©2024 TVET CDACC

071305T4 EOP

ELECTRICAL OPERATOR LEVEL 5

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

PERFORM ELECTRICAL INSTALLATION.

July/August 2024

Time: 3 Hours

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

WRITTEN ASSESSMENT

3 HOURS

easytvet.com

INSTRUCTIONS TO CANDIDATE:

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

This tool consists of FIVE (5) printed pages

Candidates should check the tool 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. Good housekeeping practices are essential in any workspace, especially in an electrical workshop where safety is paramount.Highlight **four** good housekeeping practices in reference to an electrical workshop during installation. (4 marks)
2. The Institution of Engineering and Technology (IET) publishes the Wiring Regulations, which are often referred to as the IEEE Wiring Regulations .Describe **four** IEEE regulations observed during electrical installation. (4 marks)
3. Cartridge fuses are electrical safety devices used to protect electrical circuits from overcurrent. State **four** parts of cartridge Fuse (4 marks)
4. By conducting polarity tests, electricians and inspectors can verify that electrical installations are safe, functional, and compliant with regulations, thereby promoting the overall reliability and safety of the electrical system.Give **four** reasons as to why the polarity test is carried out in an electrical installation systems? (4 marks)
5. In a three-phase system with heating loads drawing different values of current on each phase, the presence of a neutral conductor in the cable supplying the final sub-circuit is crucial.Discuss any **two** reasons why a neutral conductor is required? (4 marks)
6. Using busbar trunking system offers several advantages in electrical power distribution. Outline **four** advantages of using Busbar Trunking System. (4 marks)
7. In electrical installation, various types of diagrams are used to represent different aspects of the system. Highlight **four** types of diagrams used in electrical installaton (4 marks)

easytvet.com

8. Table 1 shows circuitsfactors that influence the choice of cable size and protective device rating in an electrical circuit design. Fill it accordingly. (6 marks)

Table 1:

Final circuit	Protective device rating	Cable size
Socket circuits		
Cooker		
Lighting		

9. When using a mega-ohmmeter to test insulation resistance in a circuit, several errors can occur that may affect the accuracy of the measurement. Explain **three** possible errors experienced when using a mega-ohmmeter when testing insulation resistance of a circuit. (3 marks)

eastvet.com

10. Documenting test results of an electrical installation provides transparency, accountability, and assurance that the installation meets safety standards, facilitates effective maintenance and troubleshooting, and protects stakeholders from liability risks. Outline any **three** importance of documenting test results of an electrical installation. (3 marks)

SECTION B (60 Marks)

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

11.

a) By carefully considering these factors, electrical engineers, contractors, and building owners can select the most suitable wiring system that meets safety requirements, cost constraints, environmental conditions, regulatory compliance, aesthetic preferences, and future flexibility needs. Explain six factors that affect the choice of wiring system.

(12 marks)

b) Mouth-to-mouth resuscitation, also known as rescue breathing, is a first aid technique used to provide oxygen to someone who is not breathing or experiencing respiratory distress.Describe the procedure of conducting mouth-to-mouth resuscitation method.

(8 marks)

12.

a) During a site survey of an electrical installation, several documents are essential for ensuring safety, compliance, and efficient planning. Explain **four** main documents to be in place during a site survey of an electrical installation (8 marks)

easytvet.com

b) An institution has the following loads connected to a three phase supply.

i. Lighting circuits: 2 circuit tungsten lighting. Total 2530 watts

ii. Socket: 2 × 30A ring circuits to 13A socket outlets

iii. Water heating: $1 \times 7Kw\ shower$

$3 \times 3\ Kw\ immersion\ heater\ thermostatically\ controlled$

Given the diversity factor for tungsten, 13A socket, and water heater shower and immersion heater as 75%, 60%, 89% and 95% respectively. Determine the total load current for the system. (12 marks)

13.

a) The national government of Kenya has built fifty units of affordable houses in Nairobi County. As the county chief engineer, you are required to inspect the electrical installations in the fifty units.list correct sequence of the equipment at the consumer's intake point (6 marks)

b) A wiring diagram for a ring final circuit illustrates how electrical components are connected in a ring configuration to supply power to sockets or outlets within a building. Ring final circuits are commonly used in residential, commercial, and industrial electrical installations. Explain using a diagram a ring final circuit. (6 marks)

c) Explain **two** advantages and disadvantages of a ring over radial final circuit. (8 marks)

14.

a) Conduit wiring systems are commonly used in electrical installations to protect and route electrical wires and cables. Discuss **five** IEE Regulation concerning conduits wiring system. (10 marks)

b) Electrical installations present various hazards that can pose risks to both people and property. State **five** types of hazards that may be encountered in electrical installations. (5 marks)

easytvet.com

c) Protecting an installation is crucial for its efficient and safe operation. Highlight **five** factors which an installation must be protected against. (5 marks)

THIS IS THE LAST PRINTED PAGE