Pretest Programmable Logic Controllers

Unit 1, Task 1

1. What is a PLC?
2. What are the four main components of a PLC?
3. What is a discrete device?
4. What is a pulse-generating device?
5. What term is used to describe the CPU in a PLC?
6. What is the difference between a communication port and a programming port on a PLC?
7. What is an Uninterruptible Power Supply? (UPS)
8. What is the expected life of a lithium battery?
9. What is the typical maximum amperage for switching with the output section of a PLC?
10. What are the three main categories of loads controlled by a PLC?
11. What are the two main parts of a PLC programming device?
12. What are the four functions of a PLC programming device?
13. What is the difference between a dumb terminal and an intelligent one?
14. What is one characteristic of a hand-held programmer?
15. What is one disadvantage of a hand-held programmer?
16. What are full-size dedicate terminals?
17. What is boilerplating and what is the advantage of using it?
18. What is emulation software?
19. What is the next step when a new program is installed and the computer is put in the run mode?

20. What is the purpose of LCD and LED readouts?

21. What are the main advantages of PLCs?

**Task 2**

1. What is a byte?

2. What is a word length?

3. What is executive memory?

4. What is user memory?

5. What is EEPROM?

6. What is UVROM?

7. What is NOVRAM?

8. What is the address of the first input for most addressing schemes?

**Task 3**

1. What is the physical link between field equipment and the CPU?

2. What is a remote I/O?

3. What is a discrete I/O?

4. What is the purpose of the isolation circuit in an I/O module?

5. What is the purpose of an Opto-isolater?

6. What voltage level does the TTL logic family operate at?

7. How is the AC output protected? (2 types)

8. How are DC outputs protected?

9. Which type of output uses SCRs for switching?
10. Which type of output uses transistors for switching?

11. What is one other type of output?

12. How are analog signals converted to digital signals for the processor?

13. Name three analog inputs and outputs.

14. What precaution should be taken when connecting analog devices? (avoid noise)

15. What is the purpose of filtering circuits in input modules?

16. Which input module contains a rectifier? (AC or DC)

17. What are the four main functions of an input module?

18. Modules are designed to be removed/replaced under power so additional precautions are unnecessary. True or false.

19. What does a noise debounce filter do?

20. What is threshold detection?

21. What is the difference between “sinking and sourcing”?

22. Which input devices require three wires?

23. How is leakage current from a TRIAC or SCR sensor output kept from being read as a true input?

24. What are the four basic functions of an output module?

25. What are an R-C snubber and a MOV?

26. What is the most common switching mechanism for the output module?

27. What is the difference between sinking and sourcing currents in an output module?

28. What is an isolated output?

29. Are isolated outputs interchangeable between AC and DC?
30. How is switching of larger currents accomplished using contact outputs?

31. What precaution must be taken when removing a field device from an output module that utilizes a triac switch?

32. What is the purpose of connecting a resistor across a neon lamp in an output module?

33. What are interposing relays used for?

34. What values should be checked before installing a replacement output module?

**Task 4**

1. What is the best guide when installing a PLC system?

2. A PLC can withstand most any temperature. True or False?

3. PLCs are intrinsically safe as they operate at lower voltages. True or False?

4. How should communication cables cross power cables?

5. Is it more important to shield input cables or output cables from noise?

6. Where should shielded cables be grounded? (How many points)

7. What color is the wire that connects a ground pad to the service ground electrode?

8. How should multiple shields be grounded?

9. What is the recommended source of power for a PLC?

10. What does “More than 1 live circuit” indicate on a motor starter?

11. Where is a “Master control relay” typically controlled from?

12. When is a master control relay used?

13. When is a master control relay not a good idea?

14. Is all program data lost when a battery is replaced in a PLC?
Unit 2, Task 1

1. Which component of a PLC contains the microprocessor?
2. Which component of a PLC executes the logic program?
3. What are the three main functions of a processor?
4. What are the two basic parts of a processor scan?
5. What is the term used to describe the process of reading inputs and writing to outputs based on a program in a PLC?
6. What is the term used to describe the process of executing a series of instructions that control the output sequence in a PLC?
7. What is the main task of the CPU?
8. What are three factors that affect scan time for a CPU?
9. What problem occurs if scan time is too long?

Task 2

1. Why are electricians so comfortable with ladder logic?
2. Why is it called “Ladder logic”?
3. How are contacts connected for the Boolean mnemonic A or B = C?
4. How are contacts connected for the Boolean mnemonic A and B = C?
5. Structured Text and Function Block are two types of what?
6. Where is the output energize or coil instruction programmed?
7. What is a “true” rung?
8. What is the meaning of the term “Examine if on”?
9. What is the meaning of the term “Examine if off”?
10. How many bytes of data are required to represent the state of 32 inputs?
11. What is a latching relay?

