



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF CHEMICAL ENGINEERING

Waste treatment in mineral industry

TCE 7016

Examination Paper

December 2024

This examination paper consists of **THREE** pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Dr Muvhiiwa

INSTRUCTIONS

1. Answer **Any 5** questions
2. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1	20
2	20
3	20
4	20
5	20
6	20
(Answer any five questions)	
TOTAL ATTAINABLE MARK	100

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Question 1

Elucidate the environmental impacts of mine waste and explore the methodologies employed for its management and monitoring. [20]

Question 2

- a) State and discuss the two methods used in the mining industry for dewatering mine wastewater and outline their advantages and disadvantages [15]
- b) Discuss the process of characterising mine waste effluent. [10]

Question 3

- a) Describe the features which show that acid rain has adversely influenced the chemical, biological and physical properties of the soil in the environment. [10]
- b) A construction firm wants to start construction on a former mining site. Soils are contaminated with a variety of solid waste contaminants. Describe the primary pathways by which the construction workers could be exposed to contaminants on the site. [10]

Question 4

State and describe critical parameters required to characterise mine waste effluent, state the instrumentation that can be used for characterising mine waste and how it works.

[20]

Question 5

Describe the wastewater treatment process at a mine of your interest. The description should list the individual unit processes that comprise the treatment system and what each process accomplishes. [20]

Question 6

- c) Describe the mining activities that result in the formation of dust and the methods used for dust suppression in the mining sector and its impact on the environment. [10]
- d) How and why does water chemical quality in rivers change during the rainy season? [10]

End of Examination Paper