CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIO

BIOC 220: BASIC METABOLISM I

STREAMS: BSC (BIOC) **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 11/4/2018 **2.30 P.M. – 4.30 P.M.**

INSTRUCTION:

- **ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS**
- **DO NOT WRITE ANYTHING ON THE QUESTION PAPER**

QUESTION ONE (30 MARKS)

(a) Gluconeogenesis is critical for the supply of glucose to the cells. Briefly explain this metabolic process. [5 marks]

(b) Differentiate between C3, and C4 metabolic pathways. [4 marks]

(c) Using suitable illustrations, explain the role of enzymes in glycogenesis. [5 marks]

(d) Reducing power molecules play significant roles in metabolism. Giving examples, state the roles of these reducing molecules. [3 marks]

(e) State the biological importance of glycolysis. [3 marks]

(f) Errors in fructose metabolism can be linked to male fertility. Elaborate this statement. [3 marks]

(g) Differentiate between oxidative and non-oxidative pentose phosphate pathways. [5 marks]

(h) Discuss the causes and symptoms of glycogen storage disorder type IV. [2 marks]

QUESTION TWO (20 MARKS)

(a) Glyoxylate pathway plays a very crucial role in the metabolic activities of plants and microorganisms. Illustrate this pathway. [10 marks]

(b) (i) Using structural illustrations, describe the glycolytic pathway. [8 marks]

(ii) Explain how the pentose phosphate pathway forms a reconnection with glycolysis. [2 marks]

QUESTION THREE (20 MARKS)

(a) Discuss the sequence of reactions in the TCA cycle, illustrating the energy yielding steps. [8 marks]

(b) Give the rate controlling enzymes and activities in the TCA cycle and explain how they regulate the process. [4 marks]

(c) Explain the electron transport chain pathway, and how energy is produced. [8 marks]

QUESTION FOUR (20 MARKS)

(a) Describe fructose metabolism in the liver. [4 marks]

(b) (i) What is the biological importance of photosynthesis? [2 marks]

(ii) Describe the dark phase (Calvin cycle) of photosynthesis, highlighting the role of RUBISCO. [10 marks]

(iii) How does photosynthesis generate oxygen from water? [4 marks]
