

071305T4EOP

ELECTRICAL OPERATION LEVEL 5

ENG/OS/PO/CR/01/5/A

Perform Electrical Installation

March/April 2025



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

WRITTEN ASSESSMENT
Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE

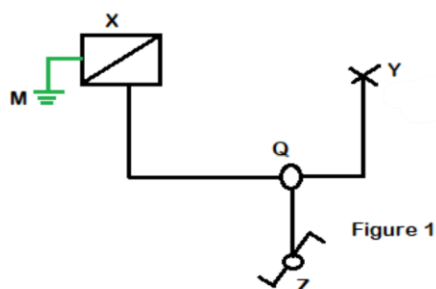
1. This paper consists of **TWO** sections: **A** and **B**.
2. Marks for each question are indicated in the brackets.
3. Candidates are provided with a separate answer booklet
4. **DO NOT** write on this question paper.

This paper consists of FIVE (5) 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 (40 MARKS)

Answer ALL the questions in this section.

1. Hazardous materials require proper disposal if present within an electrical installation. State **four** hazardous materials that may require proper disposal. (4 marks)
2. Different cable sizes are required for different electrical installation works. Highlight **three** factors that determine the cable size for use in an electrical installation. (3 marks)
3. Conductors play an important role in electrical installation. Calculate the current-carrying capacity of a 0.1 cm^2 conductor if the current density of the conductor is 400 A/cm^2 . (2 Marks)
4. In any electrical installation system, cables are protected to reduce danger to users of the system. List **three** types of conduit systems. (3 marks)
5. Residual current devices play an important role in electrical installation protection and isolation. Explain how a single phase High Breaking capacity (HBC) fuse works. (4 marks)
6. You are contracted to carry out commercial installation of a two-storey building. List **four** materials you will require. (4 Marks)
7. List **four** activities that you could carry out that would demonstrate 'a safe method of working' on a construction site and that would reduce the risk of an electrical accident occurring. (4 Marks)
8. IEE Regulation 611.3 gives a checklist of items to be considered in the initial visual inspection of an electrical installation. List **Four** of the most important items to be considered in the visual inspection process. (4 Marks)
9. Unbalanced three phase power supply systems must have a neutral or return power for unbalanced currents. Calculate the neutral current within a three-phase circuit when the current for each phase is $I_1 = 70\text{A}$, $I_2 = 90\text{A}$ and $I_3 = 35\text{A}$. (4 marks)
10. Name the parts marked X, Y, Z, Q and M in schematic diagram shown in figure 1. (4 marks)



11. During planning of a domestic wiring in a building you are required to make a choice of various electrical tools as per the tasks. State the functions of the following tools.

(4 marks)

- a) Wire strippers;
- b) Slip joint pliers;
- c) Electrician knife;
- d) Steel tape.

SECTION B (60 MARKS)

Answer any THREE questions in this section.

12. a) With reference to the code of Occupational Safety and Health Standards during installation, state four safe working procedures relevant to:
- (i) Your own safety; (4 marks)
 - (ii) The safety of others; (2 marks)
 - (iii) Systems/equipment. (4 marks)
- b) Ring and radial are final power circuits. In reference to socket outlets, discuss these final circuits. (6 marks)
- c) Electrical installation fittings and components to be used in an installation requires better understanding and skills on the area of application. List **four** factors to be considered when selecting electrical components for an installation. (4 marks)
13. a) In order to perform the wiring for a domestic installation system, an appropriate wiring system must be chosen. Discuss **five** factors considered when selecting a wiring system for an installation. (10 marks)
- b) A testing certificate is a formal document issued by a qualified electrician that confirms a system has undergone specific tests and met the specified requirements of a relevant standard. Highlight any **five** details that should be included in a testing certificate. (5 marks).
- c) A site plan of an installation helps in interpreting, estimating project cost and ensures that correct materials are chosen for the installation. List **five** components of a site plan. (5 marks)
14. a) Before commissioning an installation project, tests need to be done to determine the suitability of the installation. Describe **five** common types of tests that may be carried out before commissioning phase. (10marks)
- b) Name **two** equipment/instruments used in carrying out phase balance test. (2 marks)
- c) Electrical installation systems must have earthing mechanisms provided. Discuss **four** types of earthing systems which can be used in an electrical installation. (8 Marks)
15. a) Documentation of electrical installation inspection and testing is a cornerstone in maintaining a safe and reliable electrical system. Discuss **five** reasons why documentation of electrical installation inspection and testing is important. (10 marks)
- b) Draw the symbol of each of the electrical installation equipment and accessories shown in table 1. (5 marks)

Table 1

Name	Symbol
Fluorescent lamp	
Consumer control unit	
Intermediate switch	
Electric bell	
Time switch	

c) A 230 V ring main circuit of socket outlets is wired in 2.5 mm² single PVC copper cables in a plastic conduit with a separate 1.5 mm² CPC. An earth fault loop impedance test identifies Z_s as 1.15 Ω . Verify that the 1.5 mm² CPC meets the requirements of IEE Regulation 543.1.3 when the protective device is a 30 A semi-enclosed fuse. (5 Marks)