



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCES
DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE IN APPLIED
BIOLOGY AND BIOCHEMISTRY
GENERAL MICROBIOLOGY II SBB 2105

EXAMINATION PAPER
DECEMBER 2017

This examination paper consists of 2 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: None

INSTRUCTIONS TO CANDIDATES

- 1. Answer Four (4) Questions. Each question carries 25 marks.**
- 2. Where a question contains subdivisions, the mark value for each subdivision is given in brackets.**
- 3. Illustrate your answer where appropriate with large, clearly labelled diagrams.**

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- 1.(a) Discuss the characteristics of cultures in the log and stationery phases of microbial growth. (9 marks)
- (b) If a bacterial culture contains 10^2 cells/ml at time zero and 10^9 six hours later, calculate;
- (i) the growth rate, (3 marks)
 - (ii) Generation time and (2 marks)
 - (iii) Number of generations. (3 marks)
- (c) Describe how you would estimate the number of viable cells in a food sample. (8 marks)
- 2.(a) Describe the different categories of microorganisms based on their growth temperature requirements. (15 marks)
- (b) Explain the differences in the appearance of microbial cultures as a response to oxygen availability. (10 marks)
3. Give a detailed account of FIVE mechanisms that are used in the transport of nutrients across the bacterial cell membrane.
- 4.(a) Discuss the use of physical agents in the control of microorganisms. (15 marks)
- (b) Describe the factors that contribute to antimicrobial resistance. (10 marks)
5. Using specific examples, give an account of the microbial interactions found in natural environments.
- 6.(a) Describe how metabolic reactions are controlled using the following;
- (i) *trp* operon, (5 marks)
 - (ii) Cumulative feedback inhibition and (3 marks)
 - (iii) and concerted feedback inhibition. (3 marks)
- (b) Discuss the different categories of microorganisms based on their nutritional requirements. (14 marks)

END OF EXAMINATION PAPER

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