12. What happens to a latched bit when the processor power is turned off?

13. What precaution must be taken when using a latching relay?

14. What type of bit has no terminal wiring associated with it?

15. What is a “One shot” bit?

16. What is the main advantage of PLC timers over electromechanical timers?

17. What does EN represent in a timer address?

18. What does DN represent in a timer address?

19. When does an on-delay timer start timing?

20. What is the result of the timing control input on a timer going false during timing?

21. What is the result of the enable/reset input on a timer going false during timing?

22. How is the timer (figure 7, page 60) changed from an on-delay to an off delay?

23. What devices typically pulse an electromechanical counter?

24. How many inputs does a PLC counter typically have? What is the purpose of each?

25. What does “ACC” indicate next to a value on a counter?

26. What does “PRE” indicate next to a value on a counter?

27. How is a PLC counter reset?

**Task 3**

1. What is required before a PLC can write to hardware outputs?

2. What is the purpose of the hardware input section?

3. What is another name for the input image table?

4. How do most PLC’s store memory information?
5. In what direction on a ladder diagram does a PLC scan occur?

6. What happens to an output when there is a true path from the logical rail to the output?

7. What must be added to an output that is “true” to actually control something?

8. What are internal coils in PLC’s?

9. Why is it important to know the order of program scanning?

10. Why is rung order important in a ladder logic program?

**Task 4**

1. How is “sealing” accomplished in a motor control circuit with a momentary contact pushbutton?

2. What are two situations where it may not be a good idea to restart a machine automatically after an overload?

3. What is “fail-safe” wiring?

4. What type of contact or instruction should always be used for a stop button?

5. What type of contact or instruction should always be used for a start button?

6. How can a single pilot light indicate three states of a motor?

7. What is the purpose of a toggle operation?

8. What is a hand/off/auto switch?

9. What is one application of an up and down counter working together?

10. What is another method of providing the effect of a seal in contact?

**Unit 3 Task 1**

1. A PC along with the application software will accomplish which five tasks?
2. What are the two modes of operation when using a PC to edit a program in a PLC?

3. What is the difference between the two modes of operation?

4. What information is used to configure the simplest PLCs?

5. What is off-line programming?

6. What is another name for program lines of logic?

7. What is the next step after selecting an instruction type in a ladder logic program?

8. Instruction descriptions are part of the PLC program. True or False?

9. What must be done when a ladder logic program is completed?

10. What is a software emulator?

11. What does a PLC require to be able to go on a network?

12. What process requires the PLC be stopped?

13. Is it necessary to stop a PLC to upload the program to a file?

14. What does the brighter intensity indicate on a highlighted ladder logic diagram on-line?

15. How are display screens to monitor the status of inputs, outputs, data files, and registers typically accessed?

16. Are output and input numbers typically shown below the tables showing the status?

17. What are six of the search options offered by most PLC software?

18. What is the main concern with on-line editing in a PLC program?

19. What is often required before an on-line edit will affect the PLC ladder logic or off-line program?
20. How are different levels of access to a PLC process or program enforced?

**Task 2**

1. What are the two main operating modes of a PLC?
2. Do most PLC’s allow downloading or editing while in the run mode?
3. What is the state of the real outputs when a PLC is in test mode?
4. What is single scan mode for a PLC? (NOT A HARD QUESTION)
5. What is the main purpose of the single scan mode?
6. What is indicated by the “Outputs inhibit” light on an Omron PLC?
7. What should be done when the “Battery low” light is lit on a PLC?

**Task 3**

1. What must be done before initial startup of a PLC process system?
2. What type of information should be taken from the installation drawings before starting up a system?
3. What is one problem you may encounter when all disconnect switches are opened and you want to do an electrical check of a system?
4. List at least four procedures that are part of a mechanical inspection prior to initial startup of a system?
5. How is the wiring checked for proper connections? (Right wire in right place)
6. What should be done before any control power is applied to a PLC system?
7. What is the easiest way to check an input signal?
8. How can we be sure the input bit is being read by the PLC?
9. When does the logic program not control the outputs?
10. What checks should be made if an output light is coming on and the device connected to it is not operating?

11. What does a fuse that blows randomly from time to time indicate?

12. How are coils, that are on, displayed on a CRT during program troubleshooting?

13. What is the purpose of a “halt or temporary end” for troubleshooting?

14. What is a “histogram”? 

15. What is the purpose of rung comments?

16. Why is it important to document changes to a program?

17. What is included in a typical program printout?

18. What is typically shown on a printout that is not displayed on a programming terminal?