

**CORK INSTITUTE OF TECHNOLOGY  
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

**Autumn Examination 2012/2013**

**Module Title: Laboratory Practice (CA module)**

**Module Code:** BIOL6003

**School:** Science and Informatics

**Programme Code:** SNHSC\_8\_Y1  
SHERB\_8\_Y1  
SPHB1\_8\_Y1  
SBIOS\_7\_Y1

**Internal Examiners:** Dr. Máire Begley  
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**External Examiners:** Dr. Gillian Gardiner

**Instructions:** Answer **Question 1** and any **three** other questions.  
All questions carry equal marks (25 marks).

**Duration:** 2 hours

**Sitting:** Autumn 2013

**Requirements for this examination:** Calculator

**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. Show **all** of your calculations.

- (a) List two safety precautions that should be used when working in the Biology Lab. (2 marks)
- (b) Express 150 microlitres in mls. Which of the following pipettes should be used to deliver this volume: P100, P1000 or P5000? (3 marks)
- (c) What is a standard solution? Describe the glassware used to prepare the solution. (3 marks)
- (d) List 3 methods used to measure the pH of a solution. (2 marks)
- (e) Show your calculations for the following: 1% (w/v), 0.05% (v/v) and 0.15% (w/w). (5 marks)
- (f) Comment on the precision of the following set of data (units are in grams). 5.0, 4.99, 5.01, 5.0, 4.99, 5.0, 5.0, 5.02, 5.03, 5.01. (5 marks)
- (g) List 3 buffers commonly used in biological applications. (3 marks)
- (h) Give 3 types of fire extinguishers. (2 marks)

## Q2

- (a) Write a comprehensive note on buffers and their applications. (10 marks)
- (b) Calculate the weight of Sodium Acetate (82.03g/mol) and Acetic Acid (60.05g/mol) required to prepare a 0.25M Acetate buffer pH 4.60, pK 4.76. (10 marks)
- (c) Describe how you would prepare 250mls of a 0.2M HCl (36.5g/mol) starting with a concentrated solution of HCl (37%) Specific Gravity. (5 marks)

### Q3

(a) The Table below shows the absorbance values (at  $\lambda_{\text{max}}$ ) obtained for six tubes containing different concentrations of bromophenol blue (BPB).

Tube number	Concentration of BPB in the Tube (mg/L)	Absorbance
1	1.50	0.117
2	3.00	0.265
3	4.50	0.359
4	7.50	0.684
5	11.25	1.011
6	15.00	1.406

Use the data provided in the table to plot a graph of BPB concentration vs absorbance.  
(10 marks)

(b) Explain how the graph proves the Beer-Lambert Law. (5 marks)

(c) Explain what a “blank” solution is and state its purpose in spectrophotometry.  
(5 marks)

(d) Explain what stray light is and explain why is it important to consider stray light in spectrophotometry experiments.  
(5 marks)

**Q4** Write short notes on five of the following:

- (a) Analytical balances
- (b) Autoclave
- (c) Centrifuge
- (d) pH meter
- (e) Spectrophotometer
- (f) Thin layer chromatography

(5 x 5 marks)

## **Q5**

- (a) Explain what an MSDS is and name two pieces of information that an MSDS should contain. **(5 marks)**
- (b) Describe the correct procedure for dealing with the accidental spill of biohazardous material. **(5 marks)**
- (c) Give an example of a chemical indicator and a biological indicator that can be used for autoclave quality assurance and explain how both work. **(6 marks)**
- (d) List two pieces of information that a safety statement should contain. **(3 marks)**
- (e) List the three main routes of entry of chemicals into the body. **(3 marks)**
- (f) Explain the First Aid procedures that should be followed when treating a person with a chemical splash in their eye. **(3 marks)**