

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2014-2015

Module Title: Immunoanalysis

Module Code: BIOT6002

School: Science

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): Anne Ward

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

Duration: 2hr

Sitting: Autumn 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) List the key parameters required to validate an immunoassay (5 marks)
- (b) Define what is meant by precision (3 marks)
- (c) How would you calculate the precision of an assay (3 marks)
- (d) From the precision data generated from an immunoassay validation studied below, draw a precision profile plot (10 marks)
- (e) Discuss briefly the conclusions that can be drawn from this data. (4 marks)

<i>Concentration (mg/ml)</i>	<i>Mean Absorbance 280nm</i>	<i>Standard Deviation</i>
100	0.816	0.017
50	0.480	0.010
25	0.299	0.007
12.5	0.197	0.011
6.25	0.079	0.009
3.13	0.048	0.007

- Q2. (a) List the five classes of immunoglobulin (5 marks)
- (b) Illustrate and describe briefly the structure of IgG (10 marks)
- (c) Define each of the following:
- (i) Monoclonal antibody
 - (ii) Polyclonal antibody
 - (iii) Primary immune response
 - (iv) Secondary immune response (10 marks)

- Q3. (a) Define what is meant by a heterogeneous immunoassay (5 marks)
- (b) Illustrate the principle of a heterogeneous reagent excess non-competitive immunoassay (12 marks)

(c) Outline the main optimisation parameters to be considered for immunoassay development (8 marks)

Q4. (a) Describe and illustrate the principle of TWO of the following techniques:

- (i) Immunodiffusion (Ouchterlony Assay) (9 marks)
- (ii) Rocket Immunelectrophoresis (9 marks)
- (iii) Single Radial Immunodiffusion (9 marks)

(b) Write a short overview of enzymes as labels in immunoassay systems (7 marks)

Q5. (a) Write an overview of Internal Quality Control (IQC) in immunoassays under the following headings:

- (i) Basic IQC statistics (8 marks)
- (ii) Quality Control Charts (8 marks)

(b) Outline the main sources of error associated with poor laboratory practice (9 marks)

Q6. (a) Describe the principle of immunoaffinity chromatography for the purification of antibodies. Illustrate your answer with a diagram. (13 marks)

(b) Define each of the following:

- (i) Epitope (3 marks)
- (ii) Paratope (3 marks)
- (iii) Hapten (3 marks)
- (iv) Immunogen (3 marks)