Chapter Study Guide
The Respiratory System (C22)

Section C21.1

1 What are the organs of the respiratory system? What is the difference between the upper and lower respiratory tract? What is the difference between the conducting and respiratory division?

2 What three functions are associated with the nasal cavity?

3 In the larynx, what is the function of the vestibular folds VS the vestibular ligaments?

4 Air moves in and out of the lung tissue because a "negative pressure" is created within the lung tissue to "suck air into the lungs". Negative pressure within a tubular structure wants to "collapse" the tubular structure. What prevents this from happening in the trachea and deeper air passageways? When does this support against negative pressure end?

5 What is the significance of the mucociliary escalator? Where does it start and where does it end? What happens at the glottis of the larynx?

6 What is the difference in the functions between the "pulmonary arteries and veins" and the "bronchial arteries and veins"?

7 In the bronchial tree, what type of tissue "contributes to the recoil of the inflated lung tissue to expel air from the lungs"? Is this passive or active?

8 What are bronchioles? What do bronchioles lack that is present in the proximal segments of the air conducting? What prevents bronchioles from collapsing?

9 What are the three types of bronchioles? Which bronchioles have cilia? Which bronchioles have mucous gland?

10 Smooth muscle surrounding bronchioles maybe used to control which area of the lung tissue is ventilated. What hormone constricts bronchioles? What hormones dilate bronchioles? How do these hormones affect arterioles in the systemic circuit?

11 At the end of the air conducting pathway are alveoli. This is where gas exchange occurs. What three cell types construct the wall of the alveoli? Function of each cell type? How hick is the wall of the alveoli?

12 What is the respiratory membrane? What two cells make the respiratory membrane? What one structure do they share? What two conditions will slow the diffusion of gases across the respiratory membrane?

13 Oxygen and carbon dioxide both diffuse down their concentration gradients. Where is oxygen needed? Why? Where is carbon dioxide produced? How? Explain how these two gases diffuse? (see slide #40)

14 What is pulmonary surfactant's function? Produced by? When? What is infant respiratory distress syndrome?

15 What determines airflow within the lungs? Inspiration VS expiration? Where within the lungs are we able to change the air pressure relative to the atmospheric air pressure (greater than VS less than)? How is volume inversely related to pressure? (Boyle's Law)

16 How does Charles' Law influence respiration?

17 During quiet breathing (resting breathing) compare inspiration and expiration and explain which phase is active and which phase is passive. Why? What is the diaphragm's function?

18 How long is one respiratory cycle during quiet breathing? How long is inspiration? How long is expiration?

(Study Slide #51) What happens during inspiration? Expiration? Between breaths?

19 What chemical reaction occurs inside a RBC and requires carbonic anhydrase? You should already know this equation by memory. What happens as the carbon dioxide concentration increases and decreases? (Study slide #53) Where is carbon dioxide produced?

20 (Study slide #54) Where is oxygen loaded and unloaded on hemoglobin in erythrocytes?

21 Where are the locations for the two control centers for respiration? What is the primary molecule to stimulate inspiration?

22 What happens to carbon dioxide concentration when you hyperventilate? How does this affect respiration? What happens to blood pH? What is this called? How does this affect the nervous system? What might happen? How might this cause the death of a swimmer?

23 What is the normal cycle controlling respiration? (slide #58)

24 What is hypoxic drive? (slide # 61) What must happen in order for hypoxic drive to occur? In hypoxic drive what molecule now controls ventilation? What control center is now in control?

25 How much air is moved in an out of the respiratory system with each breath? What is this volume called? How much of this air reaches the respiratory membrane (alveoli)? Where is the rest of this air? What is this volume of air called? What happens to this volume as pulmonary diseases develops?

26 What is a spirometer? (lab objective)

27 (Study slide #67) Draw an illustration and label the following (on test!): tidal volume, inspiratory reserve voflume, expiratory reserve volume, residual volume, vital capity, total lung capacity

28 How thick is the respiratory membrane? What happens to this membrane if you have left ventricle failure? (now right ventricle pumps out more blood than left ventricle)

29 What three diseases will result in hypoxia?

30 What is the significance of ventilation-perfusion coupling? What occurs during ventilation? What occurs during perfusion? How is this regulated?

31 How is 98.5% of the oxygen transported in the blood?

32 How is carbon dioxide transported in the blood? (Know percentage for each way)

33 Where is oxygen loaded and unloaded from hemoglobin? (slide #75) How many oxygen molecules maybe carried by a single hemoglobin molecule? What does this mean 50%Hb ?

34 Where is carbonic anhydrase located? Function? (See slides 80 &81) What is the significance of the chloride shift? What is the significance of producing a H+ (proton) in the RBC cytoplasm?

35 When pulmonary venous blood leaves the lung the hemoglobin is 100% oxygenated. What is the oxygenation status of hemoglobin when it returns to the heart?

36 What three factors will cause more oxygen to be unloaded? What activity will cause these events?

37 Vocab terms: eupnea, apnea, dyspnea

Section 22.2 Control of Ventilation

38 Where is the ventral respiratory group of nuclei located? What is its function? How does it set the respiratory cycle?

39 Where is the dorsal respiratory group of nuclei located? What is its function? How may it change the VRG?

40 Where is the pontine respiratory group located? What is its function?

41 The corticospinal track maybe used to stop breathing? What will cause breathing to resume? What is this point called?