



(University of Choice)

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

**UNIVERSITY EXAMINATIONS  
2021/2022 ACADEMIC YEAR**

**FOURTH YEAR SECOND SEMESTER SPECIAL/  
SUPPLEMENTARY EXAMINATIONS  
FOR THE DEGREE  
OF  
BACHELOR OF MECHANICAL AND INDUSTRIAL  
ENGINEERING**

**COURSE CODE: MIE 484  
COURSE TITLE: MANUFACTURING PROCESSES III**

**DATE: 7 – 10 - 2022                      TIME: 9:00 AM – 11:00 AM**

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**INSTRUCTIONS TO CANDIDATES**

Question ONE (1) is compulsory  
Answer THREE (3) questions  
TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating  
This Paper Consists of 3 Printed Pages. Please Turn Over

**Question 1 /30 marks/**

- (a) Explain five components that are common with all non- destructive testing methods [4 marks]
- (b) Discuss the following types of welds [4 marks]
  - i) Surfacing weld
  - ii) Groove weld
- (c) Briefly explain four non-destructive testing methods used in weld joints' inspection [10 marks]
- (d) When designing a work piece in which spot resistance welding process is to be used, explain the guidelines that must be put in place [4 marks]
- (e) What are the circumstances where brazing and soldering are considered attractive compared to welding [5 marks]
- (f) Outline three limitations of brazing [3 marks]

**Question 2 /20 marks/**

- a) Discuss the major equipment and consumables which are required in Plasma arc welding methods [9 marks]
- b) Discuss the weldability of the following materials
  - (i) Stainless steel [2 marks]
  - (ii) High carbon steel [2 marks]
  - (iii) Magnesium alloys [2 marks]
- c) Analyze five major benefits that are usually associated with metal inert gas welding process. [5 marks]

**Question 3 /20 marks/**

- (a) Explain the principle functions of pressure in resistance welding [4 marks]
- (b) Discuss the use of Tungsten electrodes in Gas Tungsten Arc Welding (GTAW) [4 marks]
- (c) Discuss the use of ultrasonic welding in Aluminum and copper alloys. In each case outline **three (3)** areas of application of Ultrasonic welding of the two alloys [12 marks]

**Question 4 /20 marks/**

- (a) Explain six major advantages of Electron Beam Welding [6 marks]
- (b) Analyze four (4) basic steps done in friction welding [4 marks]
- (c) Fluxes are produced by several different manufacturing methods. Classify the different fluxes and outline the characteristics of each classification [10 marks]