

ELECTRICAL OPERATION (POWER OPTION) LEVEL 5

ENG/OS/PO/CR/P05nted By And Vocational College Date: 20.11.2025 07:35 AM
Install Security Systems

November/December 2025.

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

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WRITTEN ASSESSMENT

Time: 3 HOURS

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INSTRUCTIONS TO CANDIDATE

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1. sections **A** and **B**.
2. Attempt **ALL** questions in section A and **ANY THREE (3)** questions in section B.
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a booklet.
5. Do not write on the question paper.

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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)

Attempt ALL the questions in this section.

1. Open alarm circuit used in basic security systems, but they come with limitations that can affect system performance. State THREE disadvantages of open alarm circuit. (3 marks)

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2. Security alarm systems rely on various detectors to sense unauthorized access or environmental hazards. Highlight FOUR types of systems. (4marks)
3. Modern security technology encompasses a range of systems designed to protect property and people. State THREE types of security systems (3marks)
4. As technology advances, security systems are continually evolving to address new challenges. List THREE latest trends in security system technology

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5. While designing fire alarm systems, larger buildings must be divided into zones so that the location of the fire can be quickly identified by the emergency services. In selecting the zones, certain factors must be considered. Elaborate THREE such factors. (3mks)

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6. Digital Video Recorders (DVRs) are critical components of CCTV systems, offering both storage and playback capabilities. Identify THREE good features of a CCTV DVR (3marks)

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7. Troubleshooting is an essential part of maintaining a reliable security system. Outline THREE key points to be observed during troubleshooting of security systems. (3marks)

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8. Selecting an appropriate wiring system is crucial for ensuring the safety, reliability, and efficiency of a security system. Elaborate TWO factors considered when selecting a particular wiring system for a given installation (2marks)
9. CCTV systems can use either PC-based or embedded DVRs, each with distinct characteristics. Highlight FOUR key differences between PC-based Digital Video Recorder (DVR) and embedded DVR in CCTV installation (4marks)
10. Fire alarm systems include both manual and automatic call points, each serving a specific purpose. Differentiate between manual and automatic call points in fire alarm system (2marks)

11. The placement of automatic fire detectors significantly affects their performance and reliability. Explain THREE reasons why automatic fire detectors should be installed away from direct heating appliances. (3marks)
12. When designing a control panel for burglar alarms, several critical factors need to be considered to ensure the system's effectiveness and reliability. List THREE such factors. (3 marks)
13. Define the following terms as used in security system installation. (4marks)

i. CCTV

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ii. Cable segregation

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SECTION B (60 MARKS)**Attempt Any THREE Questions in This Section**

14.

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(a) **Cable installations in high-temperature environments** require specific precautions to ensure safety and performance. Explain the standard procedure used in laying cables in high temperature zones. (6marks)

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(b) **Different types of cables** are used in security systems depending on their function and environment. State FOUR types of cables used in Security systems explaining the application for each case. (8 marks)

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(c) Proper segregation of cables in a security system installation helps prevent interference and improve system integrity. Explain THREE benefits of segregation in cable laying. (6marks)

15.

(a) Conducting continuity tests ensures that electrical connections in a system are complete and effective. Outline the procedure for continuity test using ohm range of

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auto-range digital meter (4marks)

(b) Electrical testing is essential to verify the integrity and safety of installed security systems. Explain FOUR benefits of Electrical Tests on Security systems.(8marks)

(c) **Multiple types of electrical tests can be used to ensure**

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proper functionality Explain FOUR electrical tests performed on a security system.

(8marks)

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16. Withto Alarm circuits;

(a) Outline FOUR components of electric fence (4marks)

(b) Explain THREE advantages of closed alarm circuit. (6marks)

(c) Closed alarm circuits are widely used in intrusion detection systems due to their fail-

safe design. With a diagram, explain the working of closed alarm

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circuit. (10marks)

17.

(a) **Emergency systems** are designed to operate under power failure conditions

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and they are categorized based on their operational modes. Distinguish between maintained and non-maintained emergency lighting systems (4 Marks)

(b) The Institute of Electrical and Electronics Engineers (IEEE) provides key standards that govern the design and installation of alarm circuits. Explain FOUR IEEE regulation applied in Alarm circuits. (8marks)

(c) Choosing the correct cable type is critical to ensuring the performance and durability of a security system. Describe FOUR factors to consider when choosing cables for security system

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