CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 333: MICROBIAL METABOLISM

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**
- **Do not write on the question paper**

QUESTION ONE (30 MARKS)

(a) Describe Reductive TCA cycle by *Hydrogenobacterthermophilus* highlighting its importance. [7 marks]

(b) Describe the formation of Acetyl CoA from formadehyde using serine pathway in methylotrophic bacteria. [6 marks]

(c) Explain how Archaebacteria have modified Entner-Douboroff glycolytic pathway to meet their cellular requirements. [6 marks]

(d) Methylglyoxal pathway operates as an alternate to the glycolytic pathway when enteric bacteria experiences conditions of low inorganic phosphate concentration. Describe this pathway highlighting its importance. [6 marks]

(e) Anoxygenic photosynthetic bacteria consume carbon dioxide but do not release oxygen. Give five examples of Anoxygenic photosynthetic bacteria. [5 marks]

QUESTION TWO (20 MARKS)

(a) Describe Strickland reactions between L-Alanine and L-serine by Clostridium species. [8 marks]

(b) Distinguish between methanotrophs and methylotrophs. [4 marks]

(c) Discuss organic C-1 dissimilation by methylotrophs. [8 marks]

QUESTION THREE (20 MARKS)

(a) Describe electron transport chain in *E.coli* during aerobic and anaerobic conditions. [10 marks]

(b) Discuss Butyric Acid (butanol) fermentation, highlighting its industrial application. [10 marks]

QUESTION FOUR

(a) Define chemoautotrophy. [2 marks]

(b) Give five examples of chemoautotrophs and reactions they catalyze. [10 marks]

(c) Discuss heterotrophic methanogenesis. [8 marks]
