

Cork Institute of Technology

Bachelor of Science in Applied BioSciences – Stage 1

(NFQ Level 7)

Summer 2007

Biology

(Time: 3 Hours)

Answer Five questions in total.
Question 1 in section A is compulsory.
Answer TWO questions from section B and TWO
Questions from section C.
Use separate answer Books for each section.

Examiners: Prof. R. J. Fitzgerald
Ms. M. Lane
Ms. E. Flannery
Dr. J. O'Mahony

Section A

Q1. Compulsory Answer all parts.

- (a) Give a rough diagram of a binocular microscope, labelling **four** essential features.
- (b) Explain why oil is used with the oil immersion objective of a microscope.
- (c) In the case of the Biuret test, say what controls should be used and why.
- (d) 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.
- (e) On a rough standard graph of protein concentration (%) *versus* absorbance at 540 nm, illustrate how you would estimate the protein concentration of an unknown solution whose A_{540} you have measured.
- (f) What will result if a dialysis bag containing a 60% sucrose solution is placed in a beaker of distilled water? Explain the reason for your answer.
- (g) (a) Give a rough graph to illustrate the effect of temperature on the enzyme amylase. (b) Explain the term “critical point” and indicate critical point(s) on your graph.
- (h) Give the reaction for the enzyme catalase.
- (i) Give **two** labelled diagrams illustrating the difference between (a) a suspension of yeast and *E.coli* and (b) a sample of hay infusion.
- (j) Give **two** labelled diagrams of *E.coli* as it would appear under 1000X magnification after preparation by (a) a simple stain with crystal violet and (b) a negative stain with nigrosin.

Section B – Answer two questions

- Q2. (a) List the biologically important Lipids. (4 marks)
(b) Write a detailed account of the structures and functions of lipids. (16marks)
- Q3. (a) Describe using a diagram the structure of a eukaryotic cell. (4 marks)
(b) Write an account of four of the following ;
Ribosomes
Endoplasmic reticulum
Mitochondria
Cytoskeleton
Golgi Apparatus (16 marks)
- Q4. (a) Describe the stages of the cell cycle and explain how it is controlled. (14 marks)
(b) Write a brief note on Apoptosis (6 marks)

Section C – Answer two questions

- Q5. Using the following headings, write a detailed account of **enzymes**:
(a) Structure (10 marks)
(b) Applications (10 marks)
- Q6. ATP is the energy currency of the cell. Describe in detail its importance, **and** outline how it may be generated by the cell. (20 marks)
- Q7. Discuss the role of **each** of the following in relation to disease.
(i) Bacterial infections (10 marks)
(ii) Diet (10 marks)