CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

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

BIOC 220: BASIC METABOLISM I

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

DAY/DATE: TUESDAY 14/04/2020 **11.30 AM – 1.30 PM**

INSTRUCTIONS:

Answer Question One and any other Two Questions

(a) (i) Explain why the first step of glycolysis is not the committed step of the pathway. [2 marks]

(ii) Describe the regulatory mechanisms of the first committed step of glycolysis. [3 marks]

(b) Describe the de novo synthesis of glycogen. [5 marks]

(c) Describe the biochemical basis of 'muscle pull' observed during intense exercise. [5 marks]

(d) (i) Give an example of a natural un-coupler of the Electron Transport Chain and Oxidative Phosphorylation. [1 mark]

(ii) Describe the significance of the natural un-coupler in 3(i) above. [2 marks]

(iii) Explain the mechanism in which uncouplers achieve their role. [2 marks]

(e) Distinguish between autotrophs and heterotrophs. [5 marks]

(f) Using structural illustrations, describe the oxidative phase of the pentose phosphate pathway. [5 marks]

2. (a) Using appropriate biochemical structures, describe the glycolytic pathway for mannose. [10 marks]

(b) Describe how insulin, glucagon and epinephrine control glycogen metabolism. [10 marks]

3. (a) Using appropriate biochemical structures, describe the Kreb's cycle and give its significance. [10 marks]

(b) List the major characteristics of any metabolic pathway. [5 marks]

(c) Explain the biochemical basis of galactosemia and the associated symptoms. [5 marks]

4. (a) Describe the non-cyclic photophosphorylation pathway of the light reactions of photosynthesis. [6 marks]

(b) Describe any 3 glycogen storage disorders and the associated symptoms. [6 marks]

(c) With the aid of appropriate structures, describe the four steps of gluconeogenesis which bypass the irreversible steps of glycolysis. [8 marks]
