

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**EXAMINATION FOR THE AWARD OF DEGREE OF
BACHELOR OF SCIENCE IN BIOMEDICAL SCIENCE AND TECHNOLOGY**

BIOC 220: BASIC METABOLISM I

STREAMS: BSC (BIOMED) Y2S2

TIME: 2 HOURS

DAY/DATE: THURSDAY 11/04/2019

2.30 PM – 4.30 PM

INSTRUCTIONS:

- **Answer Question One and Two Other Questions**
- **Sketch maps and diagrams may be used whenever they help to illustrate your answer**
- **Do not write anything on the question paper**

SECTION A (30 MARKS)

Question 1

- (a) Give a diagrammatic representation of the electron transport chain. [5 marks]
- (b) Using structural formulae, highlight the reactions where ATP is generated in the glycolytic pathway. [3 marks]
- (c) Using structural formulae, give the reaction that regulates the TCA cycle. [2 marks]
- (d) Photosynthesis is a biochemical activity that involves two main reactions, briefly describe the light stage reaction. [4 marks]
- (e) Briefly show the fate of pyruvate under anaerobic conditions. [3 marks]
- (f) Describe why phosphofructokinase I is the enzyme that catalyzes the rate limiting step in glycolysis and not hexokinase. [2 marks]

- (g) Differentiate between oxidative phosphorylation and substrate level phosphorylation. [3 marks]
- (h) Briefly describe the metabolism of a diet rich in sucrose in the liver. [3 marks]
- (i) What is galactosemia? Highlight the reaction that promotes the entry of galactose into the glycolytic pathway. [5 marks]

SECTION B (40 MARKS)

Question 2

- (a) Describe the regulation of gluconeogenesis. [10 marks]
- (b) Discuss the process of glycogenolysis. [10 marks]

Question 3

- (a) List and describe glycogen storage diseases. [10 marks]
- (b) Describe the relevance of HMP pathway in nucleic acid metabolism, antigen processing and erythrocyte operations. [10 marks]

Question 4

- (a) Using structural formulae, discuss the TCA cycle showing the production of electron carriers. [10 marks]
- (b) Discuss the C4 photosynthetic pathway in plants. [10 marks]
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