FACULTY OF ENGINEERING AND ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

INTRODUCTION TO MINERALS INDUSTRY

EMN 1207

Final Examination Paper

APRIL 2024

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: MS C MACHADU

INSTRUCTIONS

1. **Answer ALL FOUR (4) questions**
2. **Each question carries 25 marks**

Additional Requirements

None

MARK ALLOCATION

Question 1 to 4	**Total 25 marks each**
Part Questions	**As shown in each part question**
Total Attainable	**100 marks**

ANSWER ALL FOUR QUESTIONS

QUESTION 1

a) Define the following terms used in mining:

i. Mine **[2]**

ii. Mining **[2]**

iii. Mining engineer **[2]**

iv. Mining engineering **[2]**

b) Distinguish between:

i. Grade and cut-off grade **[2]**

ii. Gangue and waste **[2]**

iii. Mineral and ore **[2]**

iv. Resource and reserve (Hint: include the different categories of resources and reserves in your answer). **[4]**

c) Define a qualified person in relation to the mining industry. **[3]**

d) Define stripping ratio and state 3 reasons why it is important. **[4]**

QUESTION 2

a) Discuss the various methods of mineral exploration and explain the factors that influence the choice of exploration techniques in different geological settings. **[10]**

b) Discuss the principles and applications of pyro-metallurgical and hydrometallurgical processes in the extraction of metals from ores. Compare and contrast the advantages and limitations of these processes. **[15]**

QUESTION 3

a) State 5 reasons why exploration is important? **[5]**

b) Describe the principles and applications of mineral processing techniques, including crushing, grinding, flotation, and leaching. Discuss the factors that affect the efficiency of these processes. **[20]**

QUESTION 4

a) Give 5 merits of surface mining over subsurface mining. **[5]**

b) Explain the principles and applications of extractive metallurgy, including the refining and purification of metals. Include the techniques used for removing impurities and producing high-purity metals. **[20]**

END OF EXAMINATION