



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

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

THIRD YEAR FIRST SEMESTER EXAMINATIONS

**FOR DIPLOMA IN
ELECTRICAL AND ELECTRONICS ENGINEERING,**

**COURSE CODE: DEE 086
COURSE TITLE: INSTRUMENTATION**

DATE: MONDAY, 25TH APRIL, 2022 TIME: 12.00-2.00PM

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer Any Other TWO (2) questions
TIME: 2 Hours

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

QUESTION ONE**30 MARKS**

- a)
- i Define Electric Transducer. *(2 Marks)*
 - ii Mention the important parts of transducer. *(2 Marks)*
 - iii You are required as an Engineer in a firm to give advice to the management on the choice of a transducer to be used in line production to improve production and curb wastages. Give FIVE factors influencing the choice of a particular Transducer. *(4 marks)*
- b) State what is meant by Helipots. *(2 Marks)*
- c)
- i Define what is meant by Digital storage oscilloscope? *(2 Marks)*
 - ii Describe how Digital sampling oscilloscopes operates? *(4 Marks)*
- d) State and explain TWO different calibration methodologies. *(3 Marks)*
- e) State the difference between limiting errors and instrumental errors. *(3 Marks)*
- f) Mention any four static characteristics of measuring instruments *(4 Marks)*

QUESTION TWO**20 MARKS**

- a) Mention TWO basic requirements of measurement. *(4 Marks)*
- b) Classify instruments based on their functions. *(4 Marks)*
- c) Name and briefly explain the types of instruments used for making voltmeter and ammeter. *(8 Marks)*
- d) State the advantages of PMMC instruments. *(4 Marks)*

QUESTION THREE**20 MARKS**

- a) State the advantages of Wheatstone bridge method. *(3 Marks)*
- b) State the advantages of Kelvin double bridge method. *(3 Marks)*
- c) What is mean by transducer? *(2 Marks)*
- d) State the classification of transducers. *(4 Marks)*
- e) State and explain at least FOUR different types of transducers. *(8 Marks)*

QUESTION FOUR**20 MARKS**

- a) Define Data Logger. *(2 Marks)*
- b) Distinguish the Data logging and data acquisition. *(4 Marks)*
- c) List out TWO dynamic characteristics of any measurement system. *(2 Marks)*
- d) State and explain at least TWO types of error measurement system? *(4 Marks)*
- e) State importance of static characteristics *(2 Marks)*
- f) What is standard? What are the different types of standard? *(2 Marks)*
- g) What is the function of manipulation element in a measurement system? *(2 Marks)*
- h) State what is meant by accuracy and precision of an instrument? *(2 Marks)*

QUESTION FIVE**20 MARKS**

- a) Draw the block diagram showing the basic functional elements of an instrument and explain the functions of each element. *(3 Marks)*
- b) Define limiting errors. Derive the expression for relative limiting errors. *(3 Marks)*
- c) Explain in detail calibration techniques and draw the calibration curve in general. *(4 Marks)*
- d) Give the methods of using any three standard inputs being used for analyzing the dynamic response of system with neat sketches. *(3 Marks)*
- e) Explain on the static and dynamic characteristics of a measurement system. *(2 Marks)*
- f) Describe in detail the different types of dynamic errors in a measurement system. *(5 Marks)*