

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Autumn Examinations 2007/08

Module Title: Bioanalytical Science 1

Module Code: BIOL 6003

School: Science

Programme Title: Bachelor of Science in Applied Biosciences – Year 1

Programme Code: SBIOS_7_Y1

External Examiner(s): Prof. G. Walsh
Internal Examiner(s): Ms. R. Kiernan, Dr. M. Sheahan

Instructions: Answer **TWO** questions from each section
Question 1 is **compulsory**
Use **Separate Answer Books** for each Section

Duration: 2 hours

Sitting: Autumn 2008

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.

Section A

Q1. Answer **all** the following:

- (a) List two safety precautions when working with chemicals in the laboratory. (2 marks)
- (b) Convert 0.02ml to microlitres and state which of the following pipettes would be used to deliver this volume: P100, P1000 or P5000? (3 marks)
- (c) What is meant by the pH of a solution? List three ways by which solution pH may be measured and comment on the accuracy of each method. (5 marks)
- (d) Give the quantities of glucose and water required to prepare a 2.5% (w/v) glucose solution. Describe the correct procedure for the preparation of this solution. (6 marks)
- (e) Draw a rough graph to illustrate what is meant by the lambda max of a solution. Label the axes appropriately. (4 marks)
- (f) What is meant by the R_f value as used in thin layer chromatography? List two applications of thin layer chromatography. (5 marks)

Q2.

- (a) Briefly outline the role of the first aid personnel. (5 marks)
- (b) Outline the first aid treatment that would be administered in the following situations:
 - (i) Corrosive chemical splash in the eye. (5 marks)
 - (ii) A cut from broken glass in the laboratory. (5 marks)
 - (iii) A person suffering from shock. (5 marks)
 - (iv) Minor external bleeding. (5 marks)

Q3.

- (a) Write a comprehensive note on the different classes of biological safety cabinets. (15 marks)
- (b) Describe the necessary clean-up procedure in the event of a spillage in the laminar flow biological safety cabinet. (10 marks)

Section B

Q4. Discuss radiation hazards in the laboratory under the following headings:

- (a) Possible sources in chemistry, physics or biology laboratories. (2 marks)
- (b) Ionizing and non-ionizing radiation; examples of each type and the relative hazards of each type. (8 marks)
- (c) Location of the radioactive source (inside or outside the body) and the type of tissue exposed. (5 marks)
- (d) Appropriate handling and protective measures to minimize and/or eliminate exposure. (10 marks)

Q5. (a) Describe the appropriate actions to be taken in each of the following cases:

- (i) Safe handling and treatment of spillages in a chemistry laboratory.
 - (ii) Safe and appropriate disposal procedures for chemical reagents. (10 marks)
- (b) Compile a list of instructions which would typically be given to laboratory personnel with regard to their behavior and conduct in a laboratory environment. (6 marks)
- (c) Distinguish between four different categories of laboratory safety signs in terms of their shape, color schemes and the information they convey. Support your answer with examples. (9 marks)

Q6. Write notes on **all** of the following:

- (a) The Health and Safety Authority (8 marks)
- (b) The Safety, Health and Welfare at work Act (12 marks)
- (c) Environmental Protection Agency (5 marks)

Periodic Table

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(251)	99 Es (252)	100 Fm (257)	101 Mn (258)	102 Ni (259)	103 Lr (262)	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (264)	108 Hs (265)	109 Mt (268)	110 (269)	111 (272)	112 (277)	113 (284)	114 (285)	115 (286)	116 (289)	117 (290)	118 (293)	119 (294)	120 (295)	121 (296)	122 (297)	123 (298)	124 (299)	125 (301)	126 (304)	127 (309)	128 (310)	129 (315)	130 (316)	131 (317)	132 (318)	133 (319)	134 (320)	135 (321)	136 (323)	137 (324)	138 (325)	139 (326)	140 (327)	141 (328)	142 (329)	143 (331)	144 (332)	145 (333)	146 (334)	147 (336)	148 (337)	149 (338)	150 (339)	151 (340)	152 (341)	153 (342)	154 (343)	155 (344)	156 (345)	157 (346)	158 (347)	159 (348)	160 (349)	161 (350)	162 (351)	163 (352)	164 (353)	165 (354)	166 (355)	167 (356)	168 (357)	169 (358)	170 (359)	171 (360)	172 (361)	173 (362)	174 (363)	175 (364)	176 (365)	177 (366)	178 (367)	179 (368)	180 (369)	181 (370)	182 (371)	183 (372)	184 (373)	185 (374)	186 (375)	187 (376)	188 (377)	189 (378)	190 (379)	191 (380)	192 (381)	193 (382)	194 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