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Level One

MODULE 12101-01 - HAND TOOLS FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Safely use selected hand tools such as: • Yoke vise • Wrap around • Hacksaw • Flat file • Fish tape • Knockout punch • Extractor • Angle finder • Rodding-out tool		
2	Drill and tap a hole using a tap wrench and tap.		
3	Thread a rod using a die and diestock.		
4	Safely set up an oxyacetylene system.		

MODULE 12102-01 - ELECTRICAL SAFETY

Task Number	Item	Date(s)	Recorded By
1	Perform a visual inspection and an air test on rubber gloves.		
2	Perform a hazard assessment of a job such as replacing the lights in your classroom. • Discuss the work to be performed and the hazards involved. • Locate the closest phone to the work site and ensure that the local emergency telephone numbers are either posted at the phone or known by you and your partner(s). • Plan an escape route from the location in the event of an accident.		

MODULE 12103-01 - POWER TOOLS FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Safely use selected power tools such as: • Electric and pneumatic power hammers and drills • Electric soldering gun or iron • Hydraulic knockout punch		
2	Safely use a threading machine to cut, thread, and ream a section of pipe.		

MODULE 12104-01- ELECTRICAL SYSTEMS FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Measure and record the current, voltage, and resistance in a DC circuit.		
2	Calculate the power consumed by the circuit, using any two of the measured values.		

MODULE 12105-01 - METALLURGY FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Identify selected steel samples from their SAE or AISI code.		
2	Identify the material composition of a bolt from its ASTM markings.		

MODULE 12106-01 - FASTENERS

Task Number	Item	Date(s)	Recorded By
1	From a selection of threaded fasteners, select the correct fastener(s) for one or more applications specified by the instructor.		
2	From a selection of non-threaded fasteners, select the correct fastener for one or more applications specified by the instructor		
3	Install a blind rivet using a rivet gun.		
4	Drill a hole and install a toggle bolt.		
5	Install a nut and bolt and torque them to a torque value specified by the instructor.		

MODULE 12107-01 - INSTRUMENT DRAWINGS AND DOCUMENTS, PART ONE

Task Number	Item	Date(s)	Recorded By
1	Locate and identify drawing elements as specified in the performance exercise.		

MODULE 12108-01 - GASKETS AND PACKING

Task Number	Item	Date(s)	Recorded By
1	Correctly select, cut, and install one or more gaskets as specified by the instructor.		
2	Remove an existing packing and install a new packing.		
3	Correctly select and install an O-ring.		

MODULE 12109-01 - LUBRICANTS, SEALANTS AND CLEANERS

Task Number	Item	Date(s)	Recorded By
1	Choose the correct cutting fluid, sealant, and cleaner as specified in the performance exercise.		
2	Interpret the MSDS as specified in the performance exercise.		

MODULE 12110 - FLOW, PRESSURE, LEVEL, AND TEMPERATURE

Task Number	Item	Date(s)	Recorded By
1	Identify measurement devices, state the variable each device measures, and describe the principles of operation of each device as specified in the performance exercise.		

MODULE 12111-01 - TUBING

Task Number	Item	Date(s)	Recorded By
1	Bend copper tubing at 45-degree and 90-degree angles using a compression-type bender.		
2	Cut and deburr copper tubing using a hacksaw or tubing cutter.		
3	Install a flare fitting on a section of copper tubing.		

MODULE 12112-01 - PIPING - 2 INCHES AND UNDER

Task Number	Item	Date(s)	Recorded By
1	Cut, ream, and thread a section of pipe.		

MODULE 12113-01 - HOSES

Task Number	Item	Date(s)	Recorded By
1	Select the proper hose, cut a section of hose, and install a fitting appropriate for a given application.		

Level Two

MODULE 12201-03 - CRAFT-RELATED MATHEMATICS

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there is no performance testing.			

MODULE 12202-03 - INSTRUMENTATION DRAWINGS AND DOCUMENTS, PART TWO

Task Number	Item	Date(s)	Recorded By
1	Trace the circuit flow on a one-line diagram.		
2	Read and interpret an electrical raceway drawing.		
3	Read and interpret a piping and instrumentation drawing (P&ID).		
4	Read and interpret a loop sheet.		

