



**TECHNICAL UNIVERSITY OF MOMBASA**  

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**FACULTY OF APPLIED AND HEALTH SCIENCES**  
**DEPARTMENT OF PURE & APPLIED SCIENCES**  
**UNIVERSITY EXAMINATION FOR:**  
**BTIMB**  
**ABT 4306 :DOWNSTREAM PROCESSING**  
**END OF SEMESTER EXAMINATION**

**SERIES:** APRIL 2016

**TIME:** 2 HOURS

**DATE:** Pick Date May 2016

**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**

- a. Differentiate between Filtration and sieving (5 marks)
- b. List five morphological characteristics of a fermentation broth (5 marks)
- c. List the names of microorganism that produce the antibiotics below (5 marks)

Antibiotic	Producing microorganism
Cephalosporin	
Cycloheximide	
Cycloserine	
Kanamycin	
Lincomycin	

d. List five areas in which cross flow filtration has been applied (5 marks)

e. Highlight the role of unit operations in downstream processes (5 marks)

### Question TWO

Explain malolactic fermentation process involved in wine production (10 marks)

Describe hydroxyapatite Chromatographic method for biomolecules separation (10 marks)

### Question THREE

Explain how the following mechanisms alter the biological activity of proteins

i) Protein deamidation (10 marks)

ii) Oxidation (10 marks)

### Question FOUR

Explain the industrial production of Tetracycline/chlortetracycline (20 marks)

### Question FIVE

Explain the application of diafiltration in downstream processing (20 marks)