasma surrounding the red blood cells containing hemoglobin
    b. Number of available binding sites for oxygen on hemoglobin
27. What is the Bohr effect?

   a. H+ ions compete with oxygen for binding to hemoglobin, so an increased H+ concentration (lower pH) causes a decrease in oxygen affinity for hemoglobin and decreased binding
28. How is the majority of CO2 transported in the blood?
   a. HCO3-
29. What are the symptoms and treatment of CO poisoning?
   a. Symptoms: confusion, respiratory distress, red skin
   b. Treatment: hyperbaric treatment
30. What is Hypoxia?
   a. Inadequate delivery of oxygen to tissues
31. What are the different types of hypoxia? Describe each!
   a. Anemic hypoxia: poor oxygen delivery because there aren't enough red blood cells or there is an abnormality in the hemoglobin
   b. Ischemic hypoxia: blood circulation is impaired
   c. Histotoxic hypoxia: body's cells can't use oxygen
   d. Hypoxemic hypoxia: reduced arterial oxygen
32. What is the difference in alveolar and capillary pressure of oxygen between healthy people and diseased people?
   a. The two pressures equilibrate quickly in healthy people, but in diseased people fluid accumulation between the alveoli and capillaries causes a much slower equilibration
33. What is the relationship between ventilation and perfusion in the lung?
   a. Top of lung: increased ventilation and decreased perfusion
   b. Base of lung: decreased ventilation and increased perfusion
34. What happens physiologically when there is a decrease in pressure of oxygen?
   a. Vasoconstriction of pulmonary vessels to reduce perfusion of poorly ventilated regions of lung
   b. No ventilation in area that receives blood (shunt)
   c. Bronchioles in the area dilate and systemic arteries dilate

Renal

35. What are the functions of the renal system?
   a. Regulation of water, inorganic ion balance, acid base balance
   b. Removal of metabolic waste products from blood, excretion in urine
   c. Removal of foreign chemicals from blood, excretion in urine
   d. Gluconeogenesis
   e. Production of hormones and enzymes
36. What two hormones are made in the kidneys?
   a. Erythropoietin: controls erythrocyte production
   b. Renin: controls formation of angiotensin and influences blood pressure and Na+ balance
   c. 1.25- dihydroxvitamin D: influences Ca2+ balance
37. Where does the blood supply for the kidneys come from?