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A 1232

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Sixth Semester

Mechatronics Engineering

EC 349 — PROGRAMMABLE LOGIC CONTROL

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Explain Band rates and Bit rates.

2. State the difference between EPROM and EEPROM.

3. What are the hardware components of PLC?

4. State the three parts of PLC scanning.

5. Define the term "LADDER" with reference to PLC.

6. Define Differentiation up and Differentiation down.

7. Draw the relay and PLC programming equivalents for two input AND and NOT gate.

8. Explain Allen Bradlay addressing format with example.

9. What do these commands do? (a) BTW (b) FMOV (c) BLKT (d) TBLK.

10. List any four factors to be considered in selecting a PLC.

PART B — (5 × 16 = 80 marks)

11. (a) (i) With a system layout and connection, explain the overall PLC system. (8)

(ii) Explain the procedural difference in the design of sequential networks using ROM's and PLAs. (8)

Or

(b) Design a sequential Traffic light controller for the intersection of "A" street (main street) and "B" street. Each street has traffic sensors which detect the presence of vehicles approaching or stopped at the intersection. "A" street has a green light until a car approaches on "B". Then the light changes and "B" has a green light. At the end of 50 seconds, the lights change back unless there is a car on "B" street and none on "A" in which case the "B" cycle is extended 10 more seconds. When "A" is green, it remains green at least 60 seconds, and then the light change only when a car approaches on "B". Develop the block diagram, state graph and state table for the above requirement.

12. (a) (i) Explain any four Analog input/output modules of PLC with suitable diagram. (8)

(ii) Explain any four Digital input/output modules of PLC with suitable diagram. (8)

Or

(b) (i) Explain the advantages and disadvantages of PLC. (8)

(ii) Explain the scanning procedure and operational faults of PLC. (8)

13. (a) With suitable elementary diagram, screen pattern and connection diagram, explain the standard forward reverse circuit.

Or

(b) Explain the PLC addition and subtraction function with examples.

14. (a) Explain the process where there are three mixer devices on a processing line : A, B and C. After process begins mixer A is to start after 7 seconds elapse. Next mixer B is to start 3.6 seconds after A and mixer C is to start 5 seconds after B. All of them remain on until a master enabled switch is turned off.

Or

(b) Draw the ladder diagram for the process of counting the net number of parts on a conveyer using two proximity sensor devices count one on the input and another on the output using (i) up and down counter (ii) up/down counter.

15. (a) Assume a logic for an operation of an automatic control of a ware house door and explain its ladder diagram construction.

Or

(b) Develop a PLC program for an automatic car washing machine assuming a reasonable actions in car washing.
