



FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

MINING GEOLOGY

EMN 2207

Final Examination Paper

JUNE 2025

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Mr. N Ndlovu

INSTRUCTIONS

1. This paper contains **ONE** section with **SIX** questions.
2. Answer **QUESTION ONE** and **any other THREE** questions.
3. Each question **carries 25 marks**.
4. Where a question contains subdivisions, the mark value of each subdivision is shown in brackets.
5. Illustrate your answer, where appropriate, with large clearly labelled diagrams.
6. Start each question on a new page.

Additional Requirements

None

MARK ALLOCATION

Question 1 to 6	25Marks
Part Questions	As shown in each part question
Total Attainable	100

Question 1

- a. Define and explain mining geology with emphasis on the relevance of mining geology to the mine value chain. [10]
- b. Rock-ore association is an important criterion in selection of an area for mineral prospecting. Explain with examples. [10]
- c. Explain the difference in magma viscosity and density, citing low to high viscous magma. [5]

Question 2: Petrology (25 marks)

- a. Elucidate on the process of formation of sedimentary rocks and the basis of classification. [5]
- b. Give an account on the different types of water that participate or influence ore forming processes [5]
- c. With the aid of a fully annotated diagram, describe the Bowen's Reaction Series. [9]
- d. What are the different types of plate boundaries and what geological features do they create? Use diagrams where possible. [6]

Question 3: Ore depositional textures and Mineralogy (25 marks)

- a. What are the two considerations for factors that govern wall rock alteration? Elucidate on the different aspects of the two considerations. [6]
- b. Discuss the rock forming minerals. Give a brief account of the physical properties of the minerals. [10]
- c. Explain the importance of the study of mineralogy in mining engineering. [9]

Question 4: Ores and Resources (25 marks)

- a. Describe the genesis of coal and its applications. [10]
- b. Deliberate on the main processes that led to the formation of the Bushveld complex in South Africa and the Great Dyke in Zimbabwe. [12]

- c. List six main minerals mined in Zimbabwe. [3]

Question 5: Ore Deposit geology (25 marks)

- a. Zimbabwe is endorsed with many minerals such as gold, diamond, lithium etc.... Give a brief account of the genesis of gold ore in placer and alluvial deposits. [9]
- b. Define Hydrothermal Deposits and state the conditions necessary for the formation of hydrothermal deposits. [6]
- c. Discuss the economic significance and importance of deposits related to surface weathering. [4]
- d. Distinguish between early magmatic and late magmatic deposits. [6]

Question 6: Exploration geology (25 marks)

- a. Enumerate 4 different methods of geophysical exploration and the principle for each of them. [16]
- b. Write detailed short notes on the following
- i. Geological exploration [5]
 - ii. Geochemical exploration [4]