



**UNIVERSITY OF  
SWAZILAND**

**FACULTY OF HEALTH SCIENCES**

**B.Sc. ENVIRONMENTAL HEALTH SCIENCE**

**END OF SEMESTER II EXAMINATIONS**

**TITLE OF PAPER:** DAIRY SCIENCES

**COURSE CODE:** EHS506

**DURATION:** 2 HOURS

**DATE:** MAY 2012

**INSTRUCTIONS:**

1. READ THE QUESTIONS CAREFULLY.
2. ANSWER **ANY 4 QUESTIONS**.
3. EACH QUESTION CARRIES 25 MARKS. WHERE A QUESTION IS SUBDIVIDED INTO PARTS, THE MARK FOR EACH PART IS SHOWN IN BRACKETS.
4. NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
5. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**SPECIAL REQUIREMENTS: NONE**

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED TO DO SO BY THE INVIGILATOR.

### QUESTION 1

- a. Briefly discuss the mechanism of interaction between *Streptococcus thermophilus* and *Lactobacillus delbrueckii ssp. bulgaricus* during yogurt manufacture. [10]
- b. The two starter microorganisms are usually added in a ratio of 1:1. Explain how each of the following factors influences the balance between the two:
  - i. Amount of inocula. [5]
  - ii. Incubation time. [5]
  - iii. Incubation temperature. [5]

[25]

### QUESTION 2

- a. Manufacture of extended shelf-life milk may require two heat treatments, (e.g. 140°C for 2 s; and 72°C for 15 s). Explain the rationale behind this approach and its effect on shelf life. [10]
- b. Use a well labelled diagram to outline the manufacture of homogenised, pasteurised liquid milk. [15]

[25]

### QUESTION 3

- a. Describe the characteristics of a bacteriophage and its commercial impact in the dairy industry. [10]
- b. Describe the concept of direct vat inoculation and discuss its advantages over bulk starter preparation in dairy processing. Use diagrams to illustrate your answer. [15]

[25]

### QUESTION 4

- a. Discuss the effect of lactose crystallization on the quality of the following milk products:
  - i. Ice cream. [5]
  - ii. Powdered milk. [5]

b. Discuss the stability of the colloidal structure of milk under the following conditions:

- i. Acidification.[5]
- ii. Heat treatment. [5]
- iii. Addition of ethanol. [5]

[25]

#### QUESTION 5

Write notes on the following:

- a. Phosphatase test. [5]
- b. Dye reduction test. [5]
- c. Effect of chymosin on  $\kappa$ -casein. [5]
- d. The lactoperoxidase system. [10]

[25]

**END OF EXAMINATION**