

Cork Institute of Technology

Bachelor of Science in Food Science & Technology - Award

(NFQ Level 7)

Spring 2007

Bioprocessing

(Time: 3 Hours)

Answer **five** questions.

Answer **two** questions from Section A

two questions from Section B and **one**
other of your choice.

Please use separate answer books for each section.

All questions carry equal marks.

Examiners:

Dr. D. Gilroy

Ms E. McDonnell

Dr. Tom Beresford

Section A

- Q1. Define what you understand by the term Modified Atmosphere Packaging. Discuss the use of MAP with the following foods and describe in detail the reasons for your choice of gases:
- Red meat
 - White fish
 - Oily fish
 - Dairy produce
 - Poultry
- (20 marks)
- Q2. (a) Outline a method for the generation and distribution of purified water and WFI in a pharmaceutical facility. (8 marks)
- (b) Describe the characteristics of a useful industrial microorganism. (4 marks)
- (c) Briefly describe the processing steps used for production of black tea. (5 marks)
- (d) Describe three sources of Carbon used in industrial fermentations. (3 marks)
- Q3. With the aid of diagrams, briefly describe the principle of the following types of chromatography:
- Adsorption
 - Ion exchange
 - Gel filtration
 - Affinity
- (20 marks)

- Q4. Using examples of industrial products describe the five main groups of commercially important fermentations. (20 marks)

Section B

- Q5. Describe, with the aid of diagrams, the principle and applications of the three following unit operations:
- (a) Ultrafiltration
 - (b) Reverse osmosis
 - (c) Centrifugation (20 marks)

- Q6. Write concise notes on three of the following:
- (a) Soy Sauce
 - (b) Blue Cheese
 - (c) Fermented Sausage
 - (d) Smoked meat products
 - (e) Probiotic bacteria (20 marks)

OR

- (a) Explain the terms; D-value, Z-value and Lethal Rate used in thermal food processing. (10 marks)
 - (b) Write an account on the use of heat exchangers in food processing plants with emphasis on the advantages and disadvantages of different designs. (10 marks)
- Q7. Define the term starter culture. Outline the key differences between mixed and defined strain starter cultures and identify the criteria that are applied to select strains of *Lactococcus* for inclusion in **defined** strains used in Cheddar cheese manufacture. (20 marks)
- Q8. Outline the key steps involved in the production of a high quality spray-dried milk powder. (20 marks)