CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2010/2011

Module Title: Bioanalytical Science IV

Module Code: **BIOT6002**

School: Biological Science

Programme Title: Bachelor of Science in Applied Biosciences & Biotechnology – Year 2
Bachelor of Science (Honours) in Nutrition & Health Science – Year 2
Bachelor of Science (Honours) in Pharmaceutical Biotechnology – Year 2

Programme Code: **SBIOS_7_Y2**
SNHSC_8_Y2
SPHBI_8_Y2

External Examiner(s): **Dr Alison Gallagher, Dr Jerry Bird, Dr Anne Nelson**
Internal Examiner(s): **Ms Anne Ward**

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

Duration: 2 Hours

Sitting: Autumn 2011

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 ELISA (15 marks)

(b) Define each of the following:

(i) Antigenic determinant (5 marks)

(ii) Hapten (5 marks)

(25 Marks)

Q2. (a) Briefly, describe and illustrate the structure of Immunoglobulin G (IgG). (5 marks)

(b) Define what is meant by the primary & secondary immune response. (5 marks)

(c) List the five main classes of antibodies. (5 marks)

(d) Define each of the following:

(a) Monoclonal Antibody (5 marks)

(b) Polyclonal Antibody (5 marks)

(25 Marks)

Q3. (a) Describe and illustrate each of the following immuno-precipitation techniques:

(i) Immunodiffusion (Ouchterlony Assay) (8 marks)

(ii) Rocket Immunoelectrophoresis (7 marks)

(b) Outline the principle of Single Radial Immunodiffusion (SRID) (10 marks)

(25 Marks)

Q4. (a) Describe with the aid of a diagram the principle of separation in Immunoaffinity Chromatography (15 marks)

(b) Outline TWO important applications of Affinity Chromatography. (10 marks)

(25 Marks)

Q5. (a) Describe with the aid of a diagram, the principle of Gel Filtration Chromatography (10 marks)

(b) Define each of the following:

(i) Void Volume (Vo) (5 marks)

(ii) Elution Volume (Ve) (5 marks)

(c) How would you calculate the partition coefficient in a gel filtration experiment? (5 marks)

(25 Marks)

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

(b) Describe the principle of each of the following electrophoretic techniques:

(i) Polyacrylamide Gel Electrophoresis (6 marks)

(ii) Isoelectric Focusing (7 marks)

(25 Marks)