

073106T4EEN

ELECTRICAL ENGINEERING (POWER OPTION) LEVEL 6

ENG/OS/PO/CR/06/6

Install Security Systems

November/December 2025



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

WRITTEN ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. Marks for each question are indicated in the brackets.
2. Attempt **ALL** questions in section A and **ANY THREE** (3) questions in section B.
3. The paper consists of **TWO** sections: **A** and **B**.
4. Candidates are provided with a separate answer booklet
5. **DO NOT** write on this 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 (40 MARKS)

(Attempt ALL the questions in this section)

1. Security stems provide surveillance and other capabilities used in the protection of people, assets and systems. List FOUR types of security systems. (4 Marks)
2. Smoke detector is one of the sensing equipment in a fire alarm system. Briefly illustrate the working principle of a smoke detector. (4 Marks)
3. Closed-circuit camera systems offer continuous and reliable visual monitoring. Write down THREE applications of CCTV. (4 Marks)
4. An access control system is a type of security system designed to manage and monitor the entry and exit of individuals in a secured area. Write down any TWO types of access control systems. (2 Marks)
5. Discuss the following terms used in security systems.
 - a) System zones/call points. (2 Marks)
 - b) Cable segregation. (2 Marks)
 - c) Arming and disarming. (2 Marks)
6. Outdoor and indoor device enclosures are usually marked IP (ingress protection rating).
 - a) Briefly elaborate the meaning of these ratings. (2 Marks)
 - b) List the characteristics of enclosures with the following ratings IP20 and IP69 (2 Marks)
7. Thermal insulation class shows the maximum operating temperature the insulation can withstand. State FOUR thermal insulation classes with their temperature ratings. (4 Marks)
8. A transformer is connected to the supply of electric bells. State any THREE IEE regulations on bell transformer. (3 Marks)
9. There are many ways of powering CCTV cameras for proper operation. State any THREE ways this operation can be done. (3 Marks)
10. Cables are critical components in an electrical security system. Discuss FOUR major benefits of cable segregation when installing electrical security system cables (4 Marks)

11. With the help of a block diagram, sketch a typical fire alarm system. (4 Marks)

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SECTION B (60 MARKS)

(Attempt any THREE questions in this section.)

12. Cables used in CCTV systems carry power and signals.
- a) Describe FOUR types of cables used in CCTV system installation. (8 Marks)
 - b) A security system comprises of notification devices. List any FOUR notification devices. (4 Marks)
 - c) After an installation of security system, various tests should be carried out before commissioning. Outline the purpose following tests carried out. (2 Marks)
 - (i) Insulation resistance test:
 - (ii) Short-circuit test:
 - d) Data transmission media refers to the physical pathways through which data travels between the devices in a security system. Describe THREE types of data transmission infrastructure in security systems. (6 Marks)

13. An electric fence is used to enhance the security of sensitive areas, such as military installations, prisons and other security-sensitive places. However, they are frequently used in agricultural fencing and other forms of animal control.

a) Explain the roles of the following components of an electric fence. (10 Marks)

- (i) Energizer
- (ii) Insulators
- (iii) End strainers
- (iv) Posts/Stakes
- (v) Warning signs

b) Describe THREE types of cables used in electric fence installation. (6 Marks)

c) There are two most common types of recorders used by CCTV systems, list them and explain their applications. (4 Marks)

14. During the installation of security systems, proper documentation and records should be created and maintained at all times.

a) Outline any FIVE essential documents to be created/maintained throughout a security system installation project. (10 Marks)

b) CCTV system provides surveillance capabilities used in the protection of people, assets and systems. Give FIVE differences between DVR and NVR based CCTV system. (10 Marks)

15. Security system control panels act as the brain of the security system for processing input signals from sensors and triggering alarms when threats are detected.

a) Describe any THREE types of control panels. (6 Marks)

b) Briefly explain FOUR factors to consider when mounting control panels. (8 Marks)

c) Intrusion detection security system is a type of security system that protects secured area from unauthorized access or breach of security in the secured area. Describe any THREE components of home/intruder detection security system. (6 Marks)