

Cork Institute of Technology
Bachelor of Science in Applied Biosciences – Stage 2

(SBIOS_7_Y2)

Autumn 2008

Microbiology

(Time: 3 Hours)

Answer **Five** questions in total.
Answer **TWO** questions from section A
and **TWO** Questions from section B and
ONE other question from either section.
Use separate answer Books for each
section.

Examiners:

Dr. T. Beresford
Ms. M. Lane
Dr. D. Gilroy

Section A

- Q1. (a) How did Pasteur defeat the theory of spontaneous generation? (4 marks)
- (b) Describe the structure, composition and function of Gram positive bacterial cell walls. (8 marks)
- (c) In prokaryotes, which transport system is best suited to the transport of nutrients present in the environment in extremely low amounts, and why? (4 marks)
- (d) Describe how prokaryotic chromosomal DNA is organised. (4 marks)

- Q2. (a) Bacteria can be divided into groups in the basis of their Carbon, Energy and Hydrogen/Electron Sources, describe these. (10 marks)
- (b) With the aid of a test tube diagram show how oxygen levels can influence the growth rate of a culture and identify the different bacterial classes based on their sensitivity to oxygen. (6 marks)
- (c) Give examples of laboratory methods for the generation of conditions for anaerobic microbial growth. (4 marks)
- Q3. (a) With the aid of graphs explain the differences that exist between bacteriostatic, bacteriocidal and bacteriolytic antimicrobial agents. (10 marks)
- (b) Discuss the use of heat as a method to control microbial populations. (10 marks)
- Q4. (a) Write short notes on *three* of the following structures and describe their function in prokaryotic cells:-
• Granules
• Plasmids
• Flagella
• Endospores (15 marks)
- (b) Using examples, explain what you understand by the terms selective and differential media for bacterial growth. (5 marks)

Section B

- Q5. Write detailed notes on each of the following:
- (a) Bacterial chromosome replication (6marks)
 - (b) Direct and indirect selection techniques (6 marks)
 - (c) Ames Test (8 marks)
- Q6. Write an account of the two catabolic pathways that *E coli* can use to provide the cell with ATP depending on the availability of oxygen in the environment. (20 marks)
- Q7. Write an account of :
- (a) The structure of viruses (8 marks)
 - (b) The replication of viruses (12 marks)
- Q8. Describe how each of the following characteristics of an organism can be used in its identification. (Use examples to illustrate your answer)
- Cultural
 - Morphological
 - Biochemical
 - Serological
 - Phage/Host Typing (20 marks)