071305T4EIN

ELECTRICAL INSTALLATION LEVEL 5

ENG/OS/EI/CR/03/5

Perform Testing of Electrical Installation

July/August 2024

Time: 3 Hours

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

WRITTEN ASSESSMENT

3 HOURS

INSTRUCTIONS TO CANDIDATE:

1. This paper consists of **TWO** sections: **A** and **B**.
2. Answer questions in all sections as instructed in the answer booklet provided.
3. Marks for each question ar indicated in brackets.
4. Do not write on this question paper.
5. Answer the questions in **English.**

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

SECTION A (40 MARKS)

*Answer **ALL** the questions in this section*

1. While carrying out testing of an electrical installation, there are some parts of the installation you would exempt from earth connection. Name **two** of these parts. (4 marks)
2. A proper earthing system for any electrical installation provide a means of protection to both the user and the installation. Explain how this is achieved. (4 marks)
3. Testing of a new Electrical Installation is a recommendation as per IEE regulations. List **four** reasons for carrying out this task as a profession. (4 marks)
4. Before performing any electrical testing on an installation, a visual inspection is crucial to ensure safety and identify potential issues. Outline **four** items that should be visually inspected before testing an electrical installation. (4 marks)
5. During your assignment to carry out a test on an electrical equipment, you noticed a fault caused by sustained overloading of wiring and equipment. Explain the effect of the fault discovered if not corrected in time. (4 marks)
6. Given a circuit with a circuit fuse operated at 50A and the supply voltage is 240V
   a) Find the maximum allowed resistance of the earth fault loop. (2 marks)
   b) State condition if the value recorded after test exceeds this value (2 marks)
7. The ability of a digital oscilloscope to analyze electrical signals with high accuracy makes it an essential piece of equipment for a wide range of applications. Explain the **two** uses of a digital oscilloscope when testing electrical circuits. (4 marks)
8. During visual inspection, color coding is an important factor for an electrical installation. Outline the **three** color coding scheme used in Kenya. (3 marks)
9. Documentation of electrical installation inspection and testing is a cornerstone of maintaining a safe and reliable electrical system. List **four** reasons why documentation of electrical installation inspection and testing is important. (4 marks)
10. One of the precautions in use of electrical appliances is waste disposal. Outline **five** methods of disposing electrical waste. (5 marks)

SECTION B (60 MARKS)

*Answer **THREE** questions in this section*

11. a) The specific tests conducted on an electrical installation can vary depending on factors like the type of installation (residential, commercial, industrial), local electrical codes, and its intended use. Identify **four** types of tests conducted on an electrical installation. (4marks)

    b) State the reason for conducting each of the tests in *(a)* above (8 marks)

    c) Identify typical satisfactory results for each test carried out on electrical circuit installation. (8 marks)

12. a) With reference to the code of Occupational Safety and Health Standards during testing, 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) An insulation resistance test carried out at a lighting distribution board shows that a low resistance fault exists between the neutral and the steel conduit of the installation. Describe **two** insulation resistance tests that can be adopted to locate the fault. (10 marks)

13. a) A person is reported to have received a serious electric shock while cleaning the reflector of a reading lamp with a damp cloth. The lamp had been switched off but the plug was not disconnected from the socket.

    i. State the reason that made this person to be electrocuted. (2 marks)

    ii. Identify what needs to be done to rectify this fault (2 marks)

    iii. Describe the solution above that is supposed to be carried out (8 marks)

    b) Name **three** equipment/instruments used in carrying out electrical installation tests. (4 marks)

    c) Following the IEE Wiring Regulation requirements for final circuits is crucial for ensuring the safety, functionality, and code compliance of your electrical installation. Outline **four** IEE regulations requirements regarding final circuits in an electrical installation (4 marks)

14. Grace is an electrical installation technician and has been awarded a sub-contract to perform a domestic electrical installation in Butali Plaza by the main contractor, Lukala Contractors. Electrical engineers from Lukala's, have already designed the layout and provided the schedule of materials to her.

Requirements:

a) Upon completion, Grace performed several tasks before commissioning the installation. One of those tasks is to perform several electrical tests relevant to the installation. These tests are to be carried out in the sequence given in IEE Regulations for reasons of safety and accuracy. Write down this sequence. (10 marks)

b) One of the tests that Grace needs to carry out is a continuity test. Explain the procedure for carrying out this test (8 marks)

c) State **two** documents that Grace should submit to the main constructor after inspection and testing. (2 marks)

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