

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Sixth Semester

MECHATRONICS ENGINEERING

MCT115: Programmable Logic Controller

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. PLCs are _____ designed to use in the control of a wide variety of manufacturing machines and systems.
a) Special-purpose industrial computers b) Personal computers
c) Electromechanical systems d) Electromagnetic relays
2. The PLC was invented by _____.
a) Bill Gates b) Dick Morley
c) Bill Landis d) Tod Cunningham
3. In __ memory type, data can be completely erased with an ultraviolet source
a) UVROM b) UVPROM
c) EEPROM d) RAM
4. Describe the similarities and differences between PLC ladder logic and relay ladder logic.
a) The PLC rung output [-()-] is a discrete output instruction or bit in memory. b) Each rung of the ladder logic represents a logical statement executed in software - inputs on the right and outputs on the left.
c) Input and output instructions in ladder logic do not directly represent the switches and actuators. d) PLC input instructions are logical symbols associated with voltage at the input module terminals.
5. In Limit test instruction, if the value of the *low* limit is greater than the value of the high limit, the instruction is true if
a) The value of the test is between or equal to the values of high and low limit b) The value of the test is equal to or less than the low limit or equal to or greater than the high limit
c) The value of the test is between or not equal the values of high and low limit d) Both a & c
6. ----- is a text based language used for building small applications
a) Structured text b) Instruction List
c) Sequential text d) Ladder logic
7. _____ network supports interconnection of 64 devices with a network length of 10,000ft.
a) Profibus b) RS232

- c) DH+ d) DH-485
8. EIA is an acronym for
a) Electrical Industries Association b) Electronic Industries Association
c) Ethernet industrial Automation d) Electromechanical Industrial Automation
9. ----- Is used to separate PLC from field devices
a) Optical Connector b) Optical Isolator
c) Optical Trainer d) Optical Tripper
10. __ covers the system's ability to be changed to produce new product types, and ability to change the order of operations executed on a part
a) Material flexibility b) Machine flexibility
c) Operator flexibility d) Robot flexibility

PART B (10 x 2 = 20 Marks)

11. What are the benefits of PLC?
12. What are the two basic sections of input module?
13. List out the various types of programming units in PLCs?
14. Define Turbocharging?
15. Where do we use seal-in-circuit?
16. When will we call a PLC timer as cascading timers?
17. What is meant by data communication?
18. Define Protocol?
19. Name any two PLC preventive maintenance procedure
20. Select and write any five Process control industries which use PLCs as a main controller.

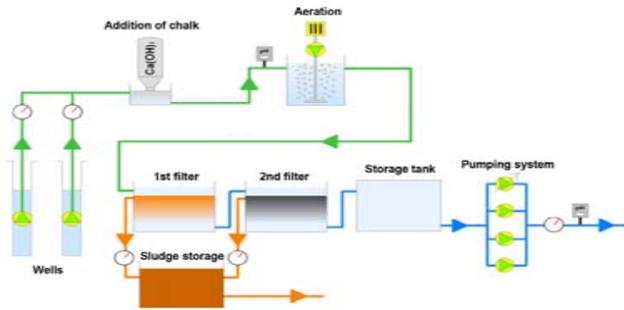
PART C (5 x 14 = 70 Marks)

21. a) (i) Define Programmable Logic Controller and explain the architecture of the PLC?
(OR)
b) (i) Compare analog I/O Module and Discrete Module in PLC & explain it in detail
22. a) (i) Illustrate the function of CPU in PLC? (7)
(ii) How do we interface PC and PLC and also explain the operation modes of the PLC? (7)
(OR)
b) (i) What is meant by PLC Scan? (2)
(ii) Explain the different types of memory unit in the PLC? (12)

23. a) (i) Define IEC 61131? (2)
(ii) Explain the different type of programming methods in the PLC? (12)

(OR)

- b) (i) List the different input sensors and output actuators needed for the groundwater (4)
treatment process.



- (ii) Develop a PLC Program for the above system and justify the selection of sensors (10)
and actuators.

24. a) (i) Justify, why redundancy is needed in PLC based systems and explain the types (7)
in detail
(ii) Explain any three communication protocols in PLCs. (7)

(OR)

- b) (i) Differentiate MAP & TOP (7)
(ii) What is the need of Distributed control system? Explain it in detail with a block (7)
diagram.

25. a) (i) Identify a system for the following condition in an industry and explain it in (4)
detail.
 - Product variety - options for the consumers
 - Optimizing the manufacturing cycle time
 - Reduced production costs

(OR)

- b) (i) What is the need of watchdogs in the PLC? (3)
(ii) Explain the PLC maintenance procedure in detail (11)
