



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

DIPLOMA IN ELECTRICAL ENGINEERING

ELECTRICAL MEASUREMENTS AND TESTING

DATE: 24/3/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer Question One and any Other Two Questions

QUESTION ONE (30 MARKS)

- a) Define the process of measurement of system (3 marks)
- b) State Two requirements of a measurement system (2 marks)
- c) Explain the significance of measurement (4 marks)
- d) Describe the following instruments
 - i. Mechanical instruments
 - ii. Electrical instruments
 - iii. Electronic instruments (12 marks)
- e) With an aid of labeled block diagrams explain the functions of an instrumentation system (9 marks)

QUESTION TWO (20 MARKS)

- a) With an aid of labeled diagram explain
 - i. An ammeter
 - ii. Voltmeter instruments (10 marks)

- b) A meter of internal resistance 6Ω is supposed to measure 20V. If the full-scale deflection current is 10mA , find the p.d across the millimeter and the multiplier required to be connected in order to meet the conditions. (10 marks)

QUESTION THREE (20MARKS)

- a) Define
- i. LED
 - ii. Photo Diode
 - iii. Amplifier
 - iv. Oscillator
 - v. Thermometer (8 marks)
- b) With an aid of labeled diagrams explain how a signal is modulated and transmitted to far off distances. (7 marks)
- c) Describe a kicking wire experiments. (5 marks)

QUESTION FOUR (20 MARKS)

- a) What is an Aerial? (2 marks)
- b) Briefly explain how radio waves are propagated into the space (5 marks)
- c) Describe the radiation pattern of an aerial (8 marks)
- d) Differentiate between indoor antenna and built-in antenna (5 marks)

QUESTION FIVE (20 MARKS)

- a) Explain the process of installing a television Antenna (5 marks)
- b) With an aid of labeled diagrams, explain the operation of a multi- channel Aerial (8 marks)
- c) Explain the following
- i. Aerial Gain
 - ii. Beam width
 - iii. Front to Back Ratio (7 marks)