



TECHNICAL UNIVERSITY OF MOMBASA

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School of Applied and Health Sciences  
DEPARTMENT OF PURE AND APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**

BACHELOR OF TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY &  
BIOTECHNOLOGY

ABT 4409 INDUSTRIAL ENZYMES

ORDINARY EXAMINATION PAPER 1

**SERIES: DECEMBER, 2024 SERIES**

**TIME: 2 HOURS**

**DATE: DECEMBER, 2024**

**Instructions to Candidates**

You should have the following for this examination

*Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other **TWO** questions.

**Do not write on the question paper.**

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**QUESTION ONE (30 MARKS)**

a. Define the following terminologies as used in Industrial enzymes.

- |     |              |   |
|-----|--------------|---|
| i.  | Biocatalysis | 1 |
|     | Mark         |   |
| ii. | Cheddaring   | 1 |
|     | Mark         |   |

b. Outline **FIVE** merits of using microorganisms as sources of enzymes. 5 Marks

- c. Outline the advantages of using enzymes rather than inorganic catalysts in biocatalysis. 3 Marks
- d. State THREE microorganisms that are sources of pullulan hydrolase. 3 Marks
- e. Outline significances of proteolysis stage in cheese maturation. 4 Marks
- f. Distinguish between pullulanase type I (EC 3.2.1.41) and pullulanase type II (amylopullulanase) 7 Marks.
- g. Discuss the medical applications of proteases. 6 Marks

**QUESTION TWO (20 MARKS)**

- a. Explain in the following process in Cheese production.
  - i. Pasteurization 4 Marks
  - ii. Acidification 8 Marks
- b. Cellulases are very important enzymes in textile industry. Explain. 8 Marks

**QUESTION THREE (20 MARKS)**

Discuss the application of proteases in the following industrial sectors

- i. Food and feed industry 12 Marks
- ii. Leather industry 8 Marks

**QUESTION FOUR (20 MARKS)**

- a. You have been tasked to prepare laundry detergents. Outline the parameters you would consider when selecting detergent proteases (10 Marks)
- b. Explain the uses of pectinases in Fruit juice extraction. (10 Marks)

**QUESTION FIVE (20 MARKS)**

- a. Explain the use of cellulases in Pulp and paper industry. 8 Marks
- b. Explain Malo-lactic fermentation in white wine production. 8 Marks

c. Explain the importance of salt in cheese production.

4 Marks