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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; May / June - 2019

Programmable Logic Controllers and SCADA

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a.	With neat block diagram, explain basic functional components of PLC system.	8
b.	Explain the sourcing and sinking of input / output connections refined in PLC.	6
c.	Explain different types of proximity switches used as sensors.	6
2 a.	Explain IEC standards for complete Life cycle of PLC.	8
b.	Explain various types of encoders used as PLC input sensors.	6
c.	Explain temperature sensor and pressure sensors.	6

UNIT - II

3 a.	Explain the following applications design using PLC : i) A conveyor belt ii) Liquid-level monitoring	6
b.	With diagram, explain ISO / OSI model.	8
c.	What is Scanning time of PLC? List the factors affecting it.	6
4 a.	Explain the serial standards communications. Name the connection used.	8
b.	With an example, illustrate the working of analog to digital converter.	6
c.	With schematic wiring diagram, explain how AC and DC inputs are interfaced to PLC system?	6

UNIT - III

5 a.	What is a Ladder diagram? Explain Logical AND and logical NAND operation in ladder diagram.	8
b.	Explain the steps followed in sequential function chart programming. Illustrate branching and convergence of SFC with its equivalent Ladder diagram.	8
c.	Write Ladder rings represented by the Boolean equations: i) $Q = \bar{A}BC + D$ ii) $Q = A.B + C.D$	4
6 a.	Write functional block diagram and ladder diagram to represent; i) A motor is switched on by pressing a spring-return push button start switch, and the motor remains on until another spring-return push button stop switch and pressed. ii) A lamp is ON if there is no input to a sensor. iii) A pump is to be switched on if the pump start switch is ON or a test switch is operated.	6

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b.	Compare Ladder program with instruction list programming. Illustrate branching codes and more than one ring equivalent in Instruction list.	8
c.	Explain battery backed internal relay with ladder diagram.	6

UNIT - IV

7 a.	With ladder diagram, explain sequencing and cascaded timers to enable an output.	8
b.	Explain the working of pulse timer.	6
c.	Classify and explain various types of counters.	6
8 a.	With Ladder diagram and timing diagram, explain the working of 4 bit shift register.	8
b.	Illustrate an application which uses timers with counters to control an output.	6
c.	Explain the working of On / Off cycle timer.	6

UNIT - V

9 a.	Explain the role of SCADA in Automation.	10
b.	Explain following data handling instructions : i) Data movement ii) Data comparison iii) Data selection	10
10 a.	With diagram, explain the architecture of SCADA.	10
b.	Briefly discuss the working of master terminal unit and remote terminal unit of SCADA system.	10

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