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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – DEC 2013 / JAN 2014

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 the equation of resistance change for RTD. (03)
   b) With a neat diagram explain the internal architecture of PLC (10)
   c) Write a short note on Solid Flow transducer. (07)

2 a) Mention the advantages of PLC over other controller (06)
   b) Describe the different types of memory of a PLC (08)
   c) Explain the term Processor Scan (06)

UNIT – II

3. a) Design a motor controller that has a forward and a reverse button. The motor forward and reverse outputs will only be on when one of the buttons is pushed (04)
   b) Mention the factors for selecting an I/O Module. (06)
   c) Explain in detail Pulse Stretcher Module (08)
   d) Define Master Rack (02)

4. a) 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 the voltage change per °C change and the equivalent number of counts per °C. (06)
   b) Simplify the following Boolean equation, and create the simplest ladder logic. (06)

$$Y = \overline{\overline{C}\left(\overline{A} + \left(\overline{A} + \left(\overline{\overline{BC}\left(A + \overline{BC}\right)}\right)\right)\right)}$$

   c) With a suitable block diagram explain the AC/DC inputs connected to Digital input module. (08)

UNIT – III

5. a) Using Twidosuite software instructions write the ladder logic solution for the following: (08)
When PB1 is pressed, the box conveyor moves. Upon detection of box present, the box conveyor stops and the Apple conveyor starts. The movement of apple conveyor makes the apples fall into the box. A part sensor will count for 10 apples. Now the apple conveyor stops and the box conveyor starts again. Counter will be reset and the operation continues till PB2 is pressed

   b) Define the following instructions: (06)
      i) Shift ii) Retentive Timer

   c) 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)

6. a) Describe the counter operation with respect to Twido-suite software (06)

   b) Develop the ladder logic that will turn on an output light, 15 seconds after switch A has been turned on. (06)

   c) 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..

UNIT – IV

7. a) Mention the precautions to be taken while placing a PLC inside an enclosure. (08)

   b) Describe the line-filtering configurations used for removing input power noise to a controller or transmitter. (07)

   c) Define: Wire Bunding (05)

8. a) Explain the recommended procedure of I/O wiring (06)

   b) Write a short note on PLC system maintenance. (10)

   c) Define: Shielding (04)

UNIT – V

9. a) Describe the term DCS. (07)

   b) What are the advantages of the SCADA system? (07)

   c) Explain different types of SCADA system. (06)

10. a) What are the functions of Master Station? (05)

    b) Differentiate between PLC and RTU. (06)

    c) With a neat diagram explain the architecture of RTU (09)

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