

Code No: 07A80204

R07**Set No. 2**

IV B.Tech II Semester Examinations, April/May 2012

PROGRAMMABLE LOGIC CONTROLLERS**Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain flashing arrow pattern and registers.
 (b) Explain PLC program for flashing arrow movement. [8+8]
2. (a) Explain general characteristics of registers.
 (b) Explain module addressing.
 (c) Explain I/O terminal addressing scheme.
 (d) Explain holding registers. [16]
3. (a) Convert input signals to a form usable by input modules.
 (b) Convert output module signals to usable valves for output devices. [8+8]
4. (a) Consider a flashing alarm as a subroutine and show its ladder logic circuit.
 (b) Describe PLC move function in its block and in coil format. [8+8]
5. (a) Explain the function of microprocessor and memory function in a PLC system layout and connection.
 (b) Explain the function of fixed memory in a operational section of a PLC. [10+6]
6. (a) Design gate logic relay logic and PLC logic for a motor control circuit with a process fan is to run only when all of the following conditions are met.
 Input 1 is off, input 2 is on or input 3 is on or both 2 & 3 are on, inputs 5 and 6 are both on, one or more of inputs 7, 8 or 9 are on.
 (b) Consider any PLC ladder diagram and show its equivalent gate diagram. [8+8]
7. Consider a start-stop-seal circuit. When the start button is depressed the coil energizes. When the button is released the coil remain on. It is held on by a sealing contact that is in parallel with the start button. The seal contact closes when the output coil goes on. If the stop button is depressed, the coil goes off. For the above problem, show relay logic, its connection diagram, PLC logic and its connection diagram, PLC latch/unlatch logic. [16]
8. (a) Explain repeat cycling timer functions with example, where an output pulse becomes on and quickly off at a constant preset time interval.
 (b) Explain one-shot operation of timer functions with example, where output b goes on for a specified time after output a is turned on. Output b will run for its specified time interval even if a is turned off during the b timing interval. [6+10]

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R07**Set No. 4**

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Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

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1. (a) Explain how holding registers are used in timers.
 (b) Explain how holding registers are used in counters. [8+8]
2. (a) Explain analog BCD input and output systems.
 (b) Explain analog input signal path and values.
 (c) Explain analog add application.
 (d) Explain BCD multi bit inputs and outputs system. [4+4+4+4]
3. (a) Explain how you apply FIFO function.
 (b) Explain FIFO stacking program formats.
 (c) Explain file arithmetic and logic (FAL) function briefly.
 (d) Explain one shot (ONS), clear (CLR) and sweep function. [4+4+4+4]
4. (a) Draw the block diagram of the PLC system layout and connection and explain.
 (b) Explain the advantages and disadvantages of PLC. [10+6]
5. Explain how to develop a drum/controller sequencer control system to operate a basic robot. [16]
6. (a) Write any eight Boolean expressions.
 (b) For a given logic figure 1 show the conversions of given digital gate diagram into ladder diagram.

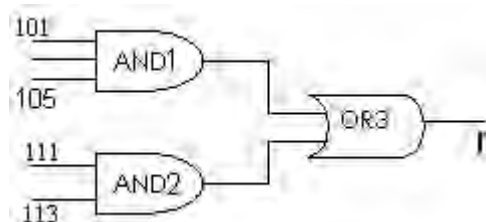


Figure 1:

- (c) For a given logic figure 2 show the conversions of given digital gate diagram into ladder diagram. [4+6+6]

Code No: 07A80204

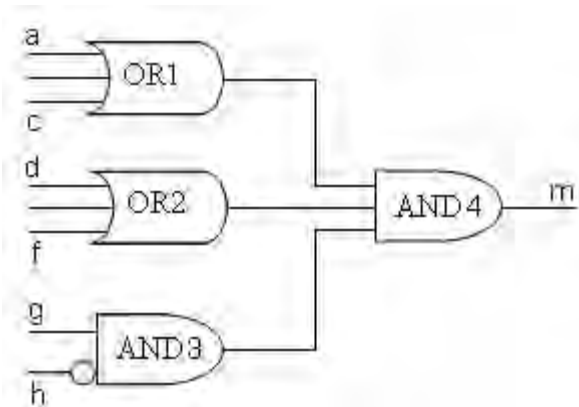
R07**Set No. 4**

Figure 2:

