

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2016/2017

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 2016

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) Define what is meant by a heterogeneous immunoassay (5 marks)
- (b) Illustrate the principle of a heterogeneous reagent excess non-competitive immunoassay (10 marks)
- (c) Outline the main optimisation parameters to be considered for immunoassay development. (10 marks)

- Q2. . (a) Explain the principle of each of the following immuno-precipitation methods:
- (i) Single Radial Immunodiffusion (5 marks)
 - (ii) Rocket immunoelectrophoresis (5 marks)
 - (iii) Ouchterlony Assay (5 marks)
 - (iv) Immunoelectrophoresis (5 marks)
 - (v) Immunoturbidimetric assay (5 marks)
- Include diagrams to illustrate all methods

- Q3. . (a) Define each of the following:
- (i) Epitope (2 marks)
 - (ii) Paratope (2 marks)
 - (iii) Hapten (2 marks)
 - (iv) Immunogen (2 marks)
- (b) Draw a fully labelled diagram illustrating the structure of IgG. (8 marks)
- (c) Define each of the following:
- (i) Primary immune response (2 marks)
 - (ii) Secondary immune response (2 marks)
- Include a graph illustrating the antibody response during each of these immune responses. (5 marks)

Q4. (a) Write short notes on each of the following classes of labels used in immunoassay systems:

(i) Enzyme labels (5 marks)

(ii) Fluorescent labels (5 marks)

(i) Particle labels (5 marks)

(b) Write a brief overview of immunoassay validation. In your answer outline the key parameters required to perform validation experiments for a newly developed immunoassay system. (10 marks)

Q5. (a) Discuss the use of the control chart as a method of Internal Quality Control under the following headings:

(i) Definition (5 marks)

(ii) Statistics used & control limits (5 marks)

(iii) Non-random patterns (5 marks)

(b) In Good Laboratory Practice sources of error must be identified & eliminated to achieve a reliable assay. Outline the main sources of error associated with analytical methods. (10 marks)

Q6 (a) Define each of the following:

(i) Polyclonal antibodies (5 marks)

(ii) Monoclonal antibodies (5 marks)

(b) Outline the key stages in polyclonal antibody production (5 marks)

(c) Describe using a diagram the principle of Immunoaffinity chromatography for the purification of polyclonal antibody (10 marks)