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, BACHELOR OF SCIENCE IN CONSUMER SCIENCE EDUCATION YEAR 2, AND BACHELOR OF SCIENCE IN HORTICULTURE YEAR 2 &YEAR 3.

COURSE CODE: CP 204

TITLE OF PAPER: MICROBIOLOGY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER QUESTIONS ONE AND ANY OTHER THREE QUESTIONS

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QUESTION ONE IS COMPULSORY

QUESTION 1

A. In a laboratory experiment, 100 bacterial cells were cultured in a broth medium. After 3 hours, there were 8, 558, 870 cells. When another 100 bacterial cells were grown under the same conditions in the same medium but amended with preservatives, after 6 hours, there were 11, 460, 480 cells.

   (i) Calculate the generation time of the bacteria in the first experiment.   (5 Marks)

   (ii) Calculate the generation time of the bacteria in the second experiment.   (5 Marks)

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

                                                                                     (2 Marks)

B. (i) Who first discovered microscopes?   (1 Mark)

   (ii) Explain the spontaneous generation and how it was ultimately proven wrong.   (5 Marks)

   (iii) What is the difference between a capsule and a capsid?   (4 Marks)

C. (i) What is the difference between base substitution and frameshift mutation?   (4 Marks)

   (ii) What is the difference between a catabolic and an anabolic reaction?   (4 Marks)

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

                                                                             [34 MARKS]

QUESTION 2

A. What mechanisms do pathogenic microorganims use to avoid being killed by phagocytosis?

(5 Marks)

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

    (i)   sarcinae   (2 Marks)

    (ii)   Strepto   (2 Marks)

    (iii)   Staphylo   (2 Marks)

C. Define the following:

    (i)   Chemolithotrophs   (2 Marks)

    (ii)   Photoheterotrophs   (2 Marks)

    (iii)   Obligate anaerobes   (2 Marks)

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

[22 MARKS]

QUESTION 3

A. Describe properties of:

    (i). Rickettsias   (5 Marks)

    (ii) Mycoplasma   (5 Marks)

    (iii) Chlamydia   (4 Marks)

B. Microrganisms can live in symbiotic relationships with other micro or organisms. Describe the different types of symbiotic relationships of microorganisms with other micro or organisms, and give an example in each case. (8 Marks)

[22 MARKS]

QUESTION 4

Discuss the different types of adaptive immunity   **[22 Marks]**

QUESTION 5

A. The following table shows codon on mRNA and corresponding amino acids.

UUA	leucine	UAA	nonsense
GCA	alanine	AAU	sparagine
AAG	lysine	UGC	cysteine
		UCG,	
GUU	valine	UCU	serine

(i)   If the sequence of amino acids encoded by a strand of DNA is serine-alanine-lysine-leucine, what is the order of bases in the sense strand of DNA?   (6 Marks).

(ii) If the sequence of amino acids encoded by a strand of DNA is serine-alanine-lysine-leucine, what will be the coding for the antisense strand of DNA?   (6 Marks)

B. Discuss properties of fungi.   (10 Marks)

                    [22 MARKS]