

APPLIED BIOLOGY LEVEL 6

SBA 2152

APPLIED MICROBIOLOGY

MARCH/APRIL 2024

MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATES

1. This paper has two sections **A** and **B**.
2. You are provided with separate answer booklet.
3. Marks for each question are indicated.
4. Do not write on the question paper.

SECTION A

Answer all the questions in this section

1. Most Probable Number Technique (MPN) is a qualitative technique that is employed to detect coliforms in water hence determining the quality of water. Summarize the principle behind this technique. (5 marks)
2. Explain any **Two** types of thermal processes as a method of food preservation. (4 marks)
3. Outline the functions of the following parts of a bioreactor. (4 marks)
 - i. Head plate
 - ii. Antifoam probe
 - iii. Stirrer shaft seal
 - iv. Acid/base probe
4. Explain the difference between solid state fermentation (SSF) and liquid/submerged fermentation. (2 marks)
5. Outline the criteria used for the choice of industrial microorganisms. (4 marks)
6. Highlight the examples of bacteria that are found in food. (4 marks)
7. Briefly explain how the following fermentation parameters are measured and controlled. (4 marks)
 - i. pH
 - ii. Oxygen and Carbondioxide
8. Analyze **Two** differences between bioreactors and fermenters. (4 marks)
9. Highlight the disadvantages of using Most Probable Number technique. (5 marks)
10. Explain how the quality control check of preserved stock cultures is carried out to ensure their quality before use. (4 marks)

SECTION B (60 MARKS)

Answer any **three** questions in this section

11. a) Describe the water treatment process. (14 marks)
b) Discuss any **three** bacteria that causes water pollution citing the diseases they cause. (6 marks)
12. a) Define pasteurization and explain why milk is pasteurized and not sterilized. (3 marks)
b) Analyze the different reduction time in Methylene blue reductase test and match each time with the quality of milk. (8 marks)
c) Describe the procedure for Methylene blue reductase test. (7 marks)
d) Summarize the functions of Methylene blue indicator in the Methylene blue reductase test for milk quality. (2 marks)

13. a) Characterize fermentation based on the end products. (4 marks)
b) Describe the process of alcohol fermentation. (7 marks)
c) Outline the benefits of consuming fermented products. (4 marks)
d) Summarize the activities taking place during conditioning as the last stage of secondary fermentation. (5 marks)
14. Water sampling is a very delicate process that requires the researcher/laboratory technician to be extra cautious in order to avoid introducing contaminants into the sample.
- a) Highlight the general rules that must be observed during water sampling process. (4 marks)
b) Outline the information that must be displayed on the label of the sampling bottle. (7 marks)
c) Describe the procedure that must be followed during water sampling. (6 marks)
d) Summarize the site observation details including environmental and other factors that must be noted. (2 marks)