Exam Review Objectives

Chapter 6: Bones and Skeletal System
3. Compare and contrast the two types of bone formation: intramembranous and endochondral ossification. What are the steps in order of endochondral ossification?
4. Describe the process of long bone growth that occurs at the epiphyseal plates.
5. Describe the difference between longitudinal and appositional growth.
6. Explain Wolff’s Law and how it applies to remodeling. Where are the roles of the osteoblasts, osteocytes, and osteoclasts in bone remodeling?
7. Explain how calcitonin and PTH regulate calcium intake and output from bone in the human body.
8. Describe the types of fractures from table 6.2 and describe the steps of fracture repair.

Chapter 9: Muscles and Muscle Tissue
1. Explain the sliding filament mechanism of skeletal muscle contraction. What is the sequence of events of the SFT events at the Cross bridge cycle? Figure 9.7 combined with Figure 9.12. Be able to tell what happens to the individual parts of a sarcomere during contraction.
2. Explain an action potential and the three steps; polarized, depolarization, and repolarization. Be sure to include what is happening to the gates, plasma membrane, and ion flow during each step.
3. Describe a neuromuscular junction. List what Neurotransmitters stimulates ms fiber.
4. Define motor unit and explain how ms fibers are stimulated to contract.
5. Define ms twitch, and what are the events of the three phases?
6. Differentiate between isometric and isotonic contractions.
7. Name and describe the four types of muscle metabolism.
8. Define oxygen debt and ms fatigue. What can cause ms fatigue?
9. Name and describe three types of skeletal ms fibers.
10. Compare the effects of aerobic and resistance exercise on skeletal ms and other body systems.
11. Define how a muscle moves a load?

Chapter 11: Fundamentals of the Nervous System and Nervous Tissue
1. Explain the following steps in an action potential; make sure to include where the ions are, the membrane potential, and what gates are opened and closed. Steps are: Resting state, Depolarization, Repolarization, Hyperpolarization (undershoot). Figure 11.11.
2. Describe the difference between graded and action potentials. Table 11.2.
3. Define propagation. Describe the two things that can speed up transmission of a nerve impulse.
4. Define threshold and the All-or-None phenomenon.
5. Define synapse. Distinguish between electrical and chemical synapses and their mechanisms of information transmission.
6. Distinguish between excitatory and inhibitory postsynaptic potentials. (ESPS, ISPS).
7. Define neurotransmitter. Know each of the NTs given in class from table 11.3 their functional classes, sites where secreted and read through comments.

Chapter 13: Peripheral Nervous System and Reflex Activity
1. Define the PNS and list its components.
2. Define sensation, perception, receptor/generator potentials, and sensory adaptation.
3. Classify general sensory receptors by structure, stimulus detected, and body location.
4. List and distinguish between all 12 Cranial Nerves by name, number, and function. For example: CN I Olfactory – Smell, CN VII Facial – Facial Expression. Keep functions short and easy. Figure 13.6, functions Table 13.2.
5. List the spinal nerves by their Plexus and major areas served, plus the major nerve name of that plexus. For example: Sacral = Sciatic. Figure 13.7.
6. Describe the reflex arc. What are the five parts? Figure 13.15. Define somatic and autonomic (visceral) reflexes. Define spinal reflexes and the differences between an inborn reflex and acquired reflex.

Chapter 14: Autonomic Nervous System
1. Define the autonomic nervous system (ANS).
2. Compare the somatic and autonomic nervous systems relative to effectors, efferent pathways, and NT released. Figure 14.2.
3. For the parasympathetic and sympathetic divisions, describe the site of CNS origin, locations of ganglia, and general fiber pathways. Compare the two divisions. Figure 14.2 and Figure 14.3.
4. Define cholinergic and adrenergic fibers.
5. Describe the clinical importance of drugs that mimic or inhibit adrenergic or cholinergic effects.
6. Define visceral reflexes. Figure 14.7. How are they different from somatic reflexes?
7. State the effects of the parasympathetic and sympathetic divisions on the following organs found on Table14: Eye (iris), Sweat glands, Adrenal medulla, Heart muscle, Lungs, Bladder, Blood vessels, and Mental Activity.
8. Describe the part of the brain that has overall control of the ANS.

