**Essay Questions for Unit 1 Exam**

1. Define homeostasis and give an example of how it might work in the body, include in your discussion the components of a reflex control pathway. Clearly explain negative and positive feedback loops and give some examples. In part two of this essay, describe the three types of protein mediated transport discussed in class (diffusion through channels, carrier mediated diffusion, and active transport -‐‐ both primary and secondary). Address the concepts of specificity, rates, energy sources involved, competition, saturation, direction, etc. Finally, in part 3 of this essay, Explain the process of osmosis. What is osmolarity and how does it differ from molarity? Explain how osmolarity and tonicity differ (i.e. How can a solution be isoosmotic and yet be hypotonic to a cell)?

2. Explain how the resting membrane potential (RMP) of the cell membrane is established. What properties/characteristics of the cell membrane account for the resting membrane potential’s development? What conditions or factors affect the resting membrane potential’s magnitude (size)? Include a brief discussion of the Nernst equation and driving force. In part 2 of this essay, discuss the action potential. List its characteristics. Describe the events that take place during a typical action potential including a description of the various phases (i.e. Rising phase, falling phase, after-‐‐hyperpolarization, relative refractory period, absolute refractory period). For each phase describe the actions of the channels involved and the ions currents. Compare and contrast a graded potential with an action potential. Give an explanation of Capacitance and length constant. Describe how capacitance and length constant are affected by Myelin.

3. Compare and contrast the sympathetic division of the ANS, the parasympathetic division of the ANS and the somatic nervous system. Include such things as their points of CNS origin, number of neurons in the pathway, location of ganglia, neurotransmitters, types of receptors, and actions. Discuss cholinergic and adrenergic receptors. Explain the different subdivisions of each type. Give mechanisms of action for each type of receptor (i.e. what happens when the neurotransmitter binds to the receptor)?