

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2008/09

Biomolecules and Cells 1 : CA

Module Code: BIOL6007

School: Science

Programme Title: B.Sc. in Analytical & Pharmaceutical Chemistry – Year 1
B.Sc. in Applied Biosciences

Programme Code: SCHQA_8_Y1
SCHEM_7_Y1
SBIOS_7_Y1

External Examiner(s): Dr Don Faller

Internal Examiner(s): Ms Margaret Lane
Ms Richenda Kiernan

Instructions: Answer 4 Questions. Question 1 is compulsory.
All Questions carry equal marks.

Duration: 2 hours

Sitting: Autumn 2009

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. Answer all parts

- (a) How is the magnifying power of the microscope calculated? (2 marks)
- (b) Explain how would test for the presence of protein in the laboratory. (2marks)
- (c) Explain how you test for the presence of a reducing sugar in the laboratory. (2 marks)
- (d) A length of dialysis tubing containing 5 mls of glucose and 20mls of starch solution is suspended in a large beaker containing water and iodine.
What visible results would you see after an hour? Why? (3 marks)
- (e) Given that the isoelectric point of a particular protein is at pH 5.0 plot a rough graph of pH versus turbidity to illustrate this. (2 marks)
- (f) Explain why oil is used with the oil immersion objective of a microscope. (2 marks)
- (g) What will result if a dialysis bag containing 60% sucrose solution is placed in a beaker of distilled water? Explain the reason for your answer. (2 marks)
- (h) State the purpose of the following parts of the binocular light microscope; (i) the ocular lenses (ii) the stage (iii) the 4x objective lens and (iv) the condenser. (4 marks)
- (i) On a rough graph of protein conc(%) versus absorbance at 540nm illustrate how you would estimate the protein concentration of an unknown solution whose absorbance at 540nm you have measured. (3 marks)
- (j) Express 0.35millilitres (ml) in microlitres (μ l) and indicate which of the following micropipettes would best deliver this volume: P5000, P1000, P100. (3 marks)

- Q2.** (a) Draw a clearly labelled diagram of a eukaryotic cell. (5 marks)
- (b) Write brief notes on the structure and functions of the following organelles:
- (i) Cell Membrane
 - (ii) Mitochondria
 - (iii) Nucleus
 - (iv) Ribosomes (20 marks)
- Q3.** (a) List and discuss the functions of proteins. (10 marks)
- (b) Describe the four levels of protein structure. (15 marks)
- Q4.** (a) Discuss the structure and functions of biological membranes. (15 marks)
- (b) Outline the mechanisms by which molecules can move across cell membranes. (10 marks)
- Q5.** (a) Outline the differences between DNA and RNA. (6 marks)
- (b) Distinguish between saturated and unsaturated fats and describe the structure of a triglyceride molecule. (9 marks)
- (c) With the aid of a clearly labelled diagram, describe the Cell cycle. (10 marks)
- Q6** (a) Using a **diagram** explain the following terms and give an example where appropriate:
- (i) An amino acid
 - (ii) A pentose sugar
 - (iii) A nucleotide
 - (iv) ATP
 - (v) Steroid (15 marks)
- (b) Write an account of Carbohydrates. Include in your answer Monosaccharides, Disaccharides, and Poly saccharides.. (10 marks)