CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2008/09

Module Title: Introduction to Biotechnology 2 CA

Module Code: **BIOT 6001**

School: Science

Programme Title:
Bachelor of Science in Analytical & Pharmaceutical Chemistry – Year 1
Bachelor of Science in Applied Biosciences – Year 1

Programme Code: **SCHQA_8_Y1**
SCHEM_7_Y1
SBIOS_7_Y1

External Examiner(s): **Dr Don Faller**
Internal Examiner(s): **Dr Jim O Mahony**
Ms Margaret Lane

Instructions: **Answer 4 Questions. Question 1 is compulsory.**

Duration: **2 Hours**

Sitting: Autumn 2009

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Question 1 is compulsory

Q1. Answer all parts.

(i) State the type of microscope and magnification required when viewing

(a) Prokaryotic cells

(b) Eukaryotic cells in T flasks (2 Marks)

(ii) State and explain one suitable method for measuring prokaryotic cell growth in the laboratory. (3 Marks)

(iii) Which of the following media would be most suitable for the growth of *E coli* in the laboratory?

(a) Nutrient Broth

(b) Nutrient Broth + Glucose

Why? (2 Marks)

(iv) How can the production of lactic acid by bacteria be monitored in the laboratory? (2 Marks)

(v) What is a cryoprotectant?

Give one example of a cryoprotectant used for bacteria and 2 other cryoprotectants. (3 Marks)

(vi) What 2 forces bring about the separation of DNA molecules during Electrophoresis. (2 Marks)

(vii) List 3 main steps in any DNA extraction procedure. (3 Marks)

(viii) State 2 ways to quantify purified DNA in a biotechnology laboratory. (2 Marks)

(viiii) What is agarose? (2 Marks)

(x) What is Ethidium Bromide? (2 Marks)

(xi) What is a pallindromic sequence? Draw one. (2 Marks)

Q2. (a) With the aid of a diagram describe the main features of a prokaryotic cell. (5 Marks)

(b) List the main differences between prokaryotic and eukaryotic cells. (5 Marks)

(c) Name the 2 types of microorganisms that are most commonly used in Biotechnology. Explain why these organisms are used and mention products that are produced by these organisms. (15 Marks)

Q3. Write an account of the requirements for optimum cell growth and describe how these requirements are met in an industrial fermentor. (25 Marks)

Q4. (a) List the applications of enzymes produced in biotechnology. (3 Marks)

(b) Describe a procedure you would use to isolate a protease enzyme for use in a detergent manufacture. (10 Marks)

(c) Explain each of the following terms.

(i) Batch Fermentation

(ii) Fed batch fermentation

(iii) Continuous fermentation. (12 Marks)

Q5. (a) What is protein engineering? (3 Marks)

(b) Describe how one important pharmaceutical (insulin) benefitted from protein engineering. (10 Marks)

(c) Write a brief description of 2 other products that are produced in Pharmaceutical Biotechnology (12 Marks)

OR

(a) Briefly differentiate between a vaccine and an antibody. (12 Marks)

(b) Describe how infectious diseases have been controlled by pharmaceutical products. (13 Marks)

Q6. Write a descriptive account of genetic engineering. (25 Marks)