

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

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

**BIOC 220: BASIC METABOLISM 1**

**STREAMS:**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 12/04/2023**

**11.30 A.M – 1.30 P.M**

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**INSTRUCTIONS:**

**Answer question one and any other two questions**

**QUESTION ONE (30 MARKS)**

- (a) Describe glycolysis in cancer cell growth and proliferation. [8 marks]
- (b) Explain the metabolic disorders associated with galactose metabolism. [6 marks]
- (c) Discuss the allosteric regulation of glycogen breakdown. [5 marks]
- (d) Illustrate the oxidative phase of the pentose phosphate pathway. [6 marks]
- (e) List inhibitors of the electron transport chain and oxidative phosphorylation. [5 marks]

**QUESTION TWO (20 MARKS)**

- (a) Using structural and chemical structures, demonstrate the pay-off steps of glycolysis. [10 marks]
- (b) Briefly explain the steps involved in glycogen synthesis. [10 marks]

**QUESTION THREE (20 MARKS)**

- (a) Describe the anaerobic fate of pyruvate. [8 marks]

- (b) Explain the regulation mechanism for phosphofructokinase -1 (PFK-1) in glycolysis. [4 marks]
- (c) Describe any four glycogen storage diseases and the associated symptoms. [8 marks]

**QUESTION FOUR (20 MARKS)**

- (a) Using suitable structural diagrams, describe the glyoxylate cycle. [10 marks]
- (b) State the steps where reducing powers and energy is produced in the TCA cycle and their fate. [7 marks]
- (c) Explain the role of glutathione in the red blood cells. [3 marks]
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