



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

FIRST YEAR FIRST TERM EXAMINATION FOR

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

2601/106 - ELECTRICAL MEASUREMENTS

DATE: 3/6/2021

TIME: 2.30-5.30 PM

INSTRUCTIONS

Answer all the questions

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|----|----|------|--|------------|
| 1 | a) | i | State two advantages of SI units | (2 marks) |
| | | ii | Explain giving examples what is meant by a measurement | (6 marks) |
| | b) | i | Give the names of the following 10^9 , 10^{-12} , 10^{-18} | (6 marks) |
| | | ii | Give the values of the following micro, femto, mega | (6 marks) |
| 2 | a) | | Explain what primary unit's means in measurements. | (5 marks) |
| | b) | | Explain the following types of maintenance programs | |
| | | i. | Breakdown | |
| | | ii. | Preventive | |
| | | iii. | Shut down | (6 marks) |
| | c) | | An ammeter reads 38.72 A instead of 38.95 A. Calculate | |
| | | i. | Static error | |
| | | ii. | Absolute error | |
| | | iii. | The percentage Error | (9 marks) |
| 3. | a) | | Explain giving equations the operations of a deflection instrument | (8 marks) |
| | b) | | Explain the three types of drifts | (12 marks) |

4. a) Explain the meaning of the following terms:
- i. Accuracy
 - ii. Span
 - iii. Range
 - iv. Absolute error (12 marks)
- b) Explain with diagrams the difference between null and deflecting measuring instruments. (8 marks)
5. a) The dimensional equation of resistance in the LMTI system of dimensions is $[R] = [ML^2I^{-2}T^{-3}]$. Use this equation to obtain the dimensional equations for the following in the LMTI system of dimensions.
- i. Resistivity
 - ii. Conductivity
 - iii. E.m.f (10 marks)
- b) Derive the dimensional equation for capacitance in c. g. s. electrostatic units. Take the dimensional equation for charge $[Q] = [\epsilon^{1/2} M^{1/2} L^{3/2} T^{-1}]$ (10 marks)