

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF BIOCHEMISTRY

BIOC 333: MICROBIAL METABOLISM

STREAMS: BIOC

TIME: 2 HOURS

DAY/DATE: MONDAY 08/4/2019

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS

- (i) Answer Question ONE and any TWO questions
- (ii) Do not write on the question paper

QUESTION ONE (30 Marks)

- (a) Methylglyoxal pathway operates as an alternate to the Embden–Meyerhof pathway when enteric bacteria experiences conditions of low inorganic phosphate concentration. Describe this pathway highlighting its importance. (8 Marks)
- (b) Describe the formation of Acetyl CoA from formaldehyde using serine pathway in methylotrophic bacteria. (9 Marks)
- (c) Explain how Thermoacidophilic Archaeobacteria have modified Entner- Doudoroff glycolytic pathway to meet their cellular requirements. (6 Marks)
- (d) Describe the butanediol fermentation pathway and its biomedical value. (7 Marks)

QUESTION TWO (20 Marks)

- (a) Describe Stickland reactions between L-Alanine and L-Glycine by *Clostridium species*. (8 marks)
- (b) Distinguish between methanotrophs and methylotrophs. (4 marks)

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- (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) Describe the reductive TCA cycle by *Chlorobium limicola*. (10 Marks)

**QUESTION FOUR (20 Marks)**

- (a) Define Chemoautotrophy. (2 Marks)
- (b) Give five examples of chemoautotrophs and reactions they catalyze. (10 Marks)
- (c) Discuss autotrophic methanogenesis. (8 Marks)
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