**Study Guide #4**

**Human Physiology (BIOL 235)**

**Respiratory Control**

1. How is respiration controlled? Describe the chemoreceptors for monitoring the respiratory system.
2. Describe how the central and peripheral chemoreceptors respond to changes in PCO2, PO2 and [H+].
3. Discuss the control centers for respiration in the brain. How do they change ventilation?
4. Explain the most important regulator of respiration and how other brain regions influence respiration.
5. What are the effects of high altitudes and depths on respiration and the rest of the body?

**The Renal (Urinary) System**

1. Describe the structures and functions of the renal system. What is the functional unit of the kidney?
2. How are the 2 types of nephrons different? Describe the 3 ‘parts’ of the renal corpuscle.
3. What are the 3 ‘parts’ of the renal tubules? Describe the structure and function of each section.
4. Renal function can be divided into 4 processes, describe them and where they take place.
5. As substances passes from the blood into the Bowman’s capsule, what 3 layers must they traverse?
6. Discuss forces that favor and oppose glomerular filtration. What are the magnitudes of these forces?
7. What is the Juxtaglomerular Apparatus? What is it comprised of? What’s its function?
8. Describe autoregulation of nephron: 1) myogenic stretch; 2) Tubuloglomerular Feedback mechanism.
9. What’s the typical value of GFR? What are factors that control Glomerular Filtration Rate (**GFR**)?
10. Define circulatory ‘portal systems’; explain the hepatic, renal and hypothalamic-hypophyseal systems.
11. Discuss the passive and active transport mechanism of renal reabsorption and their locations.
12. What is Transepithelial Transport (transcytosis)? Is it active or passive? What is transported this way?
13. Renal transport mechanisms can be affected by *saturation*, *specificity* and *competition*. Discuss.
14. Explain how the colleting ducts are a key site of filtrate modification and are under endocrine control.
15. The kidney acts as an endocrine organ. What hormones are released and what are their functions?
16. How does Renin-Angiotensin-Aldosterone system help to maintain Homeostasis in the body?
17. Compare the 3 solutions: Plasma; Filtrate; Urine. What are some pathologies detected from urinalysis?
18. List substances normally found in urine. What is polyuria? What is glycosuria? What is proteinuria?
19. What is diabetes insipidus? What is diabetes mellitus? What is nephritis? What is cystitis?
20. What is antidiuretic hormone (ADH)? How does it act in the renal system to conserve water loss?
21. Describe the micturition reflex. Briefly describe the systems that controls this reflex.
22. Define acute and chronic renal failure. How can these occur? What are the potential ramifications?

**The Endocrine and Reproductive Systems**

1. Outline the roles of the pancreas as an exocrine (digestion) and endocrine (metabolism) gland.
2. Describe the relationship between the hypothalamus and the pituitary gland (hypophysis).
3. How is the Hypothalamus-Pituitary-Adrenal Axis related to release of cortisol by the adrenal cortex?
4. List and describe the actions of the hormones released by the anterior and posterior pituitary gland.
5. Discuss how growth hormone, thyroxine and sex hormones regulate growth and metabolism.
6. Describe the general components and functions of the primary reproductive structures for males (testes) and females (ovaries), including gonads, gametes and hormones.

**Lab Concepts:**

* Urinalysis: Measurements and Diagnostics from examination of urine samples.
* Digestive System Enzymes: Gastric, Intestinal and Absorption.
* The Scientific Method and Experimental Design.
* Sweat gland Control and Activity: Compare the types, densities and locations of sweat glands.
* Experimental Analysis – constructing and reading graphs related physiological data.
* Student Presentation of Scientific Articles.