7. A two-way hydraulic cylinder has two solenoids controlling it. Energizing one solenoid causes the cylinder to extend and energizing the other solenoid causes it to retract. A limit switch at each end indicates full retraction or full extension. Use two start-stop three wire controls, one for each direction. Construct a two-directional control system, including inter locks, to control the solenoid. [16]
8. Explain interval time within a cycle timer functions with example, where we may require that an output come on 7.5 seconds after system startup, remain on for 4.5 seconds, and then go off and stay off. The interval would then be repeated only after the system is shut off and then turned back on. [16]

Code No: 07A80204

R07**Set No. 1**

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1. (a) Explain Allen Bradley addressing format.
 (b) Explain how the registers are used for arithmetic operation. [8+8]
2. (a) Explain PLC timer and its advantages.
 (b) Explain single input PLC timer. [8+8]
3. To program sequencer instructions we need to provide the process with the following information.
 File, mask, source, destination and control.
 Explain any three in the above. [16]
4. Consider any industrial process as an example and how you prepare a flow chart for this. [16]
5. (a) Consider an alarm system in an industrial control for any hazards and show its PLC logic diagram.
 (b) Design a fail-safe circuit and explain. [8+8]
6. (a) Draw and explain the ideal position control positioning curve.
 (b) Draw and explain ideal PID position control curve.
 (c) Draw the block diagram of PID module and explain. [5+5+6]
7. There are 30 bit patterns of 27 bits each to be moved sequentially into or 0011 one every 7 seconds. Design a double tr function program with a timer to accomplish the data transfer. Two tr functions are required because there are more than 16 bits (the amount available in one register) to be transferred. [16]
8. (a) Draw two input four input NOR gate, relay and PLC equivalent diagram.
 (b) There are two inputs a, b for AND gate 1 and c & d for another AND gate 2. The output 122 is to be on only when either inputs 7 and 8 are on or f inputs 17 & 18 are on. The out put 122 can be on when all four inputs are on. Draw the relay ladder and PLC ladder diagram. [6+10]

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1. (a) Explain shift right function in one register.
(b) Explain shift right function for multiple registers.
(c) Explain register rotate function. [5+5+6]
2. (a) Consider a simple ladder logic diagram for relay output and show its connection diagram.
(b) Consider a simple circuit with one switch as a contact and one output as a coil. How is the ladder diagram for a relay logic and ladder logic? [8+8]
3. (a) Explain some of the common practices for the format of control ladder diagrams.
(b) Explain the function of programmer/monitor in a PLC system layout and connection. [10+6]
4. (a) Explain different flow chart symbols and their significance in flow chart development before planning a large process ladder diagram.
(b) Explain some of the common practices for the format of control ladder diagrams.
(c) Consider any industrial process as an example and how you prepare a flow chart for this. [4+4+8]
5. A motor and its lubrication pump motor are both running. Lubrication for main motor bearings is required during motor coast-down. After the main motor is shut off, the lubrication pump remains on for a time corresponding to coast-down time. The lubrication pump remains on for 20 seconds after the main system is shut down.
(a) Show the required program
(b) Also its timing diagram. [16]
6. (a) Describe how each of the five common types of PLC registers is used in PLC operation.
(b) Explain the contents of holding register in arithmetic operation.
(c) How are the values placed in register when a timer function operates? [8+4+4]

Code No: 07A80204

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7. A paper mill process is run by proportional control. The process involves paper being wound onto a roll at a speed of 62 feet/second. At 64 ft/sec, the correction signal to the drive motor is -1.75 volts. What would be the correction signal for 66 feet/sec, 68 feet/sec and 60 feet/sec. [16]
8. A hydro electric dam PLC control program requires a running average for operational decisions. The running average is for upstream water level, which is measured by a water height sensor and sent into the control panel. The running average is to be for the previous hour and measure every minute. Set up a FIFO system to accomplish this control parameter. [16]

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