UNIVERSITY OF SWAZILAND

FINAL EXAMINATION

PROGRAMME: BACHELOR OF SCIENCE IN AGRONOMY YEAR 2 & YEAR 3, BACHELOR OF SCIENCE IN ANIMAL SCIENCE YEAR 2 & YEAR 3, BACHELOR OF SCIENCE IN ANIMAL SCIENCE (DAIRY OPTION) YEAR 2, BACHELOR OF SCIENCE IN FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR 2 & YEAR 3, BACHELOR OF SCIENCE IN CONSUMER SCIENCE YEAR 2, BACHELOR OF SCIENCE IN HOME ECONOMICS YEAR 3, BACHELOR OF SCIENCE IN CONSUMER SCIENCE EDUCATION YEAR 2, BACHELOR OF SCIENCE IN HOME ECONOMICS EDUCATION YEAR 3, AND BACHELOR OF SCIENCE IN HORTICULTURE YEAR 2 &YEAR 3.

COURSE CODE: CP 204/CP 206

TITLE OF PAPER: MICROBIOLOGY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

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QUESTION ONE IS COMPULSORY

QUESTION 1

A. In a laboratory experiment, 200 bacterial cells were cultured in a broth medium. After 3 hours, there were 5, 456, 870 cells. When 100 bacterial cells were grown under the same conditions in the same medium but amended with preservatives, after 18 hours, there were 9, 450, 280 cells.

(i) Calculate the generation time of the bacteria in the first experiment. (6 Marks)

(ii) Calculate the generation time of the bacteria in the second experiment. (6 Marks)

(iii) State if the preservative inhibited or promoted growth and give a reason for your answer. (2 Marks)

B. Biological stains enables visualisation of bacteria in the laboratory. Their ability to stain microorganims depends on their electrical charge on one of the components of the stain as well as on the cellular component to be stained .

(i) Describe a stain (dye) chemically. (6 marks)

(ii) Describe the different types of stains based on the electrical charge and give an example of a stain in each type. (8 Marks)

C. (i) What is the difference between missense and nonsense mutation? (4 Marks)

(i) How is spontaneous mutation different from normal mutation? (4 Marks)

(ii) What is the meaning of transcription and translation in microbial genetics? (4 Marks)

[40 MARKS]

QUESTION 2

A. What component of the blood is involved in phagocytosis? (4 Marks)

B. What mechanisms do pathogenic microorganims use to avoid being killed by phagocytosis? (5 Marks)

C. Bacteria multiply by binary fission. Explain how the following patterns are formed during binary fission:

(i) tetrads (2 Marks)

(ii) sarcinae (2 Marks)

(iii) Strepto (2 Marks)

(iv) Staphylo (2 Marks)

D. Define the following:

(i) Chemoheterotrophs (2 Marks)

(ii) Photoheterotrophs (2 Marks)

(iii) Aerotolerant anaerobes (2 Marks)

(iv) Microaerophiles (2 Marks)

E. Discuss the pros and cons of the pour plate and spread plate method of culturing bacteria in the laboratory. (5 Marks)

[30 MARKS]

QUESTION 3

A. Describe the different types of microorganisms based on their temperature requirements for growth. (8 Marks)

B. Discuss the sexuallike processes that bring about genetic recombination in bacteria. (9 Marks)

C. List the different types of RNA and their functions. (9 Marks)

D. What is the difference between the reticulate and elementary bodies in Chlamydia. (4 Marks)

[30 MARKS]

QUESTION 4

A. Describe the life cycle of malaria. (10 Marks)

B. Describe the lytic cycle of T-even bacteriophages. (15 Marks)

C. Describe the importance of a capsule to bacteria. (5 Marks)

[30 MARKS]