UGANDA INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGY

FINAL EXAMS

ACADEMIC YEAR: **2025/2026**

SEMESTER: **TWO**

PROGRAMME: **DIPLOMA IN ELECTRICAL AND ELECTRONICSENGINEERING (DEEE)**

YEAR OF STUDY: **TWO**

COURSE UNIT: **ELECTRICAL INSTALLATION DESIGN & PRACTICE**

COURSE CODE: **ELT2204**

DATE: **TUESDAY 23/06/2026**

TIME: **2:00PM**

DURATION: **3 HOURS**

ROOMS: **TENT A**

INSTRUCTIONS:

i. **This paper contains of Two (2) sections A and B**
ii. **Section A is compulsory and carries 40 marks**
iii. **Section B contains 5 questions, each with 20 Marks, Attempt only 3 Questions**
iv. **Show all workings where applicable**

SECTION A (40 MARKS)

PART I: OBJECTIVE QUESTIONS (10 MARKS)

Choose the most correct answer. (1 Mark each)

1. The three main components of an electrical installation project are
   A. Wiring, Testing and Maintenance
   B. Design, Installation and Inspection
   C. Design, Installation and Inspection & Testing
   D. Design, Earthing and Protection

2. The recommended mounting height of light switches above floor level is
   A. 1400 mm
   B. 1000 mm
   C. 300 mm
   D. 2000 mm

3. The main purpose of earthing is to
   A. Increase power factor
   B. Protect persons and equipment
   C. Increase current flow
   D. Reduce cable size

4. Which instrument is used to measure insulation resistance?
   A. Voltmeter
   B. Ammeter
   C. Megger
   D. Wattmeter

5. The space factor in a conduit installation should not exceed
   A. 25%
   B. 35%
   C. 45%
   D. 60%

6. Which protective device operates due to residual current caused by earth leakage?
   A. HRC Fuse
   B. MCCB
   C. MCB
   D. RCD

7. Touch voltage refers to
   A. Voltage across a transformer
   B. Voltage between two phases
   C. Voltage between metallic structure and earth surface
   D. Voltage across a fuse

8. Which circuit breaker is commonly used for final circuits up to 63A?
   A. ACB
   B. MCCB
   C. MCB
   D. OCB

9. Emergency lighting should become operational within
   A. 60 seconds
   B. 30 seconds
   C. 15 seconds
   D. 5 seconds

10. A cooker control unit is normally protected by
    A. 5 A fuse
    B. 10 A fuse
    C. 15 A fuse
    D. 30–45 A fuse

PART II: SHORT ANSWER QUESTIONS (30 MARKS)

Question 1

State five factors considered during the planning and design of an electrical installation. (5 Marks)

Question 2

(a) Differentiate between system earthing and equipment earthing. (2 Marks)

(b) Differentiate between touch voltage and step voltage. (3 Marks)

Question 3

List any five advantages of proper earthing in an electrical installation. (5 Marks)

Question 4

Explain the functions of the following components in an electrical circuit:

(a) Source of electrical energy (1 Mark)

(b) Protective device (1 Mark)

(c) Conductors (1 Mark)

(d) Control device (1 Mark)

(e) Load (1 Mark)

Question 5

Outline five precautions that should be observed when installing an electric motor. (5 Marks)

Question 6

State five causes of electrical fires and suggest one preventive measure for each. (5 Marks)

SECTION B Attempt any three(3) questions [20marks Each]

QUESTION ONE

A contractor has been assigned to design and install the electrical system of a three-bedroom residential house in Luzira subcounty. As a technician

(a) Describe the stages involved in planning and designing the installation. **(5 Marks)**

(b) State the information that should be obtained during the site visit. **(5 Marks)**

(c) Explain the importance of inspection and testing before commissioning. **(5 Marks)**

(d) Describe four final circuits that may be included in the house installation and the protection required for each. **(5 Marks)**

QUESTION TWO

A manufacturing company experiences frequent electric shocks from metallic machine casings.

(a) Explain why earthing is necessary in electrical installations. **(5 Marks)**

(b) Describe the components of a complete earthing system. **(5 Marks)**

(c) Explain how equipotential bonding improves safety. **(5 Marks)**

(d) Describe the Fall-of-Potential method used in measuring earth resistance. **(5 Marks)**

QUESTION THREE

A commercial building requires an emergency power and lighting system to ensure safe evacuation during power failure.

(a) Differentiate between standby, supplementary and emergency power supplies. **(5 Marks)**

(b) Explain the objectives of emergency lighting. **(5 Marks)**

(c) Compare maintained and non-maintained emergency lighting systems. **(5 Marks)**

(d) Discuss the factors that influence the choice of automatic or manual changeover systems. **(5 Marks)**

QUESTION FOUR

A large office complex requires protection against overloads, short circuits and earth faults.

(a) Explain the purpose of circuit protective devices in an electrical installation. **(5 Marks)**

(b) Compare HRC fuses and MCBs. **(5 Marks)**

(c) Explain the operation of an RCD during an earth fault. **(5 Marks)**

(d) Recommend suitable protective devices for:
i. Final circuits

ii. Sub-main circuits

iii. Main switchboards

Give reasons for your answers. **(5 Marks)**

QUESTION FIVE

An industrial workshop experiences repeated electrical faults resulting in equipment breakdown and production losses.

(a) Classify electrical faults under electrical, mechanical and magnetic faults. **(5 Marks)**

(b) Describe five troubleshooting instruments and their applications. **(5 Marks)**

(c) Outline the procedure for troubleshooting an electrical installation safely. **(5 Marks)**

(d) Recommend maintenance practices that can reduce the occurrence of faults in the workshop. **(5 Marks)**

END