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Reg. No. : | | | | | | | | | | |

Question Paper Code: 57502

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Seventh Semester

Electronics and Instrumentation Engineering

15UEI702 -PLC and SCADA

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The process of converting a discrete time continuous value signal into discrete time discrete value signal is CO1-R

   (a) Sampling (b) Coding (c) Quantisation (d) ADC

2. Velocity form of digital controllers causes Controller drift when _____ control action is absent CO1-R

   (a) P (b) I (c) PI (d) D

3. Small PLCs have a memory from ---------- to store the user's logic programs. CO2-R

   (a) 2Kb to 10 KB (b) 10 Kb to 20KB

   (c) 30Kb-40Kb (d) 1Gb

4. The PLCs were originally designed to replace CO2-R

   (a) Analog controllers (b) Microcontrollers

   (c) Computers (d) Hardwired Relays

5. Which one of the following is a Program control instruction CO3- R

   (a) MCR (b) Timer (c) Coil. (d) ALU

6. _____ instruction is used as a program control function. CO3- R

   (a) MCR (b) RESET (c) TIMER (d) CNTL

7. _____ motor is most suitable for precision motion control CO4 -R

   (a) Induction Motor (b) Synchronous Motor (c) Stepper Motor (d) Servo Motor

8. To identify non-metal objects in a conveyor _____ sensor is most preferable. CO4 -R

(a) Capacitive Proximity (b) Inductive Proximity

(c) IR (d) Ultrasonic

9. Line Modems used to connect RTU to a network uses _____ technique to establish communication. CO5- R

(a) Phase Shift Keying (b) Time Shift Keying

(c) Frequency Shift Keying (d) Coded Shift Keying

10 IEC60870 is an CO5- R

(a) Open SCADA Protocol (b) Serial Cable

(c) Closed SCADA Protocol (d) Parallel Cable

PART – B (5 x 2= 10Marks)

11 Determine the Z-transform for e^{at} CO1 -R

12 Differentiate modular PLC and fixed PLC. CO2-U

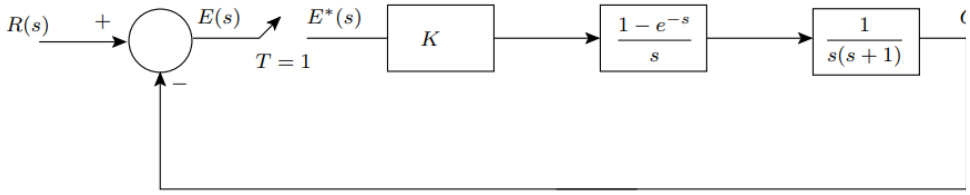
13 State the use of sequencer instructions in PLC. CO3-U

14 Draw a ladder diagram to implement the logic y = a'b+ab'. CO4-R

15 How do you communicate SCADA with PLC? CO5-U

PART – C (5 x 16= 80Marks)

16. (a) Determine the closed loop stability of the system shown in Figure when K = 1 and also find out the range of K for which the system is stable. CO1-App (16)



Or

(b) With an example explain about Jury's stability test. CO1-App (16)

17. (a) Draw the architecture of PLC and explain its functional blocks and also state the advantages of PLC. CO2 -U (16)

Or

	(b)	(i) Explain the various timer logics in PLC.	CO2 -U	(10)
		(ii) Develop a ladder program to control traffic light in one direction.	CO2-Ana	(6)
18	(a)	List and discuss various arithmetic instructions in PLC.	CO3 -U	(16)

Or

	(b)	(i) List the various compare instructions in PLC and discuss any 3 compare instructions in detail.	CO3 -U	(10)
		(ii) Develop a ON/OFF control based ladder logic program to maintain the temperature of a tank within 1% deviation between setpoint.	CO3-Ana	(6)
19.	(a)	With suitable diagram explain the construction and operation of reactor and also write a PLC program to monitor and control the reactor.	CO4-U	(16)

Or

	(b)	With suitable diagram explain the construction and operation of LPG filling system and also write a PLC program to monitor and control the reactor.	CO4 -App	(16)
20.	(a)	Draw the architecture of SCADA. Explain various functions carried out by SCADA.	CO5- U	(16)

Or

	(b)	Explain in detail about DNP3 SCADA communication protocol.	CO5-U	(16)

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