In General

The exam will be a mixture of multiple choice, short answer, and graphing questions that will test your knowledge of physiological principals, your ability to apply scientific methods, and your ability to think critically. The labs covered are Respiration I and II, Renal Physiology and Digestion.

You may be asked to:

- Draw a *properly labeled* graph given data or an experimental design;
- Design an experiment given a question;
- Design additional experiments given a question and results of an initial experiment;
- Relate experiments done in the lab with theory learned in Dr. Casotti's lectures.

You should bring an eraser and a ruler to the exam. Write in pencil on the exam.

Remember to keep the hypothesis being tested or goal of the study in mind so that your graph or experiments are relevant!

"Describe" means to tell us how something looks or appears. "Explain" or "Why" means to tell us the underlying physiological mechanism(s). You should know how the physiology works in detail for all the experiments you conducted in the labs.

The Specifics

1. Review the anatomy of each of the systems we've covered in the second part the class. Be prepared to identify structures of the throat, lungs, kidney, bladder, and gastrointestinal tract.
2. Review the introductory/background paragraphs of each lab. Refer back to your lecture notes and/or the textbook to clarify or expand.
3. Pay special attention to any terms or sentences **highlighted** by **bold** typeface.
4. Review all of your data from the labs. Know what is considered normal.
5. Make certain you know what the following terms mean *and* how to calculate them from a graph: Tidal Volume (Vt), Expiratory Reserve Volume (ERV), Inspiratory Reserve Volume (IRV), Residual Volume (RV), Vital Capacity (VC), Total Lung Capacity (TLC), Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 sec. (FEV_1), Respiration Minute Volume (RMV).
6. Know what will happen to the respiration volumes above when the bronchi constrict and dilate.
7. Understand the effect surfactant has on alveolar volume.
8. Understand what intrapleural pressure is and the terms pneumothorax, atelectasis.
9. How do conditions such as emphysema and asthma affect the breathing pattern?
10. Know the structures comprising the upper and lower respiratory tract and the larynx.
11. Be able to calculate the values of the various parameters shown on Figure 1 of the Respiratory Physiology lab. Several of these values can only be determined using **equations**, for example FEV_1/FVC. Remember the procedure we used to calculate FEV_1.
12. What is the difference between the *Spirometry* and *Chest Movement* measurements (i.e., what are each measuring)? Are there one or more physiological parameter(s) that you could determine from either type of data? What are they?
13. What physiological parameter triggers changes in breathing (i. e., pO_2 or pCO_2?) and how is that related to blood pH?
14. How do inhalation and exhalation affect one's ability to hold one's breath? Why?
15. Consider the affects of differences in ***compliance*** that occur with age and physical condition/exercise.

16. Consider **hyperventilation** and **hypoventilation**. What do they mean? How would these conditions affect breathing rate and depth?
17. Review **Table 3** of the Renal Physiology lab. Consider both pathological *and* non-pathological causes for the abnormal appearances of substances in urine.
18. How do ***ADH*** and **aldosterone** affect urine volume, concentration, and K^+ & Na^+ concentrations? On which structures of the nephron does each hormone act (see the introduction to the renal lab AND your lecture notes)?
19. What effect does changing the medullary interstitial concentration gradient have on the ability to concentrate urine?
20. Remember the experiment with the dialysis bags and osmosis. They were permeable to water but not to the solute. Given different combinations of bags and beakers, know which way water moves by osmosis. How can you tell in which direction water flowed?
21. Consider the digestive physiology simulations. Which tubes were experimental and which were controls (both positive & negative)? Positive controls show you what to expect if your experiment worked. Negative controls help determine causal relationships. What was the role or purpose of each item put into each test tube (enzyme, substrate, buffer, etc.)?
22. Know the general equations for each of the 3 digestive enzymes we studied in the simulations.
23. What is Lipase? Pepsin? Amylase? Where are they active?
24. What does the term "optimum" suggest? What factors affect enzyme activity?
25. What does boiling do to an enzyme?
26. What is the role of bile salts? How do they affect the activity of lipase?