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#### MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING,APPLIED SCIENCES AND TECHNOLOGY

**DEPARTMENT: MINING AND MINERAL PROCESSING** **ENGINEERING**

**MODULE: ENGINEERING GEOLOGY**

**CODE: HMIE 516**

### SESSIONAL EXAMINATIONS

**DECEMBER 2023**

**DURATION: 3 HOURS**

**EXAMINER: H. CHIBAYA**

## INSTRUCTIONS

1. *This paper contains five questions.*
2. *Answer any four questions.*
3. *Start a new question on a fresh page*
4. *Total marks 100*

**QUESTION 1**

1. State any four uses of granites that are mined as industrial minerals [**4]**
2. For each of the uses above discuss the concept of optimum fragment size [**8]**
3. Describe any five properties that are considered when selecting dimension stones [**13]**

**TOTAL** [**25]**

**QUESTION 2**

1. State and describe the main features of a discontinuity map [**8]**
2. Describe how geological discontinuities are represented using the following techniques
3. Face maps [**3]**
4. Stereonet [**4]**
5. Mohr’s circle [**4]**
6. Explain how seismics and ground penetrating radar can be used to map discontinuities in underground mines [**6]**

**TOTAL** [**25]**

**QUESTION 3**

1. Briefly discuss how underground water can affect underground mine working[**7]**
2. Explain the techniques used in dewatering underground mines [**8]**
3. Describe how ground and surface water can be contaminated by mining of sulphide ores [**10]**

**TOTAL** [**25]**

**QUESTION 4**

1. Discuss the principles of backfilling in underground mining including;
2. the type of backfill material used, [**4]**
3. their properties and; [**4]**
4. their impact on mine stability. [**4]**
5. Explain how waste water from underground mines can be recycled for future mining operations [**5]**
6. Describe how tailings dams are used to contain mining waste and the factors that are considered in choosing the optimum site for a tailings dam [**8]**

**TOTAL** [**25]**

**QUESTION 5**

1. Describe the geological factors that affect the stability of underground mine openings [**8]**
2. What are the main techniques used in geotechnical site investigations for mining projects? Explain their importance [**9]**
3. Discuss the terms feasibility and pre-feasibility studies as applied to new mining projects [**8]**

**TOTAL** [**25]**

**END OF EXAMINATION**