



UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER TWO EXAMINATIONS

ACADEMIC YEAR 2025/2026

DEPARTMENT : ICT AND ENGINEERING

SESSION : DAY/EVENING/WEEKEND

YEAR OF STUDY: ONE

PROGRAMMES : DEEE & DECE

COURSE : ELECTRICAL & ELECTRONIC WORKSHOP PRACTICE

COURSE CODE : ELT 1202

DATE : FRIDAY, 26TH, JUNE 2026

TIME : 9:00AM-12:00PM [3HOURS]

EXAM ROOM : LAB (1,2,3) ,3.3,3.2, Hardware lab, Smart class & Seminar

INSTRUCTIONS:

- i. This paper consists of two (2) sections: Section A and Section B
- ii. Section A is compulsory and all numbers **MUST** be attempted
- iii. Section A has a total of 40 marks
- iv. Attempt ONLY three (3) questions from section B

SECTION A (40 MARKS) – COMPULSORY

PART I: OBJECTIVE QUESTIONS (20 MARKS)

Answer ALL questions. Each question carries 1 mark.

1. During a practical workshop session, a student notices that the insulation on a portable drill's power cable is damaged and some conductor strands are visible. The student intends to continue using the drill because it is still operating normally. What should be the most appropriate action?

- A. Continue using the drill while avoiding contact with the damaged section
- B. Wrap the damaged section with paper and continue working
- C. Disconnect the drill from the supply and report the defect for repair
- D. Reduce the supply voltage before using the drill

2. An electrician receives an electric shock and remains in contact with a live conductor. Which action should be taken FIRST by a nearby colleague?

- A. Pull the victim away immediately using bare hands
- B. Pour water on the victim
- C. Isolate the electrical supply before assisting the victim
- D. Begin artificial respiration immediately

3. During an inspection of a domestic installation, an electrician discovers that all metallic parts of appliances have been properly connected to the earthing system. What is the primary purpose of this arrangement?

- A. To improve the brightness of lamps
- B. To increase the efficiency of appliances
- C. To provide a low-resistance path for fault currents
- D. To reduce electricity consumption

4. An earth resistance test reveals that the earth electrode resistance is significantly higher than the recommended value. Which of the following is the most likely consequence?

- A. Improved operation of protective devices
- B. Increased protection against electric shock
- C. Reduced effectiveness of the earthing system
- D. Reduced voltage drops in conductors

5. A technician is preparing to solder two conductors together. Before applying solder, the conductors are cleaned and flux is applied. Why is this procedure necessary?

- A. To increase conductor resistance
 - B. To improve solder adhesion and electrical continuity
 - C. To increase the diameter of the conductor
 - D. To reduce current flow through the joint
6. After inspecting a completed soldered joint, the technician notices that the solder surface appears dull, rough, and uneven. This condition most likely indicates:
- A. A properly completed joint
 - B. Excessive conductor size
 - C. A cold soldered joint
 - D. Excessive insulation resistance
7. A house owner wants a staircase lamp to be controlled from the ground floor, first floor, and second floor. Which wiring arrangement should be installed?
- A. One-way switching circuit
 - B. Two-way switching circuit
 - C. Intermediate switching circuit
 - D. Ring final circuit
8. During the installation of a lighting circuit, an electrician selects PVC conduit instead of surface wiring. What is the main advantage of using conduit wiring?
- A. Lower mechanical protection
 - B. Improved protection of conductors from damage
 - C. Increased conductor resistance
 - D. Reduced circuit continuity
9. In a domestic installation, which accessory is specifically designed to support a pendant lamp and provide a connection point for circuit conductors?
- A. Socket outlet
 - B. Ceiling rose
 - C. Junction box
 - D. Consumer unit
10. A client requests a device that can safely isolate the entire electrical installation from the incoming supply during maintenance work. Which accessory should be installed?
- A. Ceiling rose

B. Main switch

C. Lamp holder

D. Intermediate switch

11. An electrical contractor recommends a ring final circuit for supplying socket outlets in an office block. What is the main advantage of this type of circuit?

A. It requires larger conductors than radial circuits

B. It allows current to be supplied through two paths

C. It eliminates the need for circuit protection

D. It operates without earthing

12. During testing of a ring circuit, one conductor is found to be broken. What is the most likely effect?

A. The circuit automatically becomes safer

B. Socket outlets will continue operating exactly as designed

C. Part of the circuit may become overloaded

D. The supply voltage increases

13. An electrician needs to remove insulation from a conductor without damaging the conductor strands. Which tool is most appropriate?

A. Hammer

B. Hacksaw

C. Wire stripper

D. Chisel

14. While tightening terminal screws in a distribution board, which tool should be used?

A. Combination pliers

B. Screwdriver

C. Soldering iron

D. Crimping tool

15. Before energizing a newly installed circuit, an electrician performs a continuity test. The main purpose of this test is to verify:

A. The insulation quality of conductors

B. The presence of a complete conductive path

- C. The supply voltage level
- D. The earth resistance value

16. An insulation resistance test produces a very low resistance value between phase and earth conductors. This result indicates:

- A. Good insulation condition
- B. Correct polarity
- C. Possible insulation breakdown or leakage path
- D. Proper earthing

17. During cable installation in conduit, excessive force is applied while pulling conductors through bends. What is the most likely consequence?

