NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
DEPARTMENT OF BIOLOGICAL SCIENCES
2024_2 EXAMINATION

COURSE CODE: BIO 416

COURSE TITLE: INDUSTRIAL MICROBIOLOGY

CREDIT: 3 Units

TIME ALLOWED: 3 Hours

INSTRUCTION: Answer Question ONE (1) and any other THREE (3) Questions

1. (a) Write short notes on the following in relation to beer production:
   (i) Barley **(4 marks)**
   (ii) Adjuncts **(4 marks)**
   (iii) Hops **(4 marks)**
   (b) Describe the use of protoplast fusion in strain improvement. **(5 marks)**
   (c) Mention four (4) culture collection centres and the type of microbial culture they specialized in. **(4 marks)**
   (d) Write short notes on the two (2) phases of microbial growth in batch cultivation. **(4 marks)**
2. (a) Outline the roles of a microbiologist in industrial microbiology. **(5 marks)**
   (b) Describe five (5) special media used in strain isolation. **(5 marks)**
   (c) Highlight five (5) reasons why wort boiling is essential in brewing. **(5 marks)**
3. (a) Explain the advantages of using microorganisms in industrial biotechnology over plants and animals. **(6 marks)**
   (b) In tabular form, state the major sources of the following raw materials used in industrial media formulation and their associated nutrient composition:
   (i) Corn steep liquor (ii) Pharmamedia
   (iii) Distillers soluble (iv) Soyabean meal **(4 marks)**
   (c) Outline the activities that can translate to strain improvement. **(5 marks)**
4. (a) Write short notes on baker's yeasts. **(9 marks)**
   (b) Write on the roots and tubers used as carbohydrate sources in industrial media formulation. **(6 marks)**
5. (a) Highlight how protein-tannin hazes may be removed in beer. **(4 marks)**
   (b) Foam production is known to be undesirable in fermentation. State the consequences of this process. **(6 marks)**
   (c) Discuss the process of temperature control in a fermenter. **(5 marks)**
6. (a) Write short notes on choice of materials used for construction of fermenters. **(6 marks)**
   (b) Write short notes on wine preservation. **(4 marks)**
   (c) Discuss the classification of continuous microbial cultivation during fermentation. **(5 marks)**