Chapter 15: The Special Senses
1. Distinguish unique characteristics of the special senses given in class for each of the following: Vision, Hearing, Smell (Olfaction), and Taste (Gustation).
2. Define the physiology of vision: Focusing, Accommodation, Convergence, Myopia, Hyperopia, Astigmatism, and Rods and Cones. Define night blindness and color blindness.
3. Describe the processes of equilibrium and hearing. Where does each take place, and in what specific ear organ?
4. Define the properties of sound, and in those properties what is normal and what is harmful.
5. Define Deafness (two types), Tinnitus and Meniere’s Syndrome.

Chapter 16: The Endocrine System
8. Describe the two major mechanisms by which hormones bring about their effects on their target tissues.
9. Explain how hormone release is regulated. Be able to give an example of negative feedback including stimulus, gland, hormone, target organ, and response.
10. Name and describe the three types of stimulus that start hormone production.
11. Name each gland and hormone it produces. List the stimulus that starts its production, the target organ, and function for each of the hormones covered in class.
12. Name a hormone produced by the heart, and briefly explain the hormonal function of the placenta, kidney, skin, and adipose tissue.

Chapter 17: Blood
12. Describe the production of erythrocytes. Be sure to include the stages the cell goes through from hematocytoblast to erythrocyte. What controls RBC production? What triggers RBC formation? What do you need to produce erythrocytes?
13. Describe leukocygetogenesis and the committed pathways to each of the types of WBCs.
14. Define different functions or when they function the best for all the types of WBCs.
15. Describe platelet formation from the stem cell to platelet. Define the hormone that controls this production.
16. Be able to define the different types of anemias, thrombocytopenia, and other blood disorders.
17. What are the three main blood types? Who is the universal donor? Who is the universal recipient? What is fetal erythrolysis and how can it be prevented? (think Rh+ and Rh-).

Chapter 18: The Cardiovascular System
8. Name the components of the conduction system of the heart, and trace the conduction pathway.
9. Draw a diagram of a normal electrocardiogram tracing; name the individual waves and intervals, and indicate what each represents.
10. Name some abnormalities that can be detected on an ECG tracing.
11. Describe the timing and events of the cardiac cycle.
12. Make sure the chart with the different parts the ECG, the heart cycle, and the volume and pressure and valves is in your notes.
13. Describe normal heart sounds, and explain how heart murmurs differ from normal sounds.
14. Name and explain the effects of the various factors involved in regulating stroke volume and heart rate.
15. Explain the role of the autonomic nervous system in regulating cardiac output.

Chapter 19: Heart and Vessels
7. Define blood flow, blood pressure, and resistance, and explain the relationships between these factors.
8. List and explain the factors that influence blood pressure, and describe how blood pressure is regulated.
9. Define hypertension. Describe both its symptoms and consequences.
10. Explain how blood flow is regulated in the body in general and in its specific organs, both short and long term.
11. Define circulatory shock. List several possible causes.
Chapter 19: The Lymphatic System
13. Define lymph. Describe the function of the Lymphatic system.
14. Trace the pathway of lymph through the lymph vessels back to the heart.
15. Describe the composition of lymphoid tissue (basic structure and cell population), and name the major lymphoid organs and what they do.
16. Describe the general location and functions of lymph nodes.

Chapter 20: The Immune System
18. Define the immune system.
19. Describe the surface membrane barriers and their protective functions.
20. Explain the importance of phagocytosis and natural killer cells in nonspecific body defense.
21. Describe the inflammatory process. Identify the major inflammatory chemicals like histamine and chemical alert proteins.
22. Define interferon and complement.
23. Explain how fever helps to protect the body.
24. Define an antigen, and describe how antigens affect the immune system.
25. Define complete antigen, Hapten, and antigenic determinant.
26. Compare the non-specific and specific immune systems.
27. Compare cell-mediated immunity and humoral immunity.
28. Describe the differences between primary and secondary immune response.
29. Define the difference between a plasma cell and memory cell.
30. Compare and contrast active and passive humoral immunity. Include process and types of cells.
31. Describe difference between helper T-cells and cytotoxic T-cells.
32. Compare and give examples of autoimmune and immunodeficiency diseases.
33. Describe the differences in the hypersensitivity states.

