

071606T4IMT

INDUSTRIAL MECHATRONICS TECHNOLOGY LEVEL 6

ENG/OS/IMT/CR/12/6

Maintain Supervisory Control and Data Acquisition (SCADA) Systems

November/December 2025



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

WRITTEN

Test

INSTRUCTIONS TO CANDIDATE

1. Marks for each question are indicated in the brackets.
2. Answer all questions in section **A** and **ANY THREE** questions from 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 THREE (3) 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 questions in this section

1. SCADA System necessitates continuous troubleshooting and maintenance for optimization of its operations. List FOUR activities carried out during maintenance of SCADA system. (4 marks)
2. A SCADA system is mainly helps to ease fault diagnosis. Outline FOUR ways in which SCADA help to identify system faults. (4 Marks)
3. SCADA system remotely monitors all essential equipment in each substation from a single control center. Identify FOUR basic functions of SCADA control center. (4 Marks)
4. The distribution of individual SCADA system functions across multiple systems. Outline TWO functions of distributed stations in SCADA system. (4 marks)
5. Troubleshooting problems in a SCADA system can be difficult due to system complexity. Outline FOUR strategies that can be used to troubleshoot SCADA system issues. (4 marks)
6. SCADA system is made up of various automated components. Name FOUR components of a SCADA system. (4 marks)
7. After a maintenance exercise of a SCADA system, list FOUR typical safety concerns with remote control of switchgear and maintenance. (4 marks)
8. SCADA system is reliant on a computerized system operating as required. Identify FOUR measures that can be implemented to help prevent unauthorized off-site access. (4 marks)
9. SCADA system depends fully with communications from peripheral devices. Enumerate FOUR factors that influence the choice of transmission media in a SCADA system. (4 marks)
10. An auditor requests a detailed maintenance report for the last quarter to evaluate system reliability and compliance with manufacturer's standards. List FOUR reasons why maintaining accurate and complete maintenance reports is important in SCADA system management. (4 marks)

SECTION B (60 MARKS)***Answer THREE questions in this section***

11. During a routine maintenance check, it is noticed that a SCADA system is not communicating properly with the central server, and some data points are missing on the HMI display.

(a) Describe SIX step-by-step process you would follow to verify that the SCADA system is connected as per the manufacturer's standards. (12 marks)

(b) Explain FOUR specific checks you would perform to diagnose potential connection issues. (8 marks)

12.

a) Sensors in the SCADA system are core for data acquisition and transmission. Explain SIX common types of sensors found in SCADA systems. (12 Marks)

b) Faults in SCADA systems can disrupt the monitoring and control of industrial processes. Describe FOUR types of faults in a SCADA system. (8 marks)

13.

a) A SCADA system reports intermittent communication from one of its Remote Terminal Units (RTUs), and the maintenance manual suggests a potential hardware failure. Explain SIX ways of identifying the RTU from the maintenance manual. (12 marks)

b) After replacing a faulty network switch in a SCADA system, the system is required to be fully operational and free of network-related issues. Using FOUR steps describe the procedure of testing the replaced network switch as per the maintenance manual to confirm proper functionality. (8 marks)

14.

a) During routine monitoring of a SCADA system used to manage a water treatment plant, a flow sensor is observed to be showing erratic readings, affecting the accuracy of data displayed on the HMI. Describe FIVE specific steps to be taken to service the flow sensor to address the erratic readings, ensuring compliance with the manufacturer's standards and workplace procedures. (10 marks)

b) A task involving the inspection and calibration of pressure sensors is required for a SCADA System used to monitor and control crude oil pipeline operations. Discuss FIVE specific steps to be taken to accurately complete a work order for the maintenance task required, ensuring compliance with workplace procedures. (10 marks)