

**CORK INSTITUTE OF TECHNOLOGY  
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Autumn Examinations 2010**

**Introduction to Biotechnology C/A**

**Module Code: BIOT6001**

**School:** Science

**Programme Title:** Bachelor of Science (Chemistry and Biology)

**Programme Code:** CR\_SCHQA\_8\_Y1  
CR\_SCHEM\_7\_Y1  
CR\_SBIOS\_7\_Y1  
CR\_PHBI\_8\_Y1  
CR\_SNHSC\_8\_Y1

**External Examiner(s):** Dr Don Faller

**Internal Examiner(s):** James Carroll , Ms Margaret Lane

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

**Duration:** 2 hours

**Sitting:** Autumn 2010

**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) Tissue culture 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 + GlucoseWhy? (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)
- (iv) What is agarose? (2 marks)
- (x) What is Ethidium Bromide? (2 marks)
- (xi) What is a palindromic sequence? Draw one. (2 marks)

- Q2. (a)** Write notes on each of the following;
- Restriction enzymes (4 marks)
  - Isolation of DNA from cells (4 marks)
  - Vectors (4 marks)
  - Strategy used to purify a protein (5 marks)
- (b) Explain each of the following terms:
- (i) Batch Fermentation (4 marks)
  - (ii) Continuous fermentation. (4 marks)
- Q3. (a)** Explain how DNA is responsible for the synthesis of a protein. (10 marks)
- (b) Describe the procedure you would use to isolate DNA from a cell. (8 marks)
- (c) Explain how DNA is used in forensics. (7 marks)
- Q4.** Write brief notes on :
- (a) Antibodies (5 marks)
  - (b) Scale up (5 marks)
  - (c) Measurements made in a bioreactor (5 marks)
  - (d) Typical bacterial growth curve (5 marks)
  - (e) Protein purification (5 marks)

- Q5.** (a) Prokaryotic and Eukaryotic cells are used in Biotechnology.  
Using a diagram describe the difference between the two cell types. (5 marks)
- (b) Give examples of Prokaryotic and Eukaryotic cells used in biotechnology. (5 marks)
- (c) List the advantages of using prokaryotes in Biotechnology. (5 marks)
- (d) Write a brief note on tissue culture. (5 marks)
- (e) Explain why yeast are used in Biotechnology. (5 marks)

- Q6.** (a) Describe the procedure you would use to isolate a protease enzyme for use in detergents. (10 marks)
- (b) What is protein engineering? (5 marks)
- (c) Describe how protein engineering improved the properties of recombinant insulin. (10 marks)