



# Technical University of Mombasa

Faculty of Applied and Health Sciences

## DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF  
TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY  
BTMBT 12S

### ABT 4202: ENVIRONMENTAL MICROBIOLOGY

SEMESTER EXAMINATION

DECEMBER 2013 SERIES

2 HOURS

Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

#### QUESTION ONE

- a) (i) Explain negative association among soil microorganisms **(8marks)**
- (ii) Explain the role of algae in various soil environments. **(4marks)**
- b) (i) Describe the relevance of carbon cycle in the environment **(6marks)**
- (ii) Explain the forms in which carbon is found in lithosphere **(3marks)**
- c) (i) Discuss bioremediation as a method of clearing wastes from the environment **(5marks)**
- (ii) Explain how viruses reach soil and their role as soil inhabitants **(4marks)**

#### QUESTION TWO

- a) Discuss the role of microorganisms in biodegradation of synthetic polymers (plastic). **(8marks)**

- b) (i) Identify bacteria responsible for Nitrogen cycle **(4marks)**
- (ii) Discuss the constrains to microbial quality testing of water **(6marks)**
- (iii) State the importance of soil microorganism in industries **(2marks)**

### QUESTION THREE

- a) (i) Explain the importance of soil fungi **(3marks)**
- (ii) What is biofilm ? **(1mark)**
- (iii) Explain the formation of biofilm **(6marks)**
- b) (i) Describe life cycle of biofilm stages **(3marks)**
- (ii) Discuss the properties exhibited by biofilms **(4marks)**
- (iii) After nitrogen fixation in the soil, various steps still need to be passed for the complete cycle to be accomplished. Name the proceeding steps. **(3marks)**

### QUESTION FOUR

- a) (i) Explain the possibility of using microorganisms such as *E.Coli* for environmental clean up **(6marks)**
- (ii) Define the following terms which are processes carried out in the soil by microorganism **(2marks)**  
 Ammonification  
  
 Denitrification
- (iii) Name microorganisms that carry out Ammonification **(3marks)**
- b) (i) Explain the mode of life exhibited by protozoa in soil **(4marks)**
- (ii) Explain the factors that determine successful transmission of airborne infections **(4marks)**
- (iii) State the importance of sulfur cycle in the environment **(1mark)**

## QUESTION FIVE

- a) (i) Describe nitrification process as occurs during nitrogen cycle. **(6marks)**
- (ii) Explain how biotechnology may be used alongside microbial ecology to address environmental challenges **(4marks)**
- (iii) Give reasons why phosphorus cycles is comparatively simple. **(2marks)**
- (iv) Explain the biological importance of phosphorus **(3marks)**
- b) (i) State the form in which fungi exists in the soil. **(2marks)**
- (ii) Explain Antagonism as a form of negative association among microorganisms **(3marks)**