Chapter Study Guide
C19 The Heart

Section 19.1 (Note: This section is mostly about structure. You will be tested on the heart structure in lab. However, in this section there is some lecture material which I will include here.

1 What are the three "circuits" blood follow in the human body? What is the pump or force to move blood in each circuit?

2 Which side of the heart is the low pressure and high pressure pump? Which circuit is associated with each pump?

3 What is the distinction between blood flow through the heart and the pumping action of the heart?

4 What fetal structures allow blood to "bypass" the lungs? Why does this occur? What occurs to these structures after birth? After birth, what are these structures called?

5 Where are the openings to the coronary arteries located? When are these openings closed? When are these openings open? What is the state of the heart when the entrance into the coronary are open? What is the aorta doing at this time? Explain why this all makes sense.

6 What determines if a heart value is open or closed?

Section 19.2

7 How often is there a heart contraction? What is this called? How many beats per minute?

8 How much blood is ejected from the heart with each beat? What is this called?

9 How do you calculate cardiac output? What is our benchmark for cardiac output?

10 What regulates the frequency of the cardiac cycle? What determines which and when each heart chamber contracts? What are the five steps in this conduction system?

11 Why is the sinoatrial node called the pacemaker? If a virus destroys the SA Node, then what tissue becomes the "new pacemaker"? What system maybe used to increase or decrease the rhythm of the heart?

12 Under normal conditions, why must the action potential be delayed at the AV node? What structure allows action potentials to seem to contract first the upper chambers and then the lower chambers as a single muscle?

13 Where is the cardiac center located? Where do input signals come from? Where do output signals from the cardiac center go? (What is the motor system for the cardiac center?) What effects do each motor division have on the heart? (see slide 16)

14 What is more important for cardiac function, chemoreceptors or baroreceptors? Explain

15 Heart rate can increase from resting rate at 75bpm to a maximum of 240bpm, however. Cardiac output does not increase after heart rate exceeds 160bpm. Why?

16 What is cardiac systole? What part of the action potential is this associated with?

17 What is cardiac diastole? What part of the action potential is this associated with?

18 What is vagal tone? How can you demonstrate this?

19 What is an ectopic focus?

20 What is nodal rhythm? When would this occur? What is heart rate with nodal rhythm? Will this support an active life style?

21 What is a ventricular intrinsic rhythm? When would this occur? Heart rate? How serious?

22 What is cardiac fibrillation? Which condition is more serious, atrial or ventricular fibrillation? Why? How do you stop fibrillation?

23 What is the difference between tachycardia and bradycardia?

24 Why is it possible to record heart activity with an electro-caridiogram (EKG)?

25 (Study slide # 41) Using the EKG tracing, indicate when the atrial and ventricular depolarize, contract, and repolarize.

26 How is an action potential in the heart different than the skeletal muscle action potential? Why?

Section 19.3 The Cardiac Cycle

27 What is the cardiac cycle? How long is one cycle? What terms are used to describe a cycle? How long is atrial systole and ventricular systole?

28 What are the four phases that occur in a ventricle during one cardiac cycle? Explain how the atrial-ventricular and semilunar valves operate during one cardiac cycle? (When are the valves open and closed)

29 What force opens and closes the heart valves?

30 Two sounds are created during a cardiac cycle, the lub and the dub. What event in the heart causes S1 and S2?

31 How does the blood volume in a ventricle change during the cardiac cycle? What do these terms mean: end systolic volume, stroke volume, and end diastolic volume. (slide # 22)

32 How much blood is ejected from each ventricle during the cardiac cycle? What is the difference between the two ventricles?

33 What is pre-load? When does this occur? Where?

34 What is after-load? When does this occur? Where?

35 What happens to stroke volume if contractility increases? What type of force is associated with contractility?

36 What two factors determine cardiac output? What is the "standard" formula to determine normal volume per minute? What two factors may influence cardiac output?

37 What is cardiac reserve? How may this change for a fit person VS world class athlete?

38 How does stroke volume change with increase in fitness or as you get older? As stroke volume changes then what must happen to heart rate? Why? What must remain constant?

39 What is Frank-Starling Law of the Heart?

40 Where is the afterload located? What must the heart do to overcome after load?

41 What conditions are associated with hypertension? How will hypertension affect the heart?

42 What is cor pulmonale? What diseases may causes this condition?

43 (Study slide #48) What will increase stroke volume and heart rate?

44 In a normal cardiac cycle each ventricle must eject the same amount of blood? What occurs during left and right ventricle failure? In each case, where will the edema occur?