

CHUKA



UNIVERSITY

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**UNIVERSITY EXAMINATIONS**

**RESIT/SPECIAL EXAMINATION**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF  
BIOCHEMISTRY**

**BIOC 306: BIOMEMBRANES AND CELLULAR SIGNALING**

**STREAMS: BIOC**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 23/07/2018**

**2.30 P.M. – 4.30 P.M.**

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**INSTRUCTIONS:**

- Answer all the questions.
- Do not write on the question paper.

**QUESTION ONE (30 MARKS)**

- (a) Describe Insulin signalling Cascade and its effect on central metabolic pathways. (10 marks)
- (b) What are the functions of lipids as membrane biomolecules? (6 marks)
- (c) (i) Using appropriate diagram, explain the fluid mosaic model and present model. (6 marks)
- (ii) Why is the membrane fluidic? (4 marks)
- (d) Explain how the mitochondrial membrane and bacteria plasma membrane differs in terms of protein, lipid and carbohydrates composition. (4 marks)

**QUESTION TWO: 20 MARKS**

G-protein coupled receptors (GPCRs) are functionally diverse hence key targets for therapeutic control of various diseases. Using appropriate diagrams explain.

- (a) Their modes of signal transduction. (8 marks)
- (b) Properties responsibilities for their versatility. (4 marks)

- (c) What are metabotropic receptors? (2 marks)
- (d) List and describe 6 diseases associated with defective G- protein signalling. (6 marks)

**QUESTION THREE (20 MARKS)**

- (a) Apoptosis can be triggered by several signals through plasma membrane receptors. List five extracellular signals that can trigger apoptosis. (5 marks)
  - (b) Explain Warburg effect in relation to glucose metabolism by cancer cells. (5 marks)
  - (c) Describe the JAK/STAT pathways and how they are regulated. (10 marks)
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