



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

Introduction to Chemical and Environmental Process Engineering

TCE 6101

Final Examination Paper

January 2024

This examination paper consists of **two** pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements:

INSTRUCTIONS

1. Answer **ALL** questions in **SECTION A**
2. Answer **ANY TWO** questions in **SECTION B**
3. Each question carries 25 marks

MARK ALLOCATION

QUESTION	MARKS
A1	25
A2	25
B1	25
B2	25
B3	25
TOTAL ATTAINABLE MARK	100

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SECTION A: Answer ALL questions in this section.

QUESTION A1

Organizations can implement either home grown or external SHEQ systems. Which one of these systems will you recommend your organization to implement, explain your answer **[25]**

QUESTION A2

Green engineering is based on 12 principles that inherently focus on design of products with a holistic and modern approach. Discuss these principles in detail and its practical application examples. Use the aid of diagrams and equations where applicable. **[25]**

SECTION B: Answer any TWO (2) questions in this section.

QUESTION B1

Electronic Waste (E-Waste) is proving to be an environmental menace in the global world. Describe their impact and sustainable measures that can be applied to mitigate their effect with reference to the Circular Economies. **[25]**

QUESTION B2

Define Life Cycle Assessment (LCA) and explain its significance in evaluating industrial systems. Describe the stages involved in conducting a comprehensive LCA for an industrial process. **[25]**

QUESTION B3

- i. Discuss the various stages involved in obtaining SHEQ certification **[10]**
- ii. Discuss need, types and process of SHEQ system auditing. **[15]**

END OF QUESTION PAPER