

**CORK INSTITUTE OF TECHNOLOGY  
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Autumn Examination 2014**

**Module Title:    Microbes, Enzymes & Energy (CA)**

**Module Code:**                    **BIOM 6001**

**School:**                            Science

**Programme Title:**            BSc in Applied Biosciences& Biotechnology  
BSc Hons Pharmaceutical Biotechnology  
BSc Hons in Nutrition and Health science  
BSc Analytical & Pharmaceutical Chemistry  
BSc Hons in Analytical Chemistry

**Programme Code:**            **SCHQA\_8\_Y1**  
**SCHEM\_7\_Y1**  
**SBIOS\_7\_Y1**  
**SPHBI\_8\_Y1**  
**SHNSC\_8\_Y1**

**External Examiner(s):**       **Dr Tom O'Connor**

**Internal Examiner(s):**       **Ms Margaret Lane**  
**Dr Fiona O Halloran**  
**Ms. Richenda Kiernan**

**Instructions:**                    **Answer 4 Questions.**  
**Question 1 is compulsory.**

**Duration:**                    2 Hours

**Sitting:**                        Autumn 2014

**Requirements for this examination:** Graph paper

**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 is Compulsory**

**Q1. Answer all parts**

(total 25 marks)

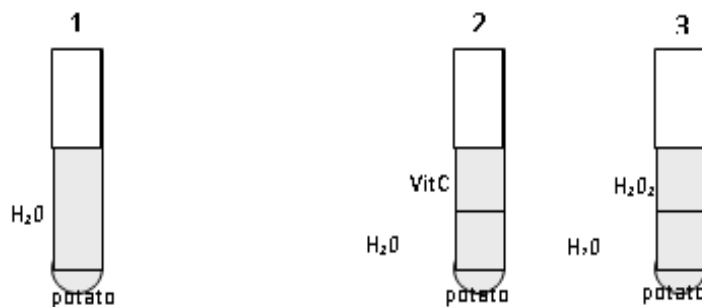
(i) Describe the experimental method you would use to determine the effect of temperature on the activity of the enzyme catalase. The source of the enzyme is potato tissue

(10 Marks)

(ii) Draw a graph to demonstrate the effect of temperature on an enzyme whose optimum activity is at  $37^{\circ}\text{C}$

(5 Marks)

(iii) The following test tubes were set up to determine the effect of  $\text{H}_2\text{O}$ , Vitamin C and  $\text{H}_2\text{O}_2$  on the enzyme Diphenol oxidase present in potato tissue. Explain the results you would expect to obtain in this experiment.



(6 marks)

(iv) State two methods that can be used in the laboratory to detect the presence of microorganisms.

(4 marks)

## Q2.

(a) In relation to enzyme activity briefly explain each of the following terms

- (i) Cofactors
- (ii) Coenzymes
- (iii) Competitive inhibition
- (iv) Non competitive inhibition
- (v) Irreversible inhibitors

(15 marks/ 3marks each)

(b) List 4 methods by which cells can control enzyme activity and briefly describe 2 of these methods

(10 marks)

## Q3

(a) Using a simple diagram explain the process of substrate level phosphorylation (SLP).

Give a reaction in glycolysis where SLP occurs

(10 Marks)

(b) Give a brief description of the biochemical reactions involved in a typical fermentation that you have studied.

(10 Marks)

(c) Write a summary reaction for Glycolysis

(5 Marks)

## Q4

(a) Write a suitable definition for sterilisation

(5 Marks)

(b) Describe the 'moist heat sterilisation' process

(10 Marks)

(c) List the most suitable sterilisation process for the following: **heat-sensitive liquid, liquid bacterial culture, inoculating loop, agar plate with mould culture, antibiotic preparation.**

(10 Marks)

**Q5**

- (a) Name four microorganism that commonly cause food borne illness (8 Marks)
- (b) Describe four ways to reduce the risk of food borne illnesses? (10 Marks)
- (c) In relation to foodborne illnesses describe what is meant by the term ‘incubation period.’ (4 Marks)
- (d) Describe a laboratory technique that you would use to isolate a pathogen from a food borne pathogen (3 marks)

**Q6.**

- (a) Draw a simple summary diagram of the citric acid cycle (10 Marks)
- (b) Describe what each turn of the cycle generates and indicate in the diagram the stages where these products are formed. (10 Marks)
- (c) Write a chemical reaction that shows how pyruvate is converted into acetyl CoA (5 Marks)