

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

**THEORY: ADVANCED APPLIED MICROBIOLOGY SBB 4109**

JUNE 2004

3 HOURS (100 marks)

**INSTRUCTIONS**

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

1. Discuss bacterial reductive evolution in the context of extracellular and intracellular parasites adapting to their respective habitats. Use Mycoplasma, Rickettsia and Chlamydia as examples.
2. (a) Briefly compare atypical bacteria (Mycoplasma, Rickettsia, Chlamydia) to typical bacteria and viruses. (7 marks)
- (b) What are L-phase variants (L-forms) of bacteria. How do they differ from Mycoplasmas. (6 marks)
- (c) Chlamydia replicate by binary fission like all bacteria, what is peculiar about their life-cycle. (6 marks)
- (d) What is the importance of Mycoplasmas in animal based research and the cell culture industry. (6 marks)
3. (a) Distinguish between the following terms:
  - (i) mycosis and mycotoxicosis (2 marks)
  - (ii) primary metabolite and secondary metabolite (2 marks)
  - (iii) acute toxicity and chronic toxicity (2 marks)
- (b) What do you understand by the following acronyms?
  - (i) Aflatoxin (1 mark)
  - (ii) TLC (1 mark)
  - (iii) ELISA (1 mark)
  - (iv) HPLC (1 mark)
- (c) Write notes on factors governing aflatoxin toxicity. (15 marks)
4. Describe the ligninolytic enzyme systems found in named basidiomycetes that cause wood rot such as the bracket fungi and explain why ancilliary oxidases are usually required.
5. Explain how certain microorganisms can utilise hydrocarbon pollutants and pesticides as nutrients, and the potential value of such organisms.
6. Define with examples five out of the following types of microbial associations: Symbiosis, mutualism, commensalisms, antagonism, competition, parasitism or predation. (5 marks each)
7. Discuss the role and requirements of methanogenic bacteria in the production of biogas, indicate how these can be met in designing methods of dealing with waste materials.

**END OF EXAMINATION**

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