True / False Questions (30 pts)
1. The main function of the kidneys is the regulation of the intracellular fluid.
2. Urine collects in the urinary bladder prior to entry into the urethra.
3. Damage to the lumbar region of the spinal cord could impair micturition.
4. The human female determines the sex of her offspring.
5. Barr bodies are normally only found in the cells of female mammals.
6. Cryptorchid males do not produce testosterone.
7. Osmosis and simple diffusion do NOT require the actions of carrier proteins.
8. Active transport proceeds when energy is expended.
9. Simple diffusion is the net diffusion of a solvent.
10. Gas exchange between the cells and extracellular fluid utilizes active transport.
11. One mole of solute per liter depresses the freezing point of water by 1.86°C.
12. Freezing-point depression is a measure of osmolality.
14. Antidiuretic hormone is released by the posterior pituitary in response to increased plasma osmolality.
15. Glucose entry into the cell is by facilitated diffusion.

Multiple Choice Questions (20 pts)
1. The membrane of resting nerve cells is more permeable to _______ than _______.
2. Blocking _____ channels would prevent neuronal depolarization.
3. During an action potential
4. An axon will depolarize only if the membrane potential reaches between -70mV and -55mV. This follows the
5. Action potentials would be conducted most rapidly by
6. Chemicals that stimulate action potentials in postsynaptic cells are called
7. What type of proteins are present in gap junctions that form water-filled channels between neurons?
8. Botulism toxin prevents release of Ach, causing
9. Neurotransmitter release would be inhibited by
10. Subunits of skeletal muscle cells that are composed of sarcomeres are called
Short Essay Questions
1. Describe the pathological background of Parkinson’s disease and how this disease can be treated therapeutically. (10 points)

2. Make a comparison list (including at least 5 different features) to distinguish the somatic motor system and autonomic motor system. (10 points)

3. Describe the major components as well as their individual functions of the “olfactory apparatus”. Please also explain why G-protein plays a critical role in the sense of smell. (10 points)

4. Describe how insulin triggers a cascade event and participates in the homeostasis of blood sugar. (10 points)

5. Explain how “immunological tolerance” has been induced. (10 points)