

**EEPE34**

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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2015**Course & Branch : B.E: Electrical & Electronics Engg.****Semester : V****Subject : Advanced Industrial Automation -I****Max. Marks : 100****Subject Code : EEPE34****Duration : 3 Hrs****Instructions to the Candidates:**

- Answer one full question from each unit.

UNIT – I

1. a) Write a short note describing various types of memory in a PLC. (08)
b) For the following Boolean expression (08)

$$X = A + B(A + \bar{C}\bar{B} + D\bar{A}C) + ABCD$$

- a) Write the ladder logic for the un-simplified equation
b) Simplify the equation
c) Write the ladder logic for the simplified expression. (04)
2. a) Mention the advantages of thermistor. (04)
2. a) Simplify the following and implement the original and simplified equations with ladder logic. (08)

$$A + (\bar{B} + \bar{C} + \bar{D}) \cdot (B + \bar{C}) + A \cdot B \cdot (\bar{C} + \bar{D})$$

- b) With a neat diagram explain the construction of Bourdon tube. (08)
c) Define the term “actuator”. (04)

UNIT – II

3. a) With suitable example explain the term “Sourcing” and “Sinking”. (06)
b) An input module, which is connected to a temperature transducer, has an A/D with a 10-bit resolution. When the temperature transducer receives a valid signal from the process (0-300 °C), it provides, via a transmitter, a 0 to +5 VDC signal compatible with the analog input module. Find the equivalent voltage change per °C change and the equivalent number of counts per °C. (06)
c) Write a short note on encoder input module. (08)
4. a) With a neat block diagram explain the AC output interface of a digital module. (06)
b) Explain in detail Pulse Stretcher Module (08)

- c) Draw the circuit diagram of the typical AC/DC input interface to the digital input module (06)

UNIT – III

5. a) Explain in detail : (06)
- One shot output
 - Examine ON
- b) Develop the ladder logic diagram for the system shown in Fig.5(b) to satisfy the following requirements (09)
- As the PB1 is pressed, MV1 opens and the water begins to fill the tank. At the same time stirring motor M starts operations
 - When the water level passes TLB2 and reaches TLB1, the MV1 closes and stirring motion stops
 - Next, MV2 opens and starts draining the water. When the water level drops below TLB2, MV2 closes.
 - When the cycle of operation has repeated four times, the operation END indicator illuminates, and the filling and draining operation will not restart even if PB1 is pressed.

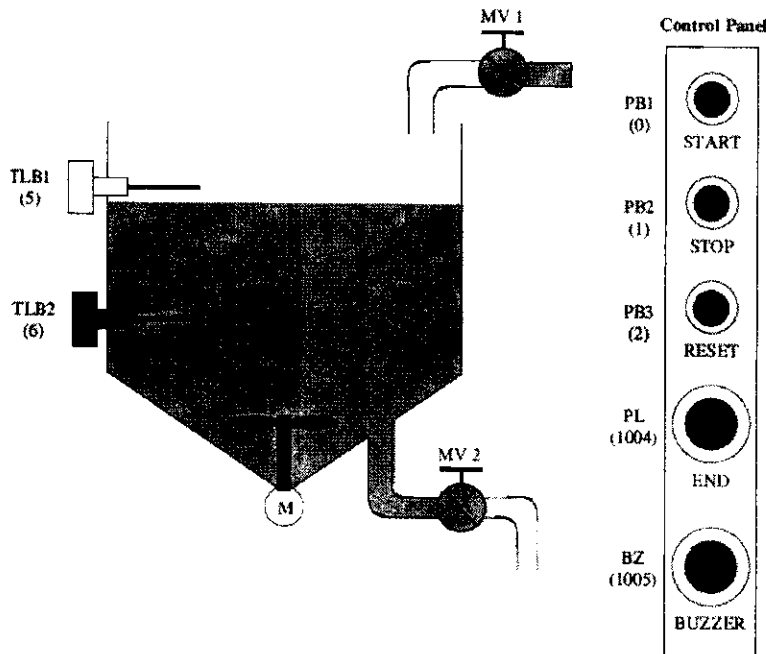


Fig.5(b)

- c) Briefly explain the Arithmetic Instructions of PLC available with Twidosuite Package. (05)
6. a) Develop the ladder logic that will turn on a light, after switch A has been closed 10 times. Push button B will reset the counters. (06)
- b) Using Twido suite software Instructions write a program to achieve the following : (08)
- When the button is pushed (momentarily) the first door will start to open immediately, the second door will start to open 2 seconds later. The first door power will stay open for a total of 10 seconds, and the second door power will stay on for 14 seconds.
- c) Explain ON delay Energize timer instruction. (06)



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UNIT - IV

7. a) Explain the recommended procedure of I/O wiring (08)
b) With a neat diagram explain the layout of the panel (12)
8. a) Write s short note on special I/O connections. (08)
b) Explain the significance of PLC documentation. (06)
c) Write the short notes on : (06)
Wire Bundling

UNIT - V

9. a) Mention the five levels of SCADA system. (05)
b) Briefly explain about the communication interfaces of modern RTU? (06)
c) Describe Master Terminal Unit. (09)
10. a) Mention the features of SCADA. (08)
b) Explain the generic software architecture of SCADA. (12)
