

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Semester 1 Examinations 2012/2013

Module Title: Immunoanalysis

Module Code: BIOT6002

School: Science & Informatics

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

Programme Code: SBIOS_7_Y2
SPHBI_8_Y2
SNHSC_8_Y2
SHERB_8_Y2

External Examiner(s): Dr Gillian Gardiner

Internal Examiner(s): Ms Anne Ward

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

Duration: 2 Hours

Sitting: Semester 1 2012/13

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 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)

Q2. Illustrate the principle of each of the following immunoassays:

- (i) Non-competitive enzyme immunoassay (10 marks)
- (ii) Competitive enzyme immunoassay (10 marks)

In your answer, show a typical calibration plot which would be generated for each type of assay

(5 marks)

Q3. 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) Immunospectrophotometric assay (5 marks)

Include diagrams to illustrate all methods

Q4. (a) Outline the main optimisation parameters to be considered for immunoassay development
(10 marks)

(b) 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)
- (vi) Particle labels (5 marks)

Q5. (a) Describe the four main performance characteristics required to achieve a reliable assay in bioanalytical testing. (12 marks)

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

- (i) Definition (3 marks)
- (ii) Statistics used & control limits (5 marks)
- (iii) Non-random patterns (5 marks)

Q6. (a) 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. (15 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)