



# **CRAWFORD UNIVERSITY**

**FAITH CITY, IGBESA, OGUN STATE**

**2022/2023 HARMATTAN EXAMINATIONS**

**COLLEGE: NATURAL AND APPLIED SCIENCES**

**DEPARTMENT: BIOLOGICAL SCIENCES**

**PROGRAMME: MICROBIOLOGY**

**COURSE CODE: MCB 423**

**COURSE TITLE: INDUSTRIAL MICROBIOLOGY.**

**COURSE UNIT: 3**

**INSTRUCTION: ANSWER ANY FIVE QUESTIONS**

**TIME ALLOWED: 2 1/2 HRS**

1. a. What are bioreactors? (1mk)
- b. Assuming you are to construct a bioreactor, explain the parameters you will take into consideration (3mks)
- c. Write short notes on the following;
  - i. Design of fermentors ii. Size of fermentors iii. Types of fermentors iv. History of fermentors(8mks)
2. a. What do you understand by the term "brewing"? (1mk)
- b. List and explain the five (5) steps involved in wine production. (5mks)
- c. Write short notes on the following;
  - i. Hops ii. Malting iii. Mashing. (6mks)
3. Discuss extensively on how media for industrial fermentation can be formulated. (12mks)
- 4.a. What is enzyme immobilization? (2mks)
- b. Describe the microbial growth curve with the aid of a diagram. (2mks)
- c. Write extensively on any four immobilization techniques. (8mks)
5. a. Define industrial microbiology with two examples each of microbial product and microbial services. (3mks)
- b. Discuss the properties to be considered in selecting microorganisms of industrial importance (6mks)
- c. List any six (6) problems associated with industrial microbial processes. (3mks)
6. Write an essay on the concept of improving the genotypic and phenotypic performance of microorganisms. (12mks)
7. a. What is microbial growth? (1 1/2 mks)
- b. List and explain any three (3) physical requirements for microbial growth.(4 1/2 mks)
- c. Write short notes on the following; i. Primary and secondary metabolism ii. Indirect methods of evaluating microbial growth iii. Direct methods of evaluating microbial growth. (6mks)