

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY

BOTA 436: INDUSTRIAL MICROBIOLOGY

STREAMS:

TIME: 2 HOURS

DAY/DATE: TUESDAY 18/4/2023

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS

- i. Answer all questions in section A and any two in section B
- ii. Do not write anything on the question paper
- iii. Use illustrations where appropriate to enhance your answer.

SECTION A (30 MARKS)

1. (i) Define the following terms as used in industrial microbiology. (3 marks)
 - a. Bioremediation
 - b. Amylolytic
 - c. Methanogenesis
- (ii) Contrast saline suspension with overlaying culture with mineral oil as applied in preservation of industrial microorganisms. (2 marks)
2. (i) Outline the advantages of fed-batch culture method in the application of micro-organisms in industries. (4 marks)
- (ii) Explain why the operating volume of a fermenter is always less than its total capacity. (1 mark)
3. a) Define a process manufacturing industry. (1 mark)

- b) Highlight four components of an industrial production process. (4 marks)
4. Give five characteristics of single-cell proteins that are used in industrial processes. (5 marks)
5. A milk fermentation company would like to preserve their microorganism for a longer period of time while in suspended metabolic state. Discuss suitable methods for this type of preservation. (5 marks)
6. a) Identify the properties of antifoam agents used during fermentation. (4 marks)
b) Explain the challenges associated with the use of defoamers. (1 mark)

SECTION B (40 MARKS)

7. (i) Discuss various factors that are considered when designing a bioreactor for fermentation process. (12 marks)
(ii) Describe the steps involved in anaerobic digestion of methane. (8 marks)
8. (i) Design an experiment on how to manufacture alcohol in the laboratory using fermentation. (10 marks)
(ii) Explain why antifoam agents are required in fermentation process. (10 marks)
9. (i) Discuss the effects of foam in industrial process that use microorganisms (10 marks)
(ii) Discuss the advantages of solid-state fermentation over submerge liquid fermentation in the production of industrial products. (10 marks)
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