Multi-State Advanced Manufacturing Consortium

US DOL SPONSORED TAACCCT GRANT: TC23767

MSAMC Master Performance Based Objectives (PBO) Review Template

Instructions

The following tab lists PBOs for the topic area ***Industrial Electronics*** . Please review each of the PBOs, and rate each PBO with one of the following ratings:

1 = Skill or understanding is required for employees.
2 = Skill is useful, but is not crucial for employees.
3 = Skill is not useful for employees, or isn't relevant for typical work assignments.
0 = PBO is unclear.

Additionally, for each PBO, note any comments or recommendations that you may have about how to improve the PBO. If any PBOs or skill sets seem to be missing from the list, please add them in the space at the bottom of the list.

Please enter your information below	
Name:	
Company/Plant:	
Department/Division:	
Industry/Segment:	
Email:	
Phone:	

Industrial Electronics

M-S AMC Industry Partner PBO Review

Please review the following PBOs to identify the appropriate skill set for a given job title / category / classification (see row 10 below).

* In the "**Importance**" column, identify how important each PBO is for someone in the relevant position. For each PBO, type 1 if the PBO must be covered in the coursework, enter 2 if the PBO is helpful but not necessary and would not impair the performance of the employee in the workplace if missed, and enter 3 if the PBO would not benefit the student or doesn't apply to the typical work assignments. If you don't understand the PBO, enter 0.

* Note any comments or feedback for improving each PBO (in the "Comments" column).

Note: It is the intention of competency based instruction to have each student individually demonstrate their proficiency of the skills indicated.

Reviewing PBOs fc ***TYPE JOB TITLE HERE*** (from whose perspective are you rating PBO importance?)

Sub-Topic	Level	Topic	PBO ID	Performance Based Objective (PBO)	Importance 1 = Need 2 = nice to have 3 = N/A 0= Don't understand	Comments *Notes to improve the PBO, PBO is unclear, etc.*
	1	EL	1	Match a list of conductors, semiconductors, and insulators to their properties.		
	1	EL	2	Match a list of Solid State terms to their proper definitions. - Electron flow - Hole flow - P-type material - N-type material - Barrier voltage - Depletion region - Biasing (forward/reverse) - Electron - Proton - Neutron - Valance Shell - Negative Ion - Trivalent Material - Pentavalent Material - Semiconductor Crystal - Impurities - Doping - Passive Component - Covalent Bonding		
	1	EL	3	List the two most common diode ratings that should not be exceeded.		
	1	EL	4	Match the following list of electronic components to their proper description of operation and/or construction and to their correct schematic symbol: - Diode - Zener Diode - Light Emitting Diode (LED) - Bipolar Junction Transistor - Thyristor - UJT - SCR - Diac - Triac - FET - IGBT - Op Amp		
	1	EL	5	Test several semiconductor diodes with an ohmmeter and identify if their condition is shorted, open, or good.		

	1	**EL**	**6**	Given the applied voltage, indicate the voltage drops across each component of a series circuit that has a diode and resistor, when forward and reverse biased.		
	1	**EL**	**7**	Construct a series circuit that has a Zener diode and resistor, predict and verify in lab the Zener diode current and voltage when the load resistor value and the voltage changes.		
	1	**EL**	**8**	Match a list of components of each section of a DC Power supply to its proper operation.		
	1	**EL**	**9**	Given the input voltage of a power supply, determine the secondary of the transformer based on the turn ratio, the amplitude of the pulsating dc output voltage of the rectifier, and the dc output of the filter circuit.		
	1	**EL**	**10**	For each section of a DC power supply, draw the waveforms of the input and output.		
	1	**EL**	**11**	Using a sine wave timing diagram, indicate on the diagram when the diode is forward-biased and reverse-biased, and when the filter capacitor charges and discharges.		
	1	**EL**	**12**	Match a list of voltage regulation and filtering components to their proper description of how they perform their circuit function.		
	1	**EL**	**13**	Given the frequency of the applied AC supply voltage, list the frequency of the pulsating DC voltage at the outputs of a half-wave and full-wave rectifier.		
	1	**EL**	**14**	Given the peak voltage of a pulsating DC voltage of half wave and full wave rectifiers, determine the average voltage.		
	1	**EL**	**15**	Given the peak-to-peak value of an AC voltage applied to the rectifier, determine the required minimum PIV rating of the rectifier diode in the circuit.		
	1	**EL**	**16**	Given various symptoms of a defective filtered rectifier circuit, determine the cause of the fault.		
	1	**EL**	**17**	Match a list of the effects of a failed component filter capacitor, load resistor, and voltage frequency on the ripple amplitude of a dc power supply.		
	1	**EL**	**18**	Given a schematic, construct an AC electrical circuit that uses a diode and resistor, and then use an oscilloscope to show how the diode will rectify on only one alternation of a sine wave.		
	1	**EL**	**19**	Given a schematic, construct an AC electrical circuit that uses two diodes and a resistor, and then use an oscilloscope to show how the two diodes can pass current on both alternations of a sine wave.		
	1	**EL**	**20**	Given a schematic, construct an AC electrical circuit that uses four diodes and a resistor, and then use an oscilloscope to show how the four diodes in the bridge circuit can produce full-wave rectification without using a center-tapped transformer.		
	1	**EL**	**21**	List the three terminals of the bipolar transistor, and how to use resistors to properly bias the junctions, and operate the transistor as an amplifier.		

	1	**EL**	**22**	Test several transistors with an ohmmeter and identify if their condition is shorted, open, or good.		
	1	**EL**	**23**	Given a schematic, construct a DC electrical circuit that uses a transistor, resistors, and lamp, demonstrate how the bipolar transistor can operates as a switching device.		
	1	**EL**	**24**	Given a schematic, construct a DC electrical circuit that uses a transistor and resistors, and then using an oscilloscope, demonstrate how the bipolar transistor operates as an amplifier.		
	1	**EL**	**25**	Construct an electrical circuit that uses a UJT to generate timed pulses. Verify proper circuit action with an oscilloscope.		
	1	**EL**	**26**	Construct a circuit containing an SCR and an UJT to control power in a load resistor. A variable RC time constant will adjust the power. Sketch the Output voltage at full and 50% power. Verify the sketch with the scope.		
	1	**EL**	**27**	Using an oscilloscope, determine the electrical characteristics of a Diac.		
	1	**EL**	**28**	Construct a circuit that uses a Diac and Triac to control the AC power in a load. A variable RC time constant will vary the power applied to the load.		
	1	**EL**	**29**	Given a schematic of an inverting amplifier using an OP Amp, predict the voltage gain of the circuit. Construct and verify.		
	1	**EL**	**30**	Given a schematic of a non-inverting amplifier using an OP Amp, predict the voltage gain of the circuit. Construct and verify.		
	1	**EL**	**32**	Given a schematic of an Op Amp comparator and the input voltages predict the output voltage. Construct and verify.		
	1	**EL**	**33**	Given the logic states applied to the inputs of a digital AND gate, list the logic states that will be produced at its output.		
	1	**EL**	**34**	Generate a truth table for a 2 input “And Gate”, “Or Gate “and “Nand Gate”. Construct and verify.		
	1	**EL**	**35**	List advantages of fiber optic cable.		
	1	**EL**	**36**	List the different types of fiber optic terminating connectors.		
	1	**EL**	**37**	List safety hazards associated with laser equipment and precautionary measures that should be taken.		
	1	**EL**	**38**	Construct a circuit to couple an AC source voltage (switched on and off) to a DC signal (switching on and off) using an optical isolator IC.		

Additions: Please add any additional objectives that we may have overlooked.

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