

Bms 15/16/0066

OLABISI ONABANJO UNIVERSITY
DEPARTMENT OF BIOCHEMISTRY
SAGAMU CAMPUS, SAGAMU
2017/2018 RAIN SEMESTER EXAMINATION

Course: BCH 316
 Course Title: Neurochemistry

Time Allowed: 2 hours
 Date: 23 July 2018

SECTION A (Instruction: Answer question number 1 and any other question)

1. Choose and answer any one (1) of questions a to f below:
 - a. Discuss briefly how neurochemicals (imbalance) can lead to substance addiction
 - b. What is a neurological disorder? Highlight five (5) main causes. Give five (5) neurological conditions
 - c. Define Obsessive-Compulsive disorder (OCD). Highlight any five (5) habits or behaviours that can be noticed in an individual with OCD. Discuss how OCD can be managed or treated in an individual. *sequenced or ordered genetic component*
 - d. Define convulsion. Compare and contrast neurosis and psychosis.
 - e. Describe ion channels and ionotropic receptors. Highlight the differences between them.
 - f. What are neurotransmitters? Differentiate between excitatory and inhibitory neurotransmitters. Give examples of both neurotransmitters.
2. Describe in detail the mechanism of transmission of nerve impulse.
3. Describe the gap junctions, with the aid of labelled diagram.

SECTION B (Instruction: Answer question number 4 and any other question)

4. (i) What do you understand by the term (a) neuromodulators (b) depolarization (c) hyperpolarization (d) excitable cell (e) resting membrane potential
 (ii) Distinguish between a voltage-gated ion channel and a ligand-gated ion channel
 (iii) Name any five small molecule neurotransmitters and give their chemical structures.
 (iv) Summarize the events that occur during synaptic transmission of named neurotransmitter
 (v) What properties must a compound have for it to be considered as a neurotransmitter.
5. (i) Explain the "All- or -Nothing " principle as it applies to the depolarization process in a nerve cell
 (ii) Compare and contrast the two major types of postsynaptic receptors
 (iii) Give the name and their sources of three neurotoxins that act on (Inhibit) Na⁺ Channels.
6. (i) The data in the table below was recorded for an excitable cell in a C. elegans. Estimate the resting membrane potential of 37°C for this cell using the appropriate equation.
 [Hint : Goldman-Hodgkins- Katz equation]

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

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

Assume that the permeability co-efficient $p_{K^+} = 1$, $p_{Na^+} = 0.04$, $p_{Cl^-} = 0.45$