



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF CHEMICAL ENGINEERING

ECE 3209 Health and Safety in Industrial Plants

Final Examination Paper

April 2025

This examination paper consists of **TWO** pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: NONE

INSTRUCTIONS

1. Answer ALL questions in Section A and any TWO in Section B
2. Each question carries 25 marks
3. Use of calculators is permissible
4. The examination is marked out of 100

5. MARK ALLOCATION

Part Questions	As shown in each part question
Total Attainable	100

SECTION A
ANSWER ALL QUESTIONS

Question A1

- a) Explain how the hierarchy of control triangle is applied to industrial safety [12]
- b) Discuss why is personal protective equipment (PPE) considered the last line of defence in the Hierarchy of Risk Control [5]
- c) Explain the non-destructive testing techniques to examine the integrity of pressure vessels [8]

Question A2

- a) Discuss the key provisions of the Factories and Works Act of Zimbabwe and their significance in promoting workplace health and safety. [12]
- b) Examine the role of the Factory Inspector under the Factories and Works Act of Zimbabwe and the powers granted to them in ensuring workplace compliance. [9]
- c) Discuss the major differences between rupture disks and relief valves [4]

SECTION B
ANSWER ANY TWO (2) QUESTIONS

Question B1

- a) Discuss the importance of incident and accident investigation in the workplace and outline the steps involved in conducting a thorough investigation [15]
- b) Explain the difference between incidents and accidents, and highlight the importance of investigating near-misses in addition to accidents [10]

Question B2

Discuss the regulations governing the operation, maintenance, and inspection of boilers and pressure vessels in Zimbabwe. [25]

Question B3

Explain the importance of safety and emergency preparedness in the workplace and discuss the key components of an effective safety and emergency preparedness program level [25]

End of Question Paper