



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

## UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN ELECTRICAL AND ELECTRONICS ENGINEERING

EEE 1201 : TESTING METHODS AND RELIABILITY

END OF SEMESTER EXAMINATION

**SERIES : JULY- AUGUST 2019**

**TIME: 2 HOURS**

**DATE:** Pick AUGUST 2019

### Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt any **THREE Questions.**

**Do not write on the question paper.**

**All Questions carry Equal Marks**

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### Question ONE

- a) Explain briefly classification of measuring Instruments. **4 Marks**
- b) Discuss the following types of errors giving **ONE** Example of each
- 1) Gross errors
  - 11) System errors **6 Marks**
- c) Calculate the failure rate if there are 60 failures from a Population of 1000 Items during a Period of 10000 Hours **4 Marks**
- d) Explain the following Terms in Equipments:-
- 1) Reliability
  - 2) Failure rate

**Question TWO**

a) State three factors affecting Reliability **6 Marks**

b) The MTBF of an Equipment is 9000 Hours. Calculate the Reliability of the Equipment during a Period of 100 Hrs. **8 Marks**

c) A Standard Multi- range Meter has a Resistance of  $20\Omega$  and Full Scale Deflection of 300mA.

Calculate the Shunt and Multiplier Resistor required so as to enable the Instrument to read up

1) 600mA f.s.d

2) 18V f.s.d

**6 Marks****Question THREE**

a) Define Signal Conditioning **2 Marks**

b) State five main tasks performed by a Signal Conditioner **5 Marks**

c) With the aid of block diagram describe AC Signal Conditioning System **8 Marks**

d) Distinguish between Flash and Successive ADC **5 Marks**

**Question FOUR**

a) Define Dimension as used in Equipments.

2 Marks

b) From the law of Force between Poles,  $F = \frac{m_1 m_2}{\mu d^2}$  Derive Dimensions for

$\mu d^2$

i. Magnetizing Force H

ii. Current I

iii. Potential Difference PD

iv. Resistance

v. Inductance

**10 Marks**

c) Explain the following Standards

i. International Standards

ii. Primary Standards

iii. Secondary Standards

iv. Working Standards

**8 Marks**

### **Question FIVE**

a) Define Unit. Discuss briefly.

3 Marks

b) Differentiate between Fundamental and Derived Units, giving two examples of each

6 Marks

c) State three advantages of SI Units.

6 Marks

d) Name two Supplementary Units

2 Marks

e) Name three types of System Units used in the field of Engineering

3 Marks