Chapter 21: The Respiratory System
16. Explain the mechanics of breathing using Boyle’s law. What are the differences between inspiration and expiration? What is the difference between forced and quiet inspiration and expiration, and what muscles are used?
17. Name and define several factors that influence Pulmonary ventilation.
18. Be able to match definitions from Figure 21.16.
20. Explain gas exchange (Figure 21.17). What is the difference between internal and external gas exchange?
21. Explain the difference between Oxygen transport and Carbon dioxide Transport on hemoglobin.
22. Define the types of hypoxia.
23. Describe how the respiratory system is controlled.
24. Define the factors that influence the rate and depth of breathing.
25. Explain what the effects of exercise and high altitude have on the respiratory system.
Chapter 22: The Digestive System
12. Describe the composition and functions of saliva, and explain how salivation is regulated.
13. Describe the mechanisms of chewing and swallowing.
14. Describe the composition of gastric juice, name the cell types responsible for secreting its various components, and indicate the importance of each component in stomach activity.
15. Explain how gastric secretion and motility in the stomach are regulated.
16. Describe the function of local hormones produced by the small intestine.
17. State the roles of bile and of pancreatic juice in digestion.
18. Describe how entry of pancreatic juice and bile into the small intestine is regulated.
19. List the major functions of the large intestine, and describe the regulation of defecation.
20. List the enzymes involved in chemical digestion, name the foodstuffs on which they act, and the end products of protein, fat, carbohydrate, and nucleic acid digestion.
21. Describe the process of absorption of digested foodstuffs that occurs in the small intestine.

Chapter 25: The Urinary System
17. Describe the three steps in urine formation. What are they, and what do they do?
18. Describe what is reabsorbed in each part of the renal tubule.
19. Define NFP. How is its gradient regulated? If HPg goes up, what does (OPg+HPc) have to do, and vice versa? How does NFP affect GFR?
20. Define is GFR? Describe the three ways it is regulated. For each regulation describe how it affects GFR.
21. Explain all the ways the kidneys control blood pressure, especially the renin-angiotensin mechanism.
22. Explain the formation of dilute versus concentrated urine. Describe the role ADH plays in this event.
23. Describe the normal physical and chemical properties of urine.
24. Define micturition process and incontinence, diuretics, renal clearance.

Chapter 26: Fluid Balance
34. Know the information about water content in the fluid compartments found in Figure 26.1.
35. Define the solutes you would find in greater amounts in each of the fluid compartments.
36. Explain how fluid moves from compartment to compartment.
37. Describe what tissue is the most hydrated and which is the least. At what age do you have the most body water content? The least?
38. Define obligatory water losses, sensible water loss, insensible water loss, dehydration, hypotonic hydration, and edema.
39. Explain the regulation of sodium balance in the body. Be able to fill in the flow chart in figure 26.9.
40. Describe where Potassium, Magnesium, and Calcium Balance are most important to balance, and what hormones control those balances.
41. Describe the three chemical buffer systems, where each is found, and why they are so important.
42. Explain the two physiological buffer systems and what role they play in alkalosis and acidosis. What are the differences between Respiratory/Metabolic alkalosis and acidosis? What causes each? See Table 26.2.

Chapter 27: The Reproductive System

27. Define the male sexual response; erection and ejaculation.
28. Compare the differences between mitosis and meiosis. Figure 27.6.
29. Be able to fill in Figure 27.8 with the phases of Spermatogenesis.
30. Explain when a sperm becomes a sperm, and where they learn to swim.
31. Be able fill in Figure 27.10 on the hormonal regulation of testicular function.
32. Be able to fill in Figure 27.10 on the phases of Oogenesis.
33. Describe the differences in the results of Spermatogenesis compared to Oogenesis.
34. Be able to fill in Figure 27.21 on the Feedback interactions involved in the regulation of ovarian function.
35. Explain the three phases of the Uterine (Menstrual) cycle. What hormones control what phase, and what is happening to the endometrium lining and follicle with each phase?