- A. Improved cable insulation
- B. Damage to conductor insulation
- C. Reduced cable resistance
- D. Improved current-carrying capacity

18. A distribution board is installed at a location that is difficult to access during emergencies. Which principle of good installation practice has been violated?

- A. Accessibility
- B. Continuity
- C. Polarity
- D. Selectivity

19. In a domestic installation, a circuit breaker trips immediately whenever a kettle is switched on. Which fault condition is most likely responsible?

- A. Open circuit
- B. Reverse polarity
- C. Overload or short circuit
- D. High insulation resistance

20. During troubleshooting of a lighting circuit, the electrician measures supply voltage at the distribution board but not at the lamp holder. Which fault is most likely present?

- A. Open circuit between the board and lamp holder
- B. Excessive earthing
- C. Correct circuit operation

D. Excessive soldering

PART II: SHORT ANSWER QUESTIONS (20 MARKS)

21. Explain four safety precautions that should be observed before commencing work on an electrical installation. (4 Marks)

22. Describe the procedure for administering first aid to a victim of electric shock. (3 Marks)

23. A three-bedroom house is to be wired using PVC conduit wiring. The installation includes:

- Six lighting points
- Four one-way switches
- Two two-way switching points
- One intermediate switching point
- Eight socket outlets
- One distribution board

Draw a simple wiring layout showing the arrangement of the above accessories within the installation. (5 Marks)

24. State four common wiring accessories used in domestic installations and explain one function of each. (4 Marks)

25. Outline four tests that should be carried out before commissioning an electrical installation and state the purpose of each test. (4 Marks)

SECTION B (60 MARKS)

ANSWER ANY THREE (3) QUESTIONS

QUESTION TWO (20 MARKS)

A newly constructed computer laboratory is being connected to the national grid. The consultant engineer insists that a properly designed earthing system must be installed before the building can be commissioned.

- a) Explain why an earthing system is particularly important in a computer laboratory environment containing computers, networking equipment, printers, and UPS systems. (6 Marks)
- b) With the aid of a well-labelled sketch, describe the components of a complete earthing system and explain the function of each component. (8 Marks)
- c) During testing, the measured earth resistance value is found to be significantly higher than the acceptable limit.

Explain three possible causes of the high resistance value and recommend one corrective action for each cause. (6 Marks)

QUESTION THREE (20 MARKS)

A client has requested you to supervise the electrical installation of a three-bedroom residential house consisting of lighting points, socket outlets, security lighting, and outdoor utility connections.

a) Describe the complete wiring process that should be followed from receipt of the building drawings up to commissioning of the installation. (8 Marks)

b) The installation requires the use of several wiring accessories.

For each of the following accessories, explain its function and identify a suitable location where it should be installed:

i. Consumer unit

ii. Socket outlet

iii. Ceiling rose

iv. Junction box (8 Marks)

c) Explain four factors that should be considered when selecting electrical accessories for a residential installation. (4 Marks)

QUESTION FOUR (20 MARKS)

An electronics maintenance workshop has experienced repeated equipment failures traced to poor soldered joints. Management has directed all technicians to improve the quality of their soldering work and adopt standard soldering procedures.

a) Explain the importance of soldering in electrical and electronic installations. (4 Marks)

b) Describe the procedure for producing a high-quality soldered joint, beginning with preparation of the conductors and ending with inspection of the completed joint. (8 Marks)

c) During inspection of completed work, the following defects are identified:

- Cold joint
- Dry joint
- Excessive solder deposition

For each defect:

i. Explain how the defect occurs.

ii. Explain its effect on circuit performance.

iii. Recommend a corrective action. (6 Marks)

d) State two safety precautions that should always be observed during soldering operations. (2 Marks)

QUESTION FIVE (20 MARKS)

A client owns a three-storey residential building and wishes to control the staircase lighting from the ground floor, first floor, and second floor. The client has requested an installation that allows the same lighting point to be switched ON or OFF from any of the three locations.

a) Identify the most suitable wiring circuit for this application and justify your choice. (2 Marks)

b) With the aid of a neat circuit diagram, illustrate how the circuit should be connected. (8 Marks)

c) Explain the function of each of the following components within the circuit:

i. One-way switch

ii. Two-way switch

iii. Intermediate switch

iv. Lamp holder (4 Marks)

d) During testing, the lamp can only be controlled from two locations instead of three.

Explain two possible wiring faults that could cause this problem and describe how each fault can be corrected. (4 Marks)

e) State two advantages of using an intermediate switching arrangement in multi-storey buildings. (2 Marks)

QUESTION SIX (20 MARKS)

A technical institution plans to establish a new electrical workshop for training students in installation, testing, maintenance, and fault diagnosis. You have been appointed as part of the team responsible for selecting tools and developing maintenance procedures.

a) Recommend five essential hand tools that should be provided in the workshop and explain the specific purpose of each tool. (5Marks)

b) Explain four factors that should be considered when selecting electrical tools and equipment for workshop use. (4 Marks)

c) Explain the meaning of electrical safety and state at least three possible workshop hazards and how each likely come about (6 Marks)

c) Develop a maintenance schedule for workshop tools by outlining four routine maintenance activities that should be carried out and explaining their importance. (5Marks)

END