

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOCHEMISTRY

BIOC 423: SPECIAL METABOLISM

STREAMS: BSC (BIOCHEM) Y4S1

TIME: 2 HOURS

DAY/DATE: TUESDAY 03/12/2019

11.30 AM – 1.30 PM

INSTRUCTIONS:

- Answer Question One and any Two Questions
- Do not write on the question paper

QUESTION ONE (30 MARKS)

- (a) In 1968, George Wald discovered that light absorption, results in the isomerization of the 11-cis retinal group of rhodopsin to its All-trans retinal form triggers cascade of events that lead to phototransduction. Give structural illustration of this photoisomerization reaction. [5 marks]
- (b) Give three examples of antimetabolic drugs used to inhibit microtubule movement. [3 marks]
- (c) Describe the unique properties of glutamate NMDA (N-methyl d-aspartate) receptors. [5 marks]
- (d) List and describe 5 types of chemicals that inhibit sodium ion channels. [5 marks]
- (e) Resting membrane potential (RMP) is the membrane potential of a cell that is not producing an electrical signal.
- (i) Explain how RMP is generated and maintained in the neuron. [8 marks]

- (ii) Describe patch-clamp technique for measuring resting membrane potential. [4 marks]

QUESTION TWO (20 MARKS)

- (a) Discuss the biosynthesis and inactivation of serotonin neurotransmitters. [8 marks]
- (b) Explain why low levels of serotonin in the brain is dangerous. [6 marks]
- (c) Describe synthesis and degradation of GABA (-aminobutyric acid) in the central nervous system. [6 marks]

QUESTION THREE (20 MARKS)

- (a) Discuss the biochemical basis of hepatic jaundice. [9 marks]
- (b) Using diagram, show how bilirubin is conjugated in the hepatocytes. [5 marks]
- (c) Explain the application of phototherapy in treatment of neonatal jaundice. [6 marks]

QUESTION FOUR (20 MARKS)

- (a) Discuss the major phases of cardiac action potential. [10 marks]
- (b) Describe energy metabolism during cardiac muscle contraction. [5 marks]
- (c) Explain role of calcium in regulation of smooth muscle contraction. [5 marks]
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