## CHEM106 Test 2 Exam You must show all equations and all work to receive any credit

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1.	good c	Fibrosis is thought to result from genetic mutations in a cAMP regulated chloride ion channel; a leal of modern CF research centers on therapeutics to modulate membrane conductances in these less.  Using intracellular / extracellular <b>chloride</b> concentrations of 60 mM and 560 mM respectively, calculate the membrane potential required to stop the flow of chloride ions across an open chloride ion channel. Do not consider the presence of any other ions or of any other membrane
		potential associated with other ions
	b.	Draw a diagram that clearly shows the chloride ion concentrations and the membrane voltage across the inlet and outlet of the chloride ion channel when it is at the equilibrium voltage determined in part a.
	c.	Clearly explain the scientific basis for each of the opposing forces at the equilibrium potential (voltage) calculated in part a.
	d.	Ion channels are often controlled by phosphorylation. Draw the mechanism for the phosphorylation of a representative amino acid residue.

2.	Two major classes of stimulants have been examined in this course. Provide a historical perspective by discussing the discovery and human historical use of each of these types of stimulants. These two classes of stimulants share a common mechanism of action that cannot be differentiated. Provide a clearly outlined and detailed molecular mechanism of action for the observed stimulant effects.
2	Draw the atmetive of an eastedeholine (Ach) malecule as it is situated in the eating site of
3.	Draw the structure of an acetylcholine (Ach) molecule as it is situated in the active site of acetylcholinestesterase. Show the side groups and the noncovalent interactions involved in holding Ach in the active site. Identify each of the three key amino acids involved in the catalytic triad for hydrolysis. Outline the mechanism of the initial step in the hydrolysis process.
4.	Describe the primary mechanism of action for the adrenergic modulating medications used to trea asthma. Be very specific in terms of the drug targets and the effects they have on these targets. Predic what effect these asthma medications would be expected to have on heart rates.

5.	Clearly explain and diagram the specific molecular mechanism through which nerve impulses are rapidly propagated down an axon (not across a synapse).
6.	Outline the complete mechanism of action for local anesthetics.
7.	Draw the complete Lewis structure for an epinephrine molecule at physiological pH of 7.4 [except for aromatic rings, show all atoms, bonds, lone pairs, and full charges (not partial charges)].
8.	When epinephrine is released into the blood stream, identify the major subclasses of blood vesses
	receptors that respond and discuss what occurs when each of these subclasses is activated. Then discuss what happens to the overall blood pressure when epinephrine is released into the blood stream and, more importantly, why.