Essay Topic 1: Structure of the Nervous Systems

- Explain the origins of the names of brain structures and the terms used to indicate directions and planes of section.
- Describe the meninges, the ventricular system, and the flow of cerebrospinal fluid through the brain.
- Outline the development of the central nervous system and the evolution of the human brain.
- Describe the telencephalon, the two major structures of the diencephalon, midbrain and hindbrain.
- Describe the peripheral nervous system including the two divisions of the autonomic nervous system.

Essay Topic 2: Structure and Function of the Cells of the Nervous System:

- Name, describe and explain the function of the parts of a neuron.
- Describe the supporting cells of the central and peripheral nervous system.
- Understand the role of neural communication in a simple reflex and its inhibition by brain mechanisms.
- Describe the measurement of the action potential and explain the dynamic equilibrium that is responsible for the membrane potential.
- Describe the role of ion channels in action potentials and explain the all-or-none law and the rate law.
- Provide a detailed comparison of the action potential in unmyelinated and myelinated axons.

Essay Topic 3: Communication Between Neurons

- To the extent presented in class and in the textbook discuss and compare voltage-gated, metabotropic, and ionotropic channels.
- Describe the structure of synapses, the release of the neurotransmitter, and the activation of postsynaptic receptors.
- Describe the postsynaptic potentials: the ionic movements that cause them, the processes that terminate them, and their integration.
- Describe the regulation of the effects of the neurotransmitters by autoreceptors, presynaptic inhibition and presynaptic facilitation.

Essay Topic 4: Neurodevelopment

- Discuss all aspects of Fetal Alcohol Syndrome. Include developmental errors and major anatomical defects. Compare and contrast with the effects of radiation poisoning during development.
- Huntington’s Disease – Discuss the genetic basis of Huntington’s Disease and its effect on the brain.
- Discuss neuronal migration and axonal pathfinding – include Sperry’s frog experiments.