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

SUPPLEMENTARY: ADVANCED APPLIED MICROBIOLOGY SBB 4109

EXAMINATION PAPER

JULY 2018

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.**

1.(a) Give a detailed account of how enteric bacteria can be differentiated using a named acid fermentation. (10 marks)

(b) Discuss the major groups of chemoautrophic bacteria giving their applications in various processes. (15 marks)

2. Discuss the methods for reducing BOD and nutrients from waste water effluents and the ecological consequences of these pollutants.

3.(a) Discuss the benefits and disadvantages of using microbial mining over the conventional method. (10 marks)

(b) Describe the direct and indirect methods for the recovery of minerals from low grade ores. (5 marks)

(c) Using a specific mine as an example, explain how gold is mined through bioleaching. (10 marks)

4.(a) Describe the essential components of the photosynthetic apparatus in the major groups of phototrophs. (9 marks)

(b) Explain how cyanobacteria are able to perform oxygenic photosynthesis and nitrogen fixation. (6 marks)

(c) Discuss one example of a symbiotic association that involves photosynthetic bacteria. (10 marks)

5.(a) Describe the mechanisms that are involved in the bioremediation of polluted environments. (15 marks)

(b) Outline the pathway for the degradation of aromatic hydrocarbons. (10 marks)

6. Write an essay on the methods that are available for decontamination/detoxification of aflatoxin contaminated foods and feeds.

END OF EXAMINATION PAPER