



**FACULTY OF ENGINEERING AND ENVIRONMENT
DEPARTMENT OF MINING ENGINEERING
UNDERGROUND MINING TECHNOLOGY
EMN 2108**

**Final Examination Paper
SEPTEMBER 2023**

This examination paper consists of 3 pages

Time Allowed: 3 hours
Total Marks: 100
Examiner's Name: Mr. D Jaibes

INSTRUCTIONS

1. The question paper contains **2** questions in Section A and **3** questions in **Section B**
2. Answer **ALL** question in **Section A** and any **TWO** in **Section B**
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. Be as **INFORMATIVE** as you can be
7. Start each question on a new page.

Additional Requirements

Graph Paper

Calculator

MARK ALLOCATION

Question 1 to 5	25 Marks
Part Questions	As shown in each part question
Total Attainable	100

Section A: Answer ALL questions

Question 1

- a. Explain the important factors that you would consider when determining the site for a shaft. (5)
- b. Mucking in shafts can either be manual or mechanised. Discuss three types mucking equipment commonly used during shaft sinking. (15)
- c. With the aid of a sketch, explain in detail what a sinkers sketch is and its importance. (5)

Question 2

- a. Describe the development layout of a long wall coal mining system, with the aid of detailed diagrams. (8)
- b. Discuss, with the aid of detailed sketches, any three raising techniques. (12)
- c. Briefly explain the sequence and method of extraction in an underground mining level of a flat orebody. (5)

Section B: Answer any TWO questions

Question 3

- a. During Shaft sinking the following equipment used:
 - i. Galloway stage
 - ii. Cactus grab.

Give a brief outline of each of them and their uses. (6)
- b. Give 4 differences between tunneling and drifting (8)
- c. What are the advantages of using tunnel boring Machines? (8)
- d. During shaft sinking there may be need to carry out Ground Consolidation. Why should it be carried out and how is it done? (3)

Question 4

- a. Describe the mining layout (development and production) of a Sublevel open stoping mining system, with the aid of detailed diagrams. (15)
- b. As Mining Engineer, you are in charge of the blast design for development operations, there are certain factors that will affect round design. Explain these factors and highlight the round design principles. (10)

Question 5

- a. Discuss the importance of the following 4 processes of drilling:
 - i. Percussion
 - ii. Feed
 - iii. Rotation
 - iv. Flushing. (8)
- b. There are two most important drilling methods that are available, i.e., Rotary and percussive drilling. Explain in detail these methods highlighting their differences. (6)
- c. With the use of a well-illustrated sketch, define and explain a wedge cut and its applicability. (5)
- d. Explosives properties are importantly considered in the choice of explosive for use in a particular blasting task. List these properties and explain how each of them affect the choice. (6)

BONNE CHANCE!!!!!!!