



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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University Examinations 2024/2025

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE BIOTECHNOLOGY

SHD 3401: INDUSTRIAL BIOTECHNOLOGY

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a) Explain the role of microorganisms in wine and pharmaceutical industry (5 marks)
- b) Describe briefly microbial indicators of water quality (4 marks)
- c) Describe the following areas of microbiology and their application to industrial biotechnology
 - (i) Air microbiology (2 marks)
 - (ii) Soil microbiology (2 marks)
 - (iii) Water microbiology (2 marks)
- d) Describe briefly amperometric, potentiometric, and conductometric microbial biosensors (6 marks)
- e) Outline the quality of a good microbes for use in a bio-reactor (3 marks)
- f) Describe briefly two sources of industrial microorganisms (2 marks)
- g) Briefly describe probiotics and their contribution to the health sector (4 marks)

QUESTION TWO (20 MARKS)

Discuss the role of microorganisms in

- (i) Bioenergy and bioenergy – gaseous fuels (10 marks)
- (ii) Production of ox-chemicals (10 marks)

QUESTION THREE (20 MARKS)

Discuss bacterial biosensors for measuring environmental pollutants (20 marks)

QUESTION FOUR (20 MARKS)

Discuss the process of waste water retreatment (20 marks)