



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.

Tel: +254(0) 799 529 958, +254(0) 799 529 959, +254 (0)712 524 293

Website: [www.must.ac.ke](http://www.must.ac.ke) Email: [info@mucst.ac.ke](mailto:info@mucst.ac.ke)

---

## UNIVERSITY EXAMINATIONS 2024/2025

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF TECHNOLOGY IN ELECTRICAL AND ELECTRONICS ENGINEERING

### EET 3204 - WORKSHOP PRACTICE II

DATE: JANUARY 2025

TIME: 2 HOURS

---

**INSTRUCTIONS: Answer Question ONE and any other TWO questions.**

---

#### QUESTION ONE (30 MARKS)

- (a) (i) State any TWO main safety rules that must be observed in the electrical workshop  
(ii) Explain any TWO main causes of electrical accidents and their remedies  
(iii) With reference to electrical hazards explain the First Aid offered for electrical burns and injuries (6 Marks)
- (b) Draw and state the functions of the following basic electrical tools  
(i) Star medium screw driver  
(ii) Stripping knife  
(iii) Side cutters (6 Marks)
- (c) (i) Distinguish between electrical appliances and accessories giving an example of each  
(ii) With the aid of a diagram show the physical structures of a paper insulated lead sheathed steel wire armored 3-core copper cable  
(iii) State any ONE I.E.E regulations with reference to the installation of the cable in (ii) (6 Marks)



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

- (d) (i) State any TWO advantages of digital- over analogue- electrical measuring Instruments  
(ii) A moving coil ammeter has a full-scale deflection of 5A and a resistance of  $0.035\Omega$   
Determine the shunt required to be connected with the ammeter to read 150A (4 Marks)
- (e) (i) State any TWO reasons of earthing electrical installations  
(ii) Draw a labelled wiring circuit diagram of two lighting points controlled independently from two positions, using one -gang two- way switches connected through a 30A junction box and state in sequence the main tests which should be carried after completion a new electrical installation (8 Marks)

## QUESTION TWO (15 MARKS)

- (a) (i) Define First Aid as applied to safety precautions  
(ii) State any TWO functional components of the Industrial First Aid box and their application in electrical hazards treatment  
(ii) While working in a busy electrical workshop, Mr. Mutwiri accidentally touched a bare live conductor and fell down unconscious on the conductor. Describe how you would carry out First Aid treatment on him (7 Marks)
- (b) With reference to I.E.E. regulations on cable sizes and ratings, explain how the following factors affect the current carrying capacity in cables  
(i) Ambient temperature  
(ii) Voltage drops (4 Marks)
- (c) Draw a labelled block diagram of the sequence of control equipment at the consumer's intake point of a single phase a.c. power supply (4 Marks)

### QUESTION THREE (15 MARKS)

- (a) Explain the following types of electrical wiring systems and give ON application of each
- (i) Surface or cleat pvc sheathed system
  - (ii) Conduit system (8 Marks)
- (b) (i) State any TWO factors that determine the choice of wiring systems
- (ii) Draw a complete wiring circuit diagram of a system consisting of both of parallel and series lighting controlled independently from three positions through intermediate switching and mini-trunking (7 Marks)

### QUESTION FOUR (15 MARKS)

- a) Draw the following basic electrical tools and state their functions
- (i) Hacksaw flame
  - (ii) Pair of pliers
  - (iii) Steel rule (6 Marks)
- (b) (i) State any TWO main differences between analogue- and digital-multimeters
- (ii) Distinguish between tolerance and thermal stability as applied to resistors and state their effect on resistance (4 Marks)
- (c) An electrical circuit supplied by 230V, 50Hz ac supply consists of two capacitors of  $2.5\mu\text{F}$ ,  $5.0\mu\text{F}$  in series and three resistors of  $15\Omega$ ,  $10\Omega$  and  $200\Omega$  connected across them in parallel. Sketch the circuit and determine the total current in the Circuit (5 Marks)

### QUESTION FIVE (15 MARKS)

- (a) (i) Distinguish between inspection and testing as applied to electrical installation work and state the certification required for each
- (ii) With the aid of a suitable diagram explain the voltmeter-ammeter method of testing for earth electrode resistance (10 Marks)
- (b) By use of suitable sketches explain the principle of operation of a thermal-magnetic miniature circuit breaker (5 Marks)