



FACULTY OF ENGINEERING AND THE ENVIROMENT

DEPARTMENT OF MINING ENGINEERING

UNDERGROUND MINING TECHNOLOGY

EMN 2108

Final Examination Paper

November/December 2024

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks : 100

Examiner's Name : Mr. D Jaibes & Miss B. Ncube

INSTRUCTIONS

1. This paper contains 5 questions.
2. Answer Question One (25 marks) and any other Three Questions (25 marks each).
3. Where a question contains subdivisions, the mark value of each subdivision is shown in brackets.
4. Start each question on a new page.

NB: DO NOT OVERTURN THE QUESTION PAPER OR COMMENCE WRITING UNTIL INSTRUCTED TO DO SO.

Additional requirements

Non-programmable calculator.

MARK ALLOCATION

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

QUESTION 1 (25 Marks)

- a. With the aid of a sketch(s), explain the following terms as used to describe underground mine workings;
- i. Adit
 - ii. Drift
 - iii. Raise
 - iv. Winze
 - v. Ore pass
 - vi. Hanging wall
 - vii. Cross-cut
 - viii. Draw-point
 - ix. Shaft
- (10)
- b. Describe and explain the development phase in underground mining. (9)
- c. Describe and explain 3 basic preliminary factors considered in choosing underground mining over surface mining after resource and reserve estimation. (6)

QUESTION 2 (25 MARKS)

- a. List factors considered when choosing a mining method. (5)
- b. During exploration at Mine X, it was discovered that a flat bedded coal seam of 250m in length, was at 200 to 400m depths;
- i. Describe and explain the mining method that can be used to extract this ore deposit, highlighting the type of support, machinery, and equipment that will be used. (12)
 - ii. Highlight the advantages and disadvantages of this mining method. (8)

QUESTION 3 (25 marks)

- a. What should a sinker's sketch contain and what is the importance of a sinker's sketch in shaft sinking? (5)
- b. Describe the shaft sinking cycle in underground mining operations. (8)
- c. Briefly describe the three primary accesses in underground mines and give an advantage and disadvantage of each method of access. (12)

Question 4 (25 Marks)

- a. Describe the block caving method and; state the advantages and disadvantages associated with the block caving mining method in underground mining. (13)
- b. What orebody geometric and rock features are necessary to adopt block caving mining? (4)
- c. What is the difference between supported and unsupported mining methods? Give 2 examples of each. (8)

QUESTION 5 (25 marks)

- a. Name 5 gases tested for during re-entry in underground mines. (5)
- b. Describe and explain the production cycle in underground mines, highlighting equipment used in each operation. (13)
- c. Differentiate between “overhand” and “underhand” techniques of extracting ore. Give examples where necessary. (7)

~THE END~