

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Winter Examinations 2014

Module Title: Cellular Biotechnology

Module Code: BIOT6006

School: Science & Informatics

Programme Title: Bachelor of Science (Hons) in Pharmaceutical Biotechnology
Bachelor of Science (Hons) in Nutrition & Health Science

Programme Code: SPHBI_8_Y2
SNHSC_8_Y2

External Examiner(s): Dr. Cormac Gahan
Internal Examiner(s): Dr. Rosemary Rea

Instructions: Answer any 3 questions below. All questions carry equal marks.

Duration: Time = 2 hours

Sitting: Winter 2014

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 following mechanisms of nutrient uptake using diagrams where appropriate
- Diffusion (**8 marks**)
 - Osmosis (**12 marks**)
 - Facilitated diffusion (**9 marks**)
 - Active transport (**6 marks**)
- (B) Present a table comparing the following characteristics for diffusion, facilitated diffusion and active transport (**15 marks**)
- Requirement for carrier proteins
 - Transport speed
 - Concentration gradient
 - Transport specificity
 - Metabolic energy requirements
- Q2.** Discuss mammalian cell culture growth in vitro using the following headings:
- Components of mammalian cell culture medium and function of each (**30 marks**)
 - Media sterilisation (**20 marks**)
- Q3.** (A) List three cell culture expression systems and the advantages and disadvantages of each (**20 marks**).
- (B) Describe the procedure for monitoring mammalian cell growth using a Neubauer haemocytometer (**15 marks**)
- (C) Define cryopreservation and describe the procedure for mammalian cells (**15 marks**)
- Q4.** Discuss the following:
- Sub-culturing of anchorage dependent and anchorage independent (suspension) mammalian cells (**10 marks**)
 - The role of restriction enzymes in creating recombinant DNA (**15 marks**)
 - Reducing the risk of contamination through the use of cleanrooms (**25 marks**)