

Cork Institute of Technology
Bachelor of Science in Cell & Molecular Biology – Award

(NFQ Level 7)

Spring 2006

Biotechnology

(Time: 3 Hours)

Answer **five** questions in total.

Examiners: Dr. Tom Beresford
Ms. Sheila Kenny
Ms. Margaret Lane

Answer **two** questions from Section A,
and **three** questions from Section B.

Question 4 is compulsory.

Use separate answer books for each Section.

Section A
(Answer any two questions)

- Q1. Describe the three methods of heat transfer. (6 marks)
What is the function of a heat exchanger?
Write a note on the scraped surface heat exchanger. (7 marks)
Describe the principle of operation of any ***two*** types of dryer (7 marks)
- Q2. Define a starter culture and a direct vat set starter culture (5 marks)
Describe in detail commercial starter culture production (15 marks)
- Q3. Write notes on ***five*** of the following:
(a) Anaerobic growth and metabolism of *E.coli*
(b) Bacillus endospores
(c) Top and bottom yeasts
(d) Centrifugal separation
(e) Ultrafiltration
(f) Applications of irradiation (20 marks)

Section B

(Question 4 is compulsory – answer two other questions in this Section)

- Q4. (a) List the requirements for a Biotechnological Fermentation Process. (4 marks)
- (b) List and discuss the possible products of Biotechnological Fermentations.
Use examples to illustrate your answer. (14 marks)
- (c) Briefly outline the importance of waste disposal in biotechnological fermentation processes. (2 marks)
- Q5. Discuss the production of Amino Acids as an example of a Biotechnological process.
Mention in your answer:
- (a) The Industrial applications of amino acids
- (b) Microbiological production of Amino acids and the strains involved
- (c) The biochemical pathways involved
- (d) The production of Glutamate (20 marks)
- Q6. Write descriptive notes on each of the following:
- (a) Industrial uses of citric acid and other organic acids.
- (b) The biosynthesis of Citric acid.
- (c) The production processes used for citric acid. (20 marks)
- Q7. (a) Explain what is meant by a secondary metabolite. (2 marks)
- (b) List the applications of antibiotics. (2 marks)
- (c) List the objectives of antibiotic research. (2 marks)
- (d) Write an account of the production of β lactam antibiotics.
(Describe the structure, biochemical synthesis and production methods used) (14 marks)