MODULE 12203-03 - PRINCIPLES OF WELDING FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Select and apply the safety equipment required for welding.		
2	Safely transport and set up welding equipment.		
3	Attach equipment to cylinders.		
4	Open cylinder valves and adjust the pressure.		
5	Properly shut down and secure welding equipment.		

MODULE 12204-03 - PROCESS CONTROL THEORY

Task Number	Item	Date(s)	Recorded By
1	Draw and accurately label a block diagram for a basic process control loop.		
2	From a piping and instrumentation drawing (P&ID), identify the major components of each of these process control loops: • Feedforward • Feedback • Cascade • Ratio		

MODULE 12205-03 - DETECTORS, SECONDARY ELEMENTS, TRANSDUCERS, AND TRANSMITTERS

Task Number	Item	Date(s)	Recorded By
1	Given a measurement element, discuss the operation, advantages, and disadvantages of the device. Discuss at least three different devices.		
2	Analyze the operation of a pressure-to-current transducer based on a diagram of the transducer. Point out the inlet and outlet ports and describe the installation procedure.		
3	Draw a diagram containing the following devices: • Transducer • Electronic transmitter • Thermocouple as the primary element • Pneumatic receiver as the final element		

MODULE 12206-03 - CONTROLLERS, RECORDERS, AND INDICATORS

Task Number	Item	Date(s)	Recorded By
1	Given a schematic of a pneumatic controller, explain the purpose and operation of all major components.		
2	Given a block diagram of an electronic controller, explain the function of each block.		
3	Given an application, select an appropriate indicator.		
4	Connect and use a chart recorder.		

MODULE 12207-03 - CONTROL VALVES, ACTUATORS, AND POSITIONERS

Task Number	Item	Date(s)	Recorded By
1	Disassemble and reassemble one or more control valves.		
2	Install a positioner on a control valve.		
3	Locate bridgewall markings on a globe valve and determine the stem and packing orientation.		
4	Identify different actuators and positioners from specific drawings.		

MODULE 12208-03 - RELAYS AND TIMERS

Task Number	Item	Date(s)	Recorded By
1	Select and install various types of relays.		
2	Select and install various types of timers.		

MODULE 12209-03 - SWITCHES AND PHOTOELECTRIC DEVICES

Task Number	Item	Date(s)	Recorded By
1	Select and install various switches.		
2	Select and install various photoelectric devices.		

MODULE 12210-03 - FILTERS, REGULATORS, AND DRYERS

Task Number	Item	Date(s)	Recorded By
1	Identify the components of filters and regulators.		
2	Select the appropriate filter for a given application.		
3	Disassemble and reassemble a pressure regulator.		
4	Select the appropriate dryer element for a given application.		

MODULE 12211-03 - ANALYZERS AND MONITORS

Task Number	Item	Date(s)	Recorded By
1	Use test strips to determine the pH of a given solution and propose the proper adjustment.		

MODULE 12212-03 - PANEL-MOUNTED INSTRUMENTS

Task Number	Item	Date(s)	Recorded By
1	Lay out an instrument panel.		
2	Install an instrument in a panel.		

MODULE 12213-03 – INSTALLING FIELD-MOUNTED INSTRUMENTS

Task Number	Item	Date(s)	Recorded By
1	Fabricate a floor-mounted instrument stand.		
2	Install an orifice plate between two flanges.		
3	Assemble and install a thermowell assembly on a section of 4-inch process piping.		
4	Identify selected pipe flange facings.		
5	Identify selected pipe flange gaskets.		
6	Install a three-valve manifold on a differential pressure transmitter using futbols.		

MODULE 12214-03 – RACEWAYS FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Cut and deburr various types of conduit.		
2	Thread, clean, and connect various types of conduit.		
3	Install and support raceways in accordance with the job specifications and the NEC®.		

Level Three

MODULE 12301-03 – INSTRUMENT FITTER'S MATH

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there is no performance testing.			

