



FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

COMPUTERIZED MINE DESIGN

EMI 3202

Final Examination Paper

July 2022

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Mr. K. Dzwiti

INSTRUCTIONS

1. This paper contains **ONE** section with **FIVE** 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

Calculator

MARK ALLOCATION

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

QUESTION ONE

Table 1 shows information that was extracted from the planning department report.

DEPTH	ASSAY
5	0.400
10	0.560
15	0.440
20	0.480
25	0.400
30	0.380
35	0.330
40	0.590
45	0.480
50	0.600
55	0.560
60	0.320
65	0.700
70	0.210
75	0.180
80	0.080
85	0.200
90	0.070

Using Table 1, calculate:

- a) Composite grade. [10 marks]
- b) 15m bench composite grades. [10 marks]
- c) If cut-off is 0.3g/t, how many benches will be mined as ore? [5

d) **marks]**

QUESTION TWO

- a) Explain briefly any three ways that can be used to reduce the overall stripping ratio. **[12 marks]**
- b) Explain briefly the steps that you follow to determine the final pit design. **[13 marks]**

QUESTION THREE

- a) Explain briefly with the aid of diagrams the following main methods of compositing:
- i. Downhole **[5 marks]**
 - ii. Ore Zone **[5 marks]**
 - iii. Bench Height **[5 marks]**
 - iv. Geology **[5 marks]**
- b) Explain briefly the benefits of compositing. **[5 marks]**

QUESTION FOUR

Illustrate 2 mandatory and 2 optional tables that can be used to generate a geological database and explain briefly the fields for each table. **[25 marks]**

QUESTION FIVE

Explain briefly how you will consider the following aspects during underground mine designing:

- i. Rock Mechanics **[5 marks]**
- ii. Material Handling Equipment **[5 marks]**
- iii. Material Movement **[5 marks]**
- iv. Operational Flexibility **[5 marks]**
- v. Services **[5 marks]**

END OF EXAMINATION PAPER