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INDUSTRIAL AUTOMATION AND ROBOTICS LEVEL 6

ENG/OS/IA/CR/08/6

Install and Maintain Human Machine Interfaces

July/August 2025

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

PRACTICAL ASSESSMENT

Time: 3 HOURS

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INSTRUCTIONS TO CANDIDATE:

1. You are required to perform the following tasks as part of a practical assessment involving PLC and HMI integration for motor control.

   Install and configure a HMI system to control a motor in both forward and reverse mode as follows:

   a. When the HMI Forward push button is pressed:
      - A buzzer activates for 5 seconds
      - Then the motor then runs in the forward direction.

   b. When the HMI Reverse push button is pressed:
      - A 5-second delay occurs.
      - Then the motor runs in the reverse direction.

   c. Pressing the Stop push button at any time will stop the motor, regardless of its direction.

   d. During forward mode, a blinking forward graphic is displayed on the HMI.

   e. During reverse mode, a blinking reverse graphic is displayed on the HMI.

f. The operator can switch between HMI control and manual control using a selector switch on the HMI. In manual mode:
   - Push Button PB1 activates forward mode.
   - Push Button PB2 activates reverse mode.
   - Push Button PB3 stops the motor.

Tasks:

i. **Task 1: Install components**
   - Install the PLC
   - Install the HMI
   - Install the power supply
   - Install a.c socket outlet
   - Connect two proximity switches to the PLC inputs
   - Connect two contactors to the PLC outputs
   - Connect the contactors to the motor
   - Install the push buttons to the input of the plc

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ii. **Task 2: Test the system**
   - Perform continuity tests
   - Perform voltage tests

iii. **Task 3: Configure the PLC**
   - Configure hardware
   - develop the program

iv. **Task 4: Configure the HMI**
   - Configure the hardware
   - Create graphics for forwards and reverse modes

v. **Task 5: Perform functionality tests**
   - Verify that the system operates according to the logic sequence outlined above.

2. You have been provided with the following resources for the practical tasks:
    - PLC module
    - Power supply
    - Two contactors
    - HMI
    - Profinet cables
    - Connecting wires
    - Normally closed push button
    - Two normally open push buttons
    - Double socket
    - A plug
    - Din rail
    - Cable tray
    - Electronics toolkit
    - Buzzer

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