

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2011/2012

Module Title: Bioanalytical Science IV

Module Code: BIOT6002

School: Science & Informatics

Programme Title: BSc in Applied Biosciences – Year 2
 BSc (Hons) in Nutrition & Health Science – Year 2
 BSc (Hons) in Pharmaceutical Biotechnology – Year 2

Programme Code: SBIOS_7_Y2
 SPHBI_7_Y2
 SNHSC_7_Y2

External Examiner(s): Dr A. Nelson, Dr J. Bird, Dr A. Gallagher
Internal Examiner(s): Ms Anne Ward

Instructions: **Answer FOUR questions only. All questions carry equal marks**

Duration: 2 hours

Sitting: Autumn 2012

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.

- Q1. (a) Illustrate the principle of a heterogeneous reagent excess non-competitive immunoassay (15 marks)
- (b) Define each of the following:
- (i) Epitope (2 marks)
 - (ii) Paratope (2 marks)
 - (iii) Hapten (2 marks)
 - (iv) Monoclonal Antibody (2 marks)
 - (v) Polyclonal Antibody. (2 marks)
- Q2. (a) Briefly, describe and illustrate the structure of Immunoglobulin G (IgG). (7 marks)
- (b) Define what is meant by the primary and secondary immune response. (8 marks)
- (c) Describe the principle of immuno-affinity chromatography for the purification of antibodies. (10 marks)
- Q3. (a) Describe and illustrate the principle of TWO of the following immunoprecipitation techniques:
- (i) Immunodiffusion (Ouchterlony Assay) (8 marks)
 - (ii) Rocket Immunelectrophoresis (8 marks)
 - (iii) Single Radial Immunodiffusion (SRID) (8 marks)
- (b) Describe and illustrate the principle of gel filtration chromatography. (9 marks)

Q4. Describe and illustrate the principle of affinity chromatography under the following headings:

- (i) Affinity Matrix (7 marks)
- (ii) Adsorption and Elution of biomolecules (8 marks)
- (iii) Applications (10 marks)

Q5. (a) Describe and illustrate the principle of ion exchange chromatography (15 marks)

(b) Write a brief summary of the principle of isoelectric focusing (10 marks)

Q6. (a) Outline the main performance characteristics required to achieve a reliable assay in bioanalytical testing. (12 marks)

(b) Describe each of the following types of centrifugal separation techniques:

- (i) Differential Centrifugation (7 marks)
- (ii) Density Gradient Centrifugation (6 marks)