

**BINDURA UNIVERSITY OF SCIENCE EDUCATION  
CHEMISTRY DEPARTMENT**

**COURSE: CH209 MINERAL TECHNOLOGY**

**2 HOURS**

**ANSWER QUESTIONS ONE AND FOUR OTHERS. TWO FROM EACH OF THE  
SECTIONS, A AND B. EACH QUESTION CARRIES 20 MARKS**

\*\*\*\*\*

1.    a)    Define the term cyanidation. [3 marks]
- b)    Explain the causes of ferrosilicon losses in dense medium  
             separation circuits. [4 marks]
- c)    Explain why particle size analysis is important. [4 marks]
- d)    Describe the factors that affect the sign and magnitude of surface  
             charge of cationic collectors. [5 marks]
- e)    Explain why cotton fabrics are by far the most common type of  
             medium of filtration. [4 marks]

**SECTION A: ANSWER ANY TWO QUESTIONS**

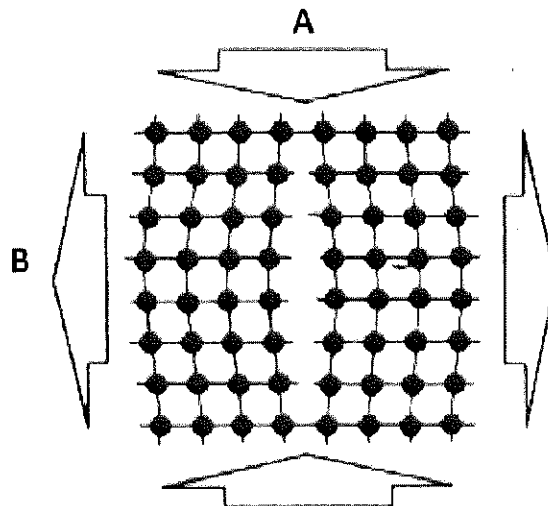
- 2    a)    Explain the advantages and disadvantages of sedimentation. [10 marks]
- b)    Explain why employing sieving as a method of particle size analysis  
             to irregularly shaped particles may be complicated. [6 marks]
- c)    Discuss the limitations of handsieving. [4 marks]
3.    a)    Describe the two important stages of sieving. [3 marks]
- b)    Explain what data from grindability tests is used for? [2 marks]
- c)    Give advantages of using pyrometallurgy in copper extraction. [5 marks]

d) Define the following terms used in concentration of minerals.

- i) Head
- ii) Concentrate
- iii) Tailing
- iv) Middlings
- v) Recovery

[2 × 5 marks]

4. a) i) Identify the types of stresses labelled A and B in a figure below. [2 marks]



ii) State the factors that affect the distribution of stress.

[2 marks]

- b) List five pretreatment methods employed before cyanidation of gold ores associated with sulphides or cyanides. [5 marks]
- c) Discuss the limitations of nickel sulphide fire assay in analysis of platinum group metals (PGMs). [5 marks]
- d) Explain the advantages of wet grinding. [6 marks]

**SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION.**

5. a) Explain the principle of dense medium separation (DMS). [4 marks]
- b) Discuss the factors that can cause a decrease in efficiency of dense medium separation (DMS). [8 marks]
- c) Explain the uses of a Partition or Tromp curve. [4 marks]
- d) Describe the properties of a good filtering media. [4 marks]
6. a) Explain the function of froth phase in the process of floatation [4 marks]
- b) Define the following terms as used in the process of floatation.
- i) Floatability
  - ii) Hydrophobicity
  - iii) Aerophilic
  - iv) Regulators
  - vi) Floatation reagent. [5 × 2 marks]
- c) Describe the two classes of minerals with regard to their surface properties. [6 marks]
7. a) Discuss the advantages and disadvantages of employing fire assaying in gold analysis. [8 marks]
- b) Why is it important to trap large particles of gold by gravity methods even if the entire mill feed is to be cyanided? [3 marks]
- c) State the four places where gravity separation can be practiced during gold processing. [4 marks]

- d) Explain the factors that influence process selection in gold processing. [3 marks]
- e) State two mechanisms of floatation. [2 marks]

**END OF PAPER**