



**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**  
**SCHOOL OF LIFE SCIENCES**  
**DEPARTMENT OF MICROBIOLOGY**

**SECOND SEMESTER EXAMINATION 2015/2016 SESSION**

**COURSE CODE: MCB 323**

**COURSE TITLE: MICROBIAL PHYSIOLOGY (3 UNITS)**

**CLASS: 300 LEVEL**

**TIME: 2 HOURS**

**Instruction: Answer FOUR (4) questions, at least one question from each section.**

**Section A**

- 1a. (i) Enumerate the steps in protein synthesis in prokaryotes.  
(ii) Classify amino acids in microorganisms based on polarity of 'R' group.
- 1b. Using annotated diagram, describe the TCA cycle in microbes.
- 1c. Discuss the function of the hexose monophosphate shunt pathway.
- 2a. (i) Anabolism and catabolism requires two (2) sub processes which are interdependent.  
Discuss these two (2) sub processes.  
(ii) With named examples, list the five (5) types of reactions observed in pyruvate pathway.
- 2b. What is electron transport?
- 2c. Describe the synthesis of purines in bacteria.

**Section B**

- 3a. Itemise **ONLY** the environmental factors influencing bacterial growth.
- 3b. Mr Maxwell Magnus was perplexed as to how bacterial growth occurs. As a microbiologist, how can you elucidate briefly and unravel the enigmatic clue of bacterial growth?
- 3c. How can cells multiply when they have exhausted their supply of nutrients?
- 3d. Briefly illuminate what happens when a stock culture stored in the refrigerator for several weeks is inoculated into fresh medium and provide a suitable reason for your answer. Elucidate briefly what happens if young cells are transferred to a medium similar in composition?
- 4a. Make a comprehensible distinction between batch and continuous culture system. Growth of a bacterial colony on a solid medium involves many of the same features as bacteria growing in liquid, but it is marked by some importance differences.
- 4b. Explicate briefly what will happen to the colony at the edge and center of the agar medium?

- 4c. At what growth phase are cells in locations between these two extremes? At what growth phase are cells in the center of the agar medium?
- 4d. How can you describe the type of growth experienced by cells at the edge of the colony?

**Section C**

- 5a. Classify microorganisms into five categories on the basis of their temperature ranges for growth.
- 5b. How do microbial activities affect the pH of their environment and how can it be controlled.
- 6a. What is water activity and how do microorganisms adapt to an habitat of low water activity?
- 6b. Explain the mechanism of cell damage by ultraviolet radiation and how can it be repaired?
- 6c. Mention two (2) effects of nutrient limitation on microbial physiology.