MODULE 12302-03 – LAYOUT AND INSTALLATION OF TUBING AND PIPING SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Given a partial system equipment location diagram (one loop) and observing all considerations covered in this module, create an isometric drawing of the given loop.		
2	Measure and bend the tubing sections in the loop and select the fittings needed to install the layout shown in the isometric drawing in Performance Task #1.		
3	Indicate the types and locations of minimal support needed for the tubing installation.		
4	Make up compression fittings on tubing.		

MODULE 12303-03 – CLEAN, PURGE, AND TEST TUBING AND PIPING SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Set up and perform a pressure leak test.		
2	Inspect the system to verify there is no leakage.		
3	Document the test results.		

MODULE 12304-03 – RECEIVE, INSPECT, HANDLE AND STORE INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Inspect a carton or container for damage.		
2	Inspect a received item for physical damage and compliance to purchase order.		
3	Select the proper level of storage required for a received item.		

MODULE 12305-03 – INSTRUMENTATION THEORY

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there is no performance testing.			

MODULE 12306-03 – GROUNDING AND SHIELDING OF INSTRUMENTATION WIRING

Task Number	Item	Date(s)	Recorded By
1	Identify and explain the function of an equipment ground in a given drawing.		
2	Draw an example of a ground loop.		
3	Identify and explain the function of an equipment shield in a given drawing.		

MODULE 12307-03 – TERMINATING CONDUCTORS

Task Number	Item	Date(s)	Recorded By
1	Physically distinguish between various types of cable, including: • Twisted pair • Non-twisted pair • Coaxial • Fiber optic		
2	Install and terminate crimp connectors.		
3	Terminate shielded cable.		
4	Install a coaxial connector onto coaxial cable.		
5	Ring out a cable using phones.		
6	Inspect a cable for defects and identify the classifications of defects found, if any.		

MODULE 12308-03 – PROTECTIVE MEASURES FOR INSTRUMENTATION

Task Number	Item	Date(s)	Recorded By
1	Install electric heat tracing on a short section of piping.		
2	Install electric heat tracing on a control valve.		
3	Install a section of steam tracing according to a set of specifications provided.		
4	Install an insulation blanket on a control valve.		
5	Install insulation blankets on a section of piping.		
6	Perform blowdown on a transmitter, following specific sequences to open and close the manifold valve to protect the instrument.		

Level Four

MODULE 12401-03 – DIGITAL LOGIC CIRCUITS

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there are no performance tasks.			

MODULE 12402-03 – INSTRUMENT CALIBRATION AND CONFIGURATION

Task Number	Item	Date(s)	Recorded By
1	Calibrate a pneumatic differential pressure transmitter using the proper equipment.		
2	Calibrate a pneumatic temperature transmitter using the proper equipment.		
3	Calibrate a 4–20mA differential pressure transmitter using the proper calibration equipment.		
4	Calibrate a 4–20mA temperature transmitter using the proper calibration equipment.		
5	Calibrate a smart transmitter using a HART® communicator.		
6	Calibrate a transducer.		
7	Calibrate the following valve positioners: • Pneumatic positioner • Electro-pneumatic positioner • Smart positioner (digital valve controller)		

MODULE 12403-03 – PERFORMING LOOP CHECKS

Task Number	Item	Date(s)	Recorded By
1	Perform a continuity check on a pneumatic system.		
2	Perform a continuity check on an electrical system.		
3	Prove a loop.		

MODULE 12404-03 – TROUBLESHOOTING AND COMMISSIONING A LOOP

Task Number	Item	Date(s)	Recorded By
1	Troubleshoot an oscillating process.		
2	Troubleshoot a newly installed control loop.		
3	Commission a loop.		

MODULE 12405-03 – TUNING LOOPS

Task Number	Item	Date(s)	Recorded By
1	Perform closed loop tuning.		
2	Perform open loop tuning.		
3	Perform visual loop tuning.		

MODULE 12406-03 – PROGRAMMABLE LOGIC CONTROLLERS

Task Number	Item	Date(s)	Recorded By
1	Given a PLC diagram, identify the basic components in a PLC system.		
2	Given a ladder logic diagram, point out commonly used symbols and their meaning.		

MODULE 12407-03 – DISTRIBUTED CONTROL SYSTEMS

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there are no performance tasks.			

MODULE 12408-03 – ANALYZERS

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there are no performance tasks.			