

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Autumn Examinations 2009/2010

Module Title: Bioanalytical Science IV

Module Code:BIOT6002

School: Science

Programme Title:

Programme Code: SBIOS_7_Y2

External Examiner(s): Prof. Gary Walsh

Internal Examiner(s): Ms. Anne Ward

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

Duration: 2hr

Sitting: Autumn 2010

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)
- 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)
- Q3. (a) Describe and illustrate each of the following immuno-precipitation techniques:
- (i) Immunodiffusion (Ouchterlony Assay) (8 marks)
 - (ii) Rocket Immunelectrophoresis (7 marks)
- (b) Outline the principle of Single Radial Immunodiffusion (SRID) (10 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)

- 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 (V_o) (5 marks)
 - (ii) Elution Volume (V_e) (5 marks)
- (c) How would you calculate the partition coefficient in a gel filtration experiment. (5 marks)
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- 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)