CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN MICROBIOLOGY AND BIOTECHNOLOGY

BOTA 831: APPLIED MICROBIOLOGY

STREAMS: MSC **TIME: 2 HOURS**

DAY/DATE: THURSDAY 06/12/2018 **2.30 P.M – 4.30 P.M**

INSTRUCTIONS

- **Answer question one (compulsory) and any other two questions**
- **Candidates are advised not to write on question paper**
- **Candidates must in their answer booklets to the invigilator while in the examination room**

1. (a) Outline three effects of microorganisms as contaminants in industry. [3 marks]

(b) Explain the following microbial quality tests in industry:

(i) Sterility test [1mark]

(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 in maintaining microbial cultures in industry: [3 marks]

(i) Baffle flasks

(ii) Shakers

(iii) Bioreactors

(g) List six pieces of requirement 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 mark]

(iii) *Thermoduric bacteria* [1 mark]

(j) List three possible defects of beer. [3 marks]

2. (a) Explain the importance of the following bacterial metabolites in food preservation.

(i) Propionic acid [3 marks]

(ii) Hydrogen peroxide [3 marks]

(iii) Reuterine [3 marks]

(b) Use examples to distinguish between ammonification, nitrification and denitrification. [6 marks]

3. (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 cheeses. [3 marks]

4. (a) Discuss the sources and nutritional benefits of the following microbial additives in the animal diet:

(i) Single cell protein [3 marks]

(ii) Amino acids [3 marks]

(iii) Flavor compounds [3 marks]

(b) Outline the steps involved in industrial processing of beer under the headings:

(i) Malting [3 marks]

(ii) Mashing [3 marks]

(iii) Hopping [3 marks]

5. (a) State the functions of the following microbial enzymes in food processing.

(i) α – 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]
