

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Autumn Examination 2016

Microbes, Enzymes & Energy: Continuous Assessment (Semester 2)

Module Code: BIOM 6001

School: Science

Programme Title: BSc in Applied Biosciences& Biotechnology
BSc Hons Biological Sciences (Common Entry)
BSc Hons Pharmaceutical Biotechnology
BSc Hons in Nutrition and Health science
BSc Hons in Herbal Science
Higher Certificat in Science in GMP and Technology

Programme Code: CR_SBIOS_7_Y1
CR_SCEBS_8_Y1
CR_SPHBI_8_Y1
CR_SHNSC_8_Y1
CR_SHERB_8_Y1
CR_SGMPR_6_Y1

External Examiner (s): Dr Brendan O Donnell

Internal Examiner (s): Ms Margaret Lane
Dr Fiona O Halloran
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Dr AnnMarie Burns

Instructions: Answer 4 Questions. Question 1 is compulsory.

Duration: 2 hours

Sitting: Autumn 2016

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. Compulsory question. Answer all parts

- (a) Describe the experimental method you would use to determine the effect of pH on the activity of the enzyme catalase. The source of the enzyme is potato tissue. **(10 marks)**
- (b) In relation to the above experiment explain why the potato is macerated **(3 marks)**
- (c) What reactions do the following enzymes catalyse:
Catalase, Rennin, Urease **(3 marks)**
- (d) What two methods can be used to detect microorganisms? **(2 marks)**
- (e) What is a decimal dilution series? **(2 marks)**
- (f) What information about a bacterial cell is obtained from a simple stain? **(2 marks)**
- (g) Explain why aseptic technique is important in a microbiology laboratory. **(3 marks)**

Q2.

- (a) In relation to enzymes and their function explain the following terms:
 - (i) Active site
 - (ii) Cofactor
 - (iii) Activation energy
 - (iv) Induced fit model **(12 marks)**
- (b) List four reaction principles that apply to all catalysts **(8 marks)**
- (c) Using a graph explain how substrate concentration affects the activity of an enzyme **(5 marks)**

Q3.

- (a) Explain the difference between a specific and a non-specific enzyme inhibitor. **(5 marks)**
- (b) Using diagrams describe the mode of action of a competitive enzyme inhibitor and a non-competitive enzyme inhibitor. **(15 marks)**
- (c) What type of inhibitor forms strong covalent bonds with an enzyme? Give two examples of this type of inhibitor. **(5 marks)**

Q4.

- (a) What is the difference between a catabolic reaction and an anabolic reaction? Give an example of each reaction. **(5 marks)**
- (b) Name the pathways involved in aerobic respiration. **(3 marks)**
- (c) Explain how ATP is formed in the electron transport chain. **(7 marks)**
- (d) Describe in detail, with the aid of a diagram, the chemical reactions involved in lactic acid fermentation. **(10 marks)**

Q5.

- (a) State 5 relevant points to best describe yeasts. **(5 marks)**
- (b) Use a diagram to show the biochemical pathway used by yeasts to produce alcohol. **(4 marks)**
- (c) Name two yeast infections. **(2 marks)**
- (d) Draw a typical bacterial cell showing all the possible structures found in bacterial cells. **(8 marks)**
- (e) State two relevant points about the following structures found in some bacterial cells:
- (i) Capsule
 - (ii) Endospore
 - (iii) Plasmid **(6 marks)**

Q6.

- (a) Explain the difference between two different types of food borne illnesses. **(4 marks)**
- (b) Name 4 bacteria that cause food borne illnesses. **(4 marks)**
- (c) State two ways that food can become contaminated with pathogenic organisms. **(4 marks)**
- (d) Describe the steps taken to investigate and identify the cause of a food borne illness involving a number of people. **(8 marks)**
- (e) Suggest a suitable treatment for those affected by a food borne pathogen. **(5 marks)**