



(University of Choice)

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

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF TECHNOLOGY EDUCATION

(MECHANICAL ENGINEERING)

COURSE CODE: TEM 481

COURSE TITLE: MECHANICAL TECHNOLOGY & PRACTICE V

DATE: 21-04-2022

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

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over

Question One

- a) Explain TWO reasons behind development of CNC machining process as alternative but important unconventional machining process. (4 Marks)
- b) Explain THREE advantages of electro hydraulic forming process over explosive process as High Energy Rate Forming (HERF) process. (6 Marks)
- c) Using a well labeled schematic diagram explain basic working principle of Ultrasonic Machining (USM) process. (4 Marks)
- d) Explain THREE basic requirements of dielectric fluid used in Electro-Discharge Machining (EDM). (6 Marks)
- e) Explain of Electro-Stream (capillary) process as drilling or application of Electro-Chemical (ECM) process. (4 Marks)
- f) Use a diagram to describe spark generation in Electro-discharge Machining (EDM) and how its utilized in material removal (6 Marks)

Question Two

- a) Discuss TWO reasons behind supporting use of explosive forming as a High Energy Rate Forming (HERF) process. (4 Marks)
- b) Explain any THREE functions of Machine Control Unit (MCU) as central part of a CNC system. (6 Marks)
- c) Explain TWO functions of constant supply of abrasive grains or slurry used in Ultrasonic machining (USM) process. (4 Marks)
- d) Use neat sketches to discuss working principle of Electro-hydraulic forming as a High Energy Rate Forming (HERF). (6 Marks)

Question Three

- a) Use neat sketches to explain working principle standoff explosive forming process. (4 Marks)

- b) Discuss TWO instances you recommend use of High Energy Rate Forming (HERF) as modern forming process over conventional forming processes such as forging. (4 Marks)
- c) Use neat sketches to explain the working principle of Servo Mechanism in Electro-Discharge Machining process. (6 Marks)
- d) Discuss THREE situations where you prefer Ultrasonic Machining (USM) over Electro-Discharge Machining (ECM) process. (6 Marks)

Question Four

- a) Explain TWO requirements of tool material used in Electro-Chemical Machining (ECM) process. (4 Marks)
- b) Discuss TWO factors that affect selection of material tool in Electro-Discharge Machining (EDM) process. (4 Marks)
- c) With help of well labeled schematic diagram describe working principle of material removal in Electro-Chemical Machining (ECM) process. (6 Marks)
- d) Explain the functions of each of the parts of the following three basic components of Computerized Numerical Control (CNC) machine (6 Marks)
 - i) Part program.
 - ii) Feed Back System.
 - iii) Machine tool

