JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SECURITY, HORTICULTURE AND ANIMAL SCIENCE 2013/2014 ACADEMIC YEAR

AAB 3121: AGRICULTURAL MICROBIOLOGY

DATE: **TIME:**

Instructions:

1. This paper consists of **TWO** sections, **A** and **B**.
2. Answer **ALL** questions from section **A** and any **TWO** from section **B**.
3. Write all answers in the booklet provided.

SECTION A [30MARKS]

Answer ALL questions in this section

1. a) Define the following terminologies:

   i) Mycorrhizae. [1 mark]
   ii) Chemoheterotrophy. [1 mark]
   iii) Archae. [1 mark]
   iv) Pasteurization. [1 mark]

   b) Explain the differences between:

   i) Simple stain and differential stain. [2 marks]
   ii) Catabolism and anabolism. [2 marks]
   iii) Osmotolerant and halophilic bacteria. [2 marks]

2. a) Describe the mode of action of microbes or microbial metabolites as biopesticides? [5 marks]

   b) Define fermentation and describe its relationship with the overall energy production processes. [5 marks]

3. a) Differentiate between Gram-positive and Gram-negative bacterial cell wall highlighting the structurally component responsible for differences in virulence and response to penicillin and lysozyme. [5 marks]

   b) Briefly discuss the concept of microbial biofertilizers in agricultural production. [5 marks]

SECTION B [40 MARKS)

Answer ANY TWO questions from this section

4. a) With help of an illustration, discuss the microbial growth highlighting what occurs at the different phases of growth and their important metabolites [12 marks]

   b) Describe the main categories of microorganisms on the basis of optimum temperature and the corresponding environment in which a representative might thrive [8 marks]

5. Atmospheric nitrogen gas (N_2) is unavailable to plants. Plants therefore depend on various types of nitrogen-fixing bacteria to take up nitrogen gas and make it available to them as some form of organic nitrogen. Discuss nitrogen cycle highlighting the role of microorganisms in each step. [20 marks]

6. Microorganisms are important in the food industry for production of fermented foods and beverages. Using examples, discuss the above statement starting clearly the roles of microorganism in the production of fermented foods and beverages. [20 Marks]