

071605T4MCT

MECHATRONICS TECHNOLOGY LEVEL 5

ENG/OS/MC/CR/01/5

Install Mechatronic Systems

July/August 2025



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

PRACTICAL ASSESSMENT

Ti URS

INSTRUCTIONS TO CANDIDATE:

1. You will be allocated 4 HOURS to complete the practical tasks.
2. The assessor will assess your performance at critical points and may record your performance using audio-visual means.
3. You are supposed to have a name tag.

This paper consists of THREE (3) printed pages.

The candidate should check the question paper to ascertain that all pages are printed as indicated and that no pages are missing.

System Functioning Overview

The objective is to install, wire, and program a PLC-controlled smart lighting system that operates in two modes: automatic and manual. In automatic mode, a proximity sensor detects an object to trigger a pneumatic cylinder and turn on an LED. Once the object is removed, the LED remains on for 1 minute before turning off.

In manual mode, the proximity sensor is disabled. The LED and cylinder can be manually controlled using push buttons. The mode selector switch determines the system operation.

You are required to perform the following tasks:

Task 1: Install the power and safety system

Mount and wire the circuit breaker and supply power to the PLC and 24VDC devices. Confirm safe voltage and isolation.

Task 2: Install and wire input and output devices

Wire proximity sensor, selector switch, push buttons, LED, and solenoid valve.

Task 3: Connect and test the pneumatic s

Connect the pneumatic cylinder to the sole e and air compressor. Ensure safe pressure levels. Manually test the actuation.

Task 4: Program the Programmable Logic Controller

Develop an input/output mapping table. Write logic for automatic and manual modes. Use a timer for the 1-minute LED delay. Ensure switching between modes using the selector switch.

Task 5: Test and operate the system

Test all system functions in both modes. Conduct safety and functionality checks and then run the system.

1. You have been provided with the following resources for the practical tasks:

- i. PLC unit
- ii. Proximity sensor
- iii. Double-acting pneumatic cylinder
- iv. 5/2 solenoid valve (24VDC)

- v. Air compressor with FRL unit
- vi. LED lamp (24VDC)
- vii. Mode selector switch (2-position)
- viii. Push button (NO)
- ix. Circuit breaker (6A–10A)
- x. Electrical wires
- xi. The PLC programming cable
- xii. A computer that is installed with appropriate programming software