

071304T4EIN

ELECTRICAL INSTALLATION LEVEL 4

ENG/OS/EI/CC/03/4/A

Apply Electrical Principles

March/April 2025



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

INSTRUCTIONS TO CANDIDATE

1. This paper consists of **TWO** sections **A** and **B**.
2. Attempt **ALL** the questions in each section.
3. Marks for each question are indicated in the brackets.
4. You are provided with a separate answer booklet to answer the questions.
5. **DO NOT** write on the question paper.

This paper consists of FOUR (4) printed pages
Candidates should check the question paper to ascertain that all pages
are printed as indicated and that no questions are missing

SECTION A (10 MARKS)

Attempt all questions in this section. Each question carries one mark

1. Electric current is an essential concept in physics and electrical engineering. Which of the following is the SI unit of electric current?
 - A. Volt
 - B. Ampere
 - C. Ohm
 - D. Coulomb
2. Resistors use color bands to indicate their resistance values. Identify a color band representing a resistor value of $220\ \Omega \pm 10\%$?
 - A. Red, Red, Brown, Silver
 - B. Red, Black, Red, Gold
 - C. Red, Red, Black, Silver
 - D. Red, Red, Black, Gold
3. Motors can be classified based on their phase and application. Which of the following is a single-phase AC motor?
 - A. Induction motor
 - B. Stepper motor
 - C. Synchronous motor
 - D. Universal motor
4. Earthing plays a critical role in electrical safety. What is the purpose of earthing?
 - A. To increase voltage
 - B. To ensure the circuit is open
 - C. To prevent electrical shock hazards
 - D. To reduce power consumption
5. Capacitors come in various types for different applications. Which of the following is NOT a type of capacitor?
 - A. Ceramic capacitor
 - B. Electrolytic capacitor
 - C. Transformer capacitor
 - D. Tantalum capacitor

6. Inductance in a circuit affects current and voltage behavior. What is the effect of increasing inductance in a circuit?
- A. Decreases resistance
 - B. Increases current flow
 - C. Opposes change in current
 - D. Reduces voltage
7. The behavior of bulbs in series circuits depends on their connection. If there are two bulbs connected in series and one bulb blows out, what happens to the other bulb?
- A. The other bulb continues to glow
 - B. The other bulb stops to glow
 - C. The other bulbs glow with increased brightness
 - D. The other bulb burns out
8. In three-phase systems, voltage phases are separated at specific angles. In a three-phase power system, the voltages are separated by:
- A. 45°
 - B. 90°
 - C. 120°
 - D. 180°
9. Which of the following is a good conductor of electricity?
- A. Rubber
 - B. Copper
 - C. Plastic
 - D. Glass
10. Resistance measurement in earthing systems is critical for safety. Which test is used to measure the resistance of an earthing system?
- A. Megger test
 - B. Voltage test
 - C. Continuity test
 - D. Earth resistance test

SECTION B (40 MARKS)

Attempt ALL questions in this section.

11. Electrical quantities are fundamental for analyzing circuits. List FOUR electrical quantities and their definition (4 Marks)
12. A circuit has a voltage of 24 V and resistance of $8\ \Omega$. Calculate the current. (3 Marks)
13. Single-phase motors require specific methods to start effectively. state FOUR methods to start single-phase motors. (4 Marks)
14. A single-phase motor operates at 230 V with a power output of 1.5 kW. Calculate the current (3 Marks)
15. Calculate the equivalent resistance of three resistors, $4\ \Omega$, $6\ \Omega$, and $12\ \Omega$, connected in parallel. (3 Marks)
16. Capacitors are key components in electronic circuits. List FOUR types of capacitors. (4 Marks)
17. A capacitor of $5\ \mu\text{F}$ is connected to a 10 V source. Calculate the charge stored in the capacitor. (3 Marks)
18. There are different types of earthing, State TWO types of earthing. (2 Marks)
19. Use Kirchhoff's laws to work shown in Figure 1. (9 Marks)

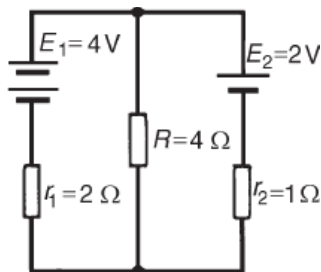


Figure 1

20. Conductors and insulators have different functionalities in electrical and electronic circuits. State TWO differences between conductors and insulators giving one example in each case. (5 Marks)