



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY**  
**SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES**  
**UNIVERSITY EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE**  
**IN MICROBIOLOGY**  
**1<sup>st</sup> YEAR 1<sup>st</sup> SEMESTER 2018/2019 ACADEMIC YEAR**  
**MAIN CAMPUS - REGULAR**

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**COURSE CODE:** SBT 815  
**COURSE TITLE:** APPLIED MICROBIOLOGY  
**EXAM VENUE:** STREAM: (MSC)  
**DATE:** EXAM SESSION:  
**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer Question One (Compulsory) and two other questions**
  - 2. Candidates are advised not to write on question paper**
  - 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**
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**QUESTION ONE (30 MARKS)**

- a) Outline three effects of microorganisms as contaminant in industry (3 marks)
- b) Define the following microbial quality tests in industry
  - i) Sterility test (1 mark)
  - ii) Preservative effect test (1 mark)
  - iii) Endotoxin test (1 mark)
- c) State the importance of environmental monitoring in factory hygiene maintenance (3 marks)
- d) Explain the process of microbial biomass fermentation (3 marks)
- e) State three modifications required in the industrial process for a high yield of microbial enzymes (3 marks)
- f) State the modifications of the following vessels used in maintaining microbial cultures in industry
  - i) Baffle flasks
  - ii) Shakers
  - iii) Bioreactors (3 marks)
- g) List six requirements for a good industrial fermenter (3 marks)
- h) State the benefits and disadvantages of microbial transformation of industrial compounds (3 marks)
- i) State the roles of the following groups of bacteria in food processing
  - i) *Proteolytic bacteria* (1 mark)
  - ii) *Psychrotrophic bacteria* (1 marks)
  - iii) *Thermotolerant bacteria* (1 mark)
- j) List three possible defects of beer (3 marks)

**QUESTION TWO (15 MARKS)**

- a) Explain the importance of the following bacterial metabolites in food preservation
  - i) Propionic acid (3 mark)
  - ii) Hydrogen peroxide (3 marks)
  - iii) Reuterin (3 mark)
- b) Use examples to distinguish between ammonification, nitrification and denitrification (6 Marks)

**QUESTION THREE (15 MARKS)**

- a) Describe the microbiology of yoghurt fermentation under the following subheadings
- i) Characteristics (4 marks)
  - ii) Processing (4 marks)
  - iii) Growth (4 marks)
- b) Distinguish between ripened and unripened cheese (3 marks)

**QUESTION FOUR (15 MARKS)**

- a) Discuss the sources and nutritional benefits of the following microbial additives in the animal diet
- i) Single cell proteins (3marks)
  - ii) Amino acids (3 marks)
  - iii) Flavour compounds (3 marks)
- b) Outline the steps involved in industrial processing of beer under the headings;
- i) Malting (3marks)
  - ii) Mashing (3 marks)
  - iii) Hopping (3 marks)

**QUESTION FIVE (15 MARKS)**

- a) State the functions of the following microbial enzymes in food processing
- i)  $\alpha$ -amylase (3 marks)
  - ii) Catalase (3 marks)
  - iii) Invertase (3 marks)
- b) Outline the steps involved in the following methods of determining microbial concentration in foods
- i) Single cell proteins (3 marks)
  - ii) Amino acids (3 marks)