CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2015/2016

Module Title: Immunoanalysis

Module Code: **BIOT6002**

School: Science

Programme Title: **Bsc in Applied Biosciences & Biotechnology**
BSc (Honours) in Pharmaceutical Biotechnology
BSc (Honours) in Nutrition & Health Science
BSc (Honours)in Herbal Science

Programme Code: **SBIOS_7_Y2**
SPHBI_8_Y2
SNHSC_8_Y2
SHERB_8_Y2

External Examiner(s): **Dr Brendan O'Donnell**
Internal Examiner(s): **Anne Ward**

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

Duration: 2hr

Sitting: Semester 1 2015

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) Describe the principle of each of the following immunoassays:

(i) Non-competitive sandwich enzyme immunoassay (10 marks)

(ii) Competitive enzyme immunoassay (10 marks)

Use diagrams to illustrate your answer for each assay.

(b) Write a short note on enzyme labels suitable for use in these assays. (5 marks)

Q2. Describe and illustrate the principle of each of the following immunoprecipitation techniques:

(i) Single Radial Immunodiffusion (SRID) (10 marks)

(ii) Rocket Immunoelectrophoresis (8 marks)

(iii) Ouchterlony Immunodifffusion (7 marks)

Include diagrams of all methods described above

Q3. (a) Define each of the following:

(i) Monoclonal Antibody (4 marks)

(ii) Polyclonal Antibody (4 marks)

(b) Outline the main stages in the isolation of a polyclonal antibody from a host animal. (7 marks)

(c) Briefly, describe the principle of immuno-affinity chromatography and its application in polyclonal antibody purification.

Draw a diagram illustrating the principle of this technique (10 marks)

Q4. (a) What are the characteristics of a heterogeneous immunoassay? (5 marks)

(b) How would you optimise this type of immunoassay? (10 marks)

(c) Outline the key validation parameters typically used in an immunoassay validation protocol. (10 marks)

Q5. (a) Define each of the following:

(i) Internal Quality Control (IQC) (4 marks)

(ii) External Quality Assessment (EQA) (4 marks)

(b) Control charts are an essential element of an IQC laboratory system. Discuss their use under the following headings:

(i) Statistics used (3 marks)

(ii) Control limits set (2 marks)

(iii) Non-random patterns (2 marks)

(c) Outline the main sources of error associated with analytical methods (10 marks)

Q6. (a) Define each of the following:

(i) Epitope (3 marks)

(ii) Paratope (3 marks)

(iii) Hapten (3 marks)

(iv) Immunogen (3 marks)

(v) International Standard (3 marks)

(vi) Laboratory Standard (3 marks)

(b) What is the significance of the primary and secondary immune responses in the isolation of IgG from serum. (3 marks)

(c) Draw a graph illustrating the level of IgG produced over time for both responses (4 marks)