



CRAWFORD UNIVERSITY
FAITH CITY, IGBESA, OGUN STATE
2022/2023 RAIN SEMESTER EXAMINATIONS

COLLEGE: NATURAL AND APPLIED SCIENCES

DEPARTMENT: BIOLOGICAL SCIENCES

PROGRAMME: MICROBIOLOGY

COURSE CODE: MCB 424

COURSE TITLE: MICROBIAL PHYSIOLOGY AND METABOLISM

COURSE UNIT: 3

INSTRUCTION: ANSWER ANY FIVE QUESTIONS (AT LEAST TWO QUESTIONS FROM EACH SECTION).

TIME ALLOWED: 2HRS 30MINS

ALL QUESTIONS CARRY EQUAL MARKS (12 MARKS)

SECTION A

1. Starting with the chemical formula of the cell, discuss the importance of the essential elements in the nutrients' requirements of microorganisms.
- 2a. Discuss the different phases of the microbial growth.
 - b. What is the consequence of the exponential growth?
 - c. Calculate the generation time g and the generation number n in a growth experiment in which a culture medium goes through exponential growth for 5 hours starting with a 5×10^6 cells/ml of *Staphylococcus aureus* cells and reached a population of 5×10^9 cells/ml.
- 3a. Discuss in details the batch and continuous culture systems
 - b. In what instances will the culture systems in (a) above be useful?
4. Write concisely on three factors affecting microbial growth.

SECTION B

5. Write short notes on the following separation techniques;
 - i. Dialysis ii. Salting in and salting out iii. Differential centrifugation
 - iv. Affinity chromatography v. High pressure Liquid chromatography
6. Write concisely on the glycolytic pathway
7. Briefly describe how the following buffers are prepared;
 - i. Acetic acid-Sodium acetate buffer ii. Citrate buffer iii. Carbonate-Bicarbonate buffer iv. Phosphate buffer v. Potassium-Phosphate buffer