



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

SPECIAL/ SUPPLEMENTARY UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIFTH YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

**BACHELOR OF SCIENCE IN MECHANICAL AND INDUSTRIAL
ENGINEERING**

COURSE CODE: MIE 515E

COURSE TITLE: EXTRACTIVE METALLURGY

DATE: 04-10-2022

TIME: 12:00-14:00

INSTRUCTIONS TO CANDIDATES

1. This paper consists of **FOUR** Questions
2. Answer Question ONE (**Compulsory**) and any other TWO Questions
3. All symbols have their usual meaning

TIME: 2 HOURS

QUESTION ONE (30 marks)

- a) Discuss the three main extractive metallurgical processes (12 marks)
- b) With the aid of a labeled diagram, discuss froth flotation (9 marks)
- c) State five factors that can influence the choice of method of metal extraction (5 marks)
- d) With the aid of an equation, explain how scrap Iron can be used to extract copper and state two advantages of this process (4 marks)

QUESTION TWO (20 marks)

- a) State four reasons as to why scrap metal recycling is desirable (4marks)
- b) Outline the steps involved in Iron recycling (4 marks)
- c) Explain four methods of physical concentration in mineral/ore processing (8 marks)
- d) Distinguish between oxidative and non-oxidative leaching (4 marks)

QUESTION THREE (20 marks)

- a) State any five advantages of hydrometallurgy over pyrometallurgy (5 marks)
- b) Use diagrams to distinguish between heap and dump leaching (6 marks)
- c) Explain how solvent extraction of copper takes place (6 marks)
- d) State three factors that affect the kinetics of leaching (3marks)

QUESTION FOUR (20 marks)

- a) Discuss screening and classification methods of industrial material sizing (4marks)
- b) Explain the difference between primary and secondary crushing (4 marks)

c) Discuss environmental issues associated with metallurgical industry and how they can be solved
(6 marks)

d) Explain the process of Aluminium extraction
(6 marks)

