

# Cork Institute of Technology

## Bachelor of Science (Honours) in Herbal Science – Stage 2

(SHERB\_8\_Y2)

Summer 2008

### Microbiology

(Time: 2 Hours)

Answer **four** questions

Answer **two** questions from Section A.

Answer **two** questions from Section B.

Please use separate answer books for each section.

All questions carry equal marks.

Examiners: Mr. B. Walsh  
Dr. D. Gilroy  
Dr. D. Corrigan  
Dr. D. Clare

### Section A

- Q1. (a) A water sample containing circa  $125 \times 10^3$  cfu/c.c. has to be analysed for specification purposes. Outline the procedure by which this can be achieved. (8 Marks)
- (b) Outline a procedure by which a growth curve may be measured in the laboratory. Describe each phase of the growth curve. (8 Marks)
- (c) Explain the difference between spread plate and pour plate techniques? (5 Marks)
- (d) What are the different types of media? (4 Marks)
- Q2. (a) What is the lytic cycle? (2 Marks)
- (b) Describe each step in the lytic cycle. (12 Marks)
- (c) Explain how yeasts and moulds are classified. (11 Marks)
- Q3. (a) What is the purpose of the Gram stain? (5 Marks)
- (b) Explain the meaning of 'fixing' in the staining process. (2 Marks)
- (c) Describe the procedure for the Gram stain. (6 Marks)
- (d) What are faecal indicators? (6 Marks)
- (e) Explain the IMViC tests. (6 Marks)

## Section B

- Q4. (a) How did Pasteur defeat the theory of spontaneous generation? (4 Marks)
- (b) Describe the structure of Gram negative bacterial cell walls. (12 Marks)
- (c) Describe how prokaryotic DNA is organised. (4 Marks)
- (d) What molecular adaptations to the cytoplasmic membrane are seen in psychrophiles and why are they necessary? (5 Marks)
- Q5. (a) With the aid of graphs explain the differences that exist between bacteriostatic, bacteriocidal and bacteriolytic antimicrobial agents. (12 Marks)
- (b) Discuss the use of heat as a method to control microbial populations. (10 Marks)
- (c) Give examples of laboratory methods for the generation of conditions for anaerobic microbial growth. (3 Marks)
- Q6. (a) Bacteria can be divided into groups on 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) In a few sentences, indicate how the bacterial endospore differs from the vegetative cell in structure, chemical composition and ability to resist extreme environmental conditions. (9 Marks)