



1st SEMESTER FINAL EXAMINATION 2017/2018

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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME: BACHELOR OF SCIENCE IN AGRONOMY YEAR 2, BACHELOR OF SCIENCE IN ANIMAL SCIENCE YEAR 2, BACHELOR OF SCIENCE IN ANIMAL SCIENCE (DAIRY OPTION) YEAR 2, BACHELOR OF SCIENCE IN FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR 2, BACHELOR OF SCIENCE IN CONSUMER SCIENCE YEAR 2, AND BACHELOR OF SCIENCE IN HORTICULTURE YEAR 2

COURSE CODE: CPR207

TITLE OF PAPER: MICROBIOLOGY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS

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QUESTION ONE IS COMPULSORY

QUESTION 1

- a. Describe the life-cycle of the malaria causal organisms. (10 Marks)
- b. It is possible to purchase the following microorganisms in a retail store. Provide a reason for buying each.
 - i. *Saccharomyces cerevisiae* (2 Marks)
 - ii. *Bacillus thuringiensis* (3 Marks)
- c. Explain the following media used in a Microbiology laboratory:
 - i. Complex media (2 Marks)
 - ii. Differential media (2 Marks)
 - iii. Selective media (2 Marks)
- d. In a laboratory practical the bacterium *Clostridium* is stained by applying a basic stain, carbolfuchsin, with heat, decolourising with acid alcohol, and counterstaining with an acidic stain, nigrosin. Under the microscope, describe the colour of:
 - i. endospores (2 Marks)
 - ii. cells (2 Marks)

[25 Marks]

QUESTION 2

Differentiate the following:

- i. Fimbriae and pili in bacteria (4 Marks)
- ii. A Gram-positive and Gram-negative cell wall (8 Marks)
- iii. Psychrophiles and psychrotrophs (4 Marks)
- iv. Facultative anaerobes and aerotolerant anaerobes (4 Marks)
- v. The enzymes catalase and peroxidase in bacterial respiration (5 Marks)

[25 Marks]

QUESTION 3

- a. With the aid of a well-labelled diagram, describe what happens to a bacterial population as it grows in a given medium. (15 Marks)
- b. Given a jug of fresh milk that contains 10 000 bacteria per millilitre to be cultured, explain step by step how you would obtain a concentration of 10 bacteria per millilitre. (5 Marks)
- c. From a Petri dish on which 1 mL of sour milk was cultured, after four serial dilutions were made, a total of 56 colonies were counted. What was the original number of bacterial cells per millilitre that were in the original sour milk? (5 Marks)

[25 Marks]

QUESTION 4

- a. Describe any three physical methods, other than heat, used to control microorganisms. (6 Marks)
- b. In microbial genetics, how is translation different from transcription? (4 Marks)
- c. What is an anticodon in microbial genetics? (2 Marks)
- d. What are the functions of mRNA and tRNA? (10 Marks)
- e. What is an exon? (3 Marks)

[25 Marks]

QUESTION 5

- a. Explain how genetic transfer occurs in bacteria. (15 Marks)
- b. What are..
 - i. transposons? (3 Marks)
 - ii. Plasmids and what do they code for? (7 Marks)

[25 Marks]