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FACULTY OF BASIC MEDICAL SCIENCES
DEPARTMENT OF BIOCHEMISTRY
2016/2017 RAIN SEMESTER EXAMINATION

BCH 316: NEUROCHEMISTRY

July 2017 Time allowed: 2hrs

Instruction: Answer question ONE and any other question

1 (i) Name the various types of glia cells and give their function

(ii) What do you understand by the term (a) EPSP and (b) IPSP as in relates to postsynaptic membrane potential

(iii) Give the name of any five basic anatomical structures of the brain

(iv) Name the lobes of the human brain that can easily be viewed laterally

(v) Distinguish between depolarization and hyperpolarization

(vi) The data in the table below was recorded for an excitable cell in a *C. elegans*. Estimate the resting membrane potential of 37^{0}C for this cell using the appropriate Goldman-Hodgkin- Katz constant field equation

Ion	Intracellular (mM)	Extracellular (mM)
Na^+	14	142
K^+	140	4
Cl^-	21	110

Assume that the permeability co-efficient $pk^+ = 1$, $pNa^+ = 0.04$, $pCl^- = 0.45$

$$\mathbf{EmF\ (mV) = -\ RT/F\ ln\ (\{[Na^+]_i P_{Na+} + [K^+]_i P_{K+} + [Cl^-]_o P_{Cl-}\} / \{[Na^+]_o P_{Na+} + [K^+]_o P_{k+} + [Cl^-]i P_{Cl-}\})}$$

Where R= 8.315 J/K mol, F= 96485 J/V mol, 1 J = 1 C V

2. (i) What do you understand by the term (a) excitable cell (b) resting membrane potential
(ii) Briefly comment (not more than three sentences) the role of Na^+- K^+- ATPase activity in maintaining the electrical gradients across a cell
(iii) Explain the "All- or –Nothing "principle as it applies to the depolarization process in a nerve cell
(iv) Summarize the events that lead to the generation of an action potential in a typical neuron

3 (i) What properties must a compound have for it to be considered as a neurotransmitter?
(ii) Distinguish between a voltage-gated ion channel and a ligand-gated ion channel
(iii) Briefly comment (not more than five sentences) on the role ion channels play in bringing about nervous conduction
(iv) Compare and contrast the two major types of postsynaptic receptors,
(v) Give the name and their sources of three neurotoxins that poisons ion channels