



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

THIRD YEAR SECOND SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF TECHNOLOGY EDUCATION
IN
ELECTRICAL AND ELECTRONICS ENGINEERING**

COURSE CODE: TEE 324

**COURSE TITLE: ELECTRICAL INSTALLATION AND
PRACTICE**

DATE : 26TH APRIL 2023

TIME: 8:00 AM - 10:00 AM

INSTRUCTIONS TO CANDIDATES:

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS.
QUESTION ONE CARRIES 30 MARKS AND ALL OTHERS 20 MARKS EACH.

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

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QUESTION ONE



- a) i) Describe a flame proof equipment (3 Marks)
- ii) Differentiate between division 0 and division I in relation to special installation (flame proof installations) (2 Marks)
- b) List any *four* types of construction materials that can cause corrosion in relation to installation in moist and damp places (2 Marks)
- c) Explain how the following factors determine the type of wiring systems for an electrical installation (2 Marks)
- i) Cost
- ii) Safety
- d) Explain *two* reasons for using flexible conduits in electrical installation (2 Marks)
- e) Outline *three* reasons why farm and horticultural installations are categorized as special installation (3 Marks)
- f) i) With an aid of diagrams, distinguish between a ring and a radial power circuit. Which advantage does radial connection has over ring connection? (4 Marks)
- ii) Explain any two IEE regulations governing the installation of power circuits (2 Marks)
- g) i) Outline *three* reasons for testing and inspecting an electrical installation (3 Marks)
- ii) Illustrate the continuity test for a circuit having one socket. (4 Marks)
- h) State any *three* issues in an electrical installation that can be identified during the inspection stage of an electrical installation (3 Marks)

QUESTION TWO

- a) State and explain any *three* factors influencing the current ratings of cables (6 Marks)
- b) Define the term 'voltage drop' (2 Marks)
- c) A corridor 96 meters long is to be lightened by 60w bulbs spaced 12m apart and controlled by one switch at the supply end. The wiring to be used is single core PVC insulated cables enclosed in metal conduits.
- i) Sketch a diagram illustrating the light bulbs arrangement with the corridor (4 Marks)
- ii) Can a wire of 1.0mm² CSA support the above load? Show step by step calculation for your justification (Assume a 1.0mm² single core cable has a voltage drop of 40mV and a current rating of 11A when the cable is carrying 2A) (7 Marks)
- d) State any IEE regulation governing voltage drops (1 Mark)

QUESTION THREE

- a) Define the following terms as used in electrical installation (4 Marks)
- i) Equipotential bonding
- ii) Earthing
- iii) Earthing lead
- iv) Earth continuity tester
- b) State any *three* types of hazards that may be encountered in electrical installations (3 Marks)
- c) With an aid of a well labelled diagram, describe how earthing is achieved through Protective Multiple earthing (PME) (6 Marks)
- d) i) State the necessity for carrying out an earth loop impedance test in a finished electrical installation (2 Marks)
- ii) Describe the procedure for carrying out earth fault loop impedance test (5 Marks)

QUESTION FOUR

- a) Explain any *three* IEE regulations requirements regarding temporal installations (3 Marks)
- b) i) List any *three* recommended electrical installation tests necessary to be carried out in a hazardous area (3 Marks)
- ii) Discuss any *two* types of wiring systems used in temporal installations (4 Marks)
- c) i) State any *three* types of corrosions which majorly destroy electrical installation in such corrosive environments (3 Marks)
- ii) With an aid of a well labelled diagram, explain the sacrificial anode method of cathodic protection as used in protection for installation in corrosion prone areas (7 Marks)

QUESTION FIVE

- a) i) Highlight any *two* reasons why earthing in electrical installation is desirable (2 Marks)
- ii) List any *four* commonly used earthing methods (2 Marks)
- b) i) What is an '*earthing electrode*'? (1 Mark)
- ii) State any *two* types of earthing electrodes (3 Marks)
- c) With an aid of a well labelled diagram, explain the operation of an earth leakage circuit breaker (ELCB) (6 Marks)
- d) i) Explain '*electric shock*' with reference to safety (2 Marks)
- ii) Outline the procedure for rescuing a colleague who has received an electric shock and is in contact with live wires (4 Marks)