BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF CHEMISTRY

MAIN EXAMINATION PAPER

PROGRAMME:	Bsc (Hons) CHEMICAL TECHNOLOGY
COURSE:	LABORATORY TECHNIQUES
COURSE CODE:	CH 112
DURATION:	2 HOURS

MAR 2024

INSTRUCTIONS TO CANDIDATES

1. Answer **Question 1** and **Two** questions in **Section A** and Two from **Section B.**
2. Each question should start on a fresh page and marks will be allocated as indicated.

Question 1

(a) Discuss the precautions that should be taken during filtration. **[4 marks]**

(b) Distinguish between the application of a water and oil baths in a laboratory **[4 marks]**

(c) Material Safety Data Sheets (MSDSs), labels, or other chemical reference materials provide proper storage information. Describe any 6 types of information that can be found on MSDS sheets. **[12 marks]**

Section A: Answer TWO questions from this section

Question 2

(a) Define first aid. **[2 marks]**

(b) The following acronym is used for the treatment of shock "P.E.L.C.R.N." (Pronounced Pell-Crin) Explain what each letter stands for; **[6 marks]**

(c) Outline how you can attend and treat a first degree burn. **[4 marks]**

(d) List any four laboratory fire prevention protocols or tips. **[4 marks]**

(e) List two rule that must be observed when weighing. **[2 marks]**

(f) Name two most common funnels used in vacuum filtration. **[2 marks]**

Question 3

(a) Calculate the answer for the following and give the answer with correct significant figures.

(i) 3340 x 1.2 = **[1 mark]**

(ii) 2.88359/ 3 = **[1 mark]**

(iii) 8.888 x 3.29853 = **[1 mark]**

(vi) 1.25 + 3.2 = **[1 mark]**

(v) 145 - 0.222 = **[1 mark]**

(b) Before you do a titration there is need to standardize your solutions.

(i) Define a primary standard **[2 marks]**

(ii) List three examples of primary standards. **[3 marks]**

(iii) Highlight five attributes of primary standards. **[5 marks]**

(e) Explain what you understand by reaction work up after a synthetic process. Include manipulations that are involved. **[6 marks]**

Question 4

(a) Explain what you understand by the phrase "weigh *out approximately 0.5 g accurately.*

[2 marks]

(b) Explain briefly how you can measure the melting point of a solid organic compound using the Thiele tube. **[8 marks]**

(c) Briefly discuss methods that can be used for the extraction of essential oils from plants.

[8 marks]

(d) Particular types of samples may create emulsions when liquid-liquid extraction into a solvent. Briefly explain ways of breaking the emulsion. **[2 marks]**

Section B: Answer TWO questions from this section

Question 5

(a) Explain how you can make 10 liters of 50 mM NaCl, 10 mM Tris-HCl (Mr = 157.56 g/mol) and 10 mM NaOH complex solution. **[10 marks]**

(b) Briefly explain how you can deal with the following situations.

(i) decontaminate an area spilled with mercury. **[5 marks]**

(ii) chemical spill on body **[5 marks]**

Question 6

Discuss recommendations to minimize physical hazards in the lab and sample preparation room. **[20 marks]**

Question 7

Explain the principle behind paper and column chromatography and explain how they can be used to separate and identify a mixture of coloured dyes. **[20 marks]**

END OF EXAMINATION