U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Institutional Elective **Duration: 3 hrs.**

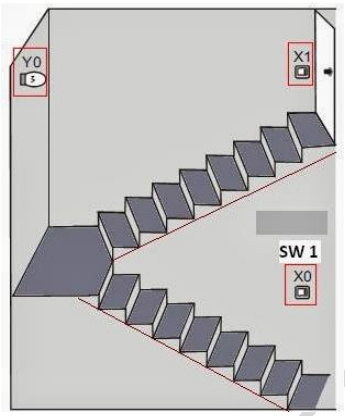
Course Code: 19EE6OE1PS **Max Marks: 100**

Course: PLC and SCADA

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain data loggers with the help of a neat block diagram.	CO1	PO1	**04**
	b)	Discuss the main objectives and applications of Scada systems.	CO2	PO1	**08**
	c)	With a neat block diagram explain supervisory digital control of an industrial.	CO2	PO1	**08**
		OR			
2	a)	With a neat block diagram describe the operation of Data acquisition system.	CO2	PO1	**08**
	b)	With a neat block diagram explain direct digital computer control of an industrial process.	CO2	PO1	**08**
	c)	Enumerate the advantages of SCADA system.	CO1	PO1	**04**
		UNIT - II			
3	a)	Explain the basic architecture of PLC with relevant block diagram.	CO3	PO2	**08**
	b)	It is required to program PLC to be used for a typical motor stop/start control station with pilot lights. Develop a suitable ladder program for the same.	CO3	PO3	**06**
	c)	Develop a ladder diagram for the following operation and represent the gate logic i) Y= (ABC) + (ADE)+ (FE) +(FDBC) ii) (A+B)(C+D) =Y	CO3	PO2	**06**
		OR			
4	a)	As per standard IEC 61131, What are the various standardized languages adopted for PLC programming.	CO3	PO2	**06**

		b)	How do input and output modules act as an interface between PLC and External Devices. With the neat block schematic explain PLC AC input module.	*CO3*	*PO2*	**08**
		c)	Develop a ladder program and PLC connection diagram for two way switching control as shown in figure. X0- Bottom switch, X1 - Top Switch, Y0 – Yellow Pilot Light. The lamp is on if the states (ON or OFF) of both bottom and Top switches are same. Otherwise it is OFF. Also indicate which logic gate does the switching state correspond to? 	*CO3*	*PO3*	**06**
			UNIT - III			
	5	a)	Explain the principle of operation of OFF Delay timer instruction with ladder diagram and a neat timing diagram.	*CO4*	*PO2*	**10**
		b)	Develop a ladder logic and for the following process application: An output indicator to go on when ten of product A and twelve of product B are on the conveyor belt. IN002 and IN003 are the proximity devices that pulse on when a product goes by them. The circuit would not indicate more than ten or twelve parts; it would only indicate when there are enough parts	*CO4*	*PO3*	**10**
			OR			
	6	a)	Explain the principle of operation of Down counter instruction with ladder diagram a neat timing diagram.	*CO4*	*PO2*	**10**
		b)	Develop a ladder logic circuit to control a set of traffic lights in one direction using PLC timer and explain the operation.	*CO4*	*PO3*	**10**
			UNIT - IV			
	7	a)	Illustrate the operation of the following instructions. i) CPT ii) MVM iii) MUL iv) NEG	*CO4*	*PO2*	**08**
		b)	Develop a ladder logic circuit and write the corresponding timing diagram for the below process. Three motors are being controlled using three separate timers. Each motor will remain ON for 10 seconds. After every ten	*CO4*	*PO3*	**06**

			seconds previous motor stops and the next motor becomes ON. This will continue in a cycle. Switch I1 is used to start and I2 is used to stop the cycle. Inputs – Switches I1, I2 Outputs – Motors Q1,Q2,Q3			
		c)	What is the advantage of using the file copy (COP) or fill file (FLL) instruction rather than the FAL instruction for the transfer of data?	*CO4*	*PO2*	**06**
			OR			
	8	a)	Illustrate the operation of the following instructions. i) GEQ ii) SQR iii) CLR iv) BTD	*CO4*	*PO2*	**08**
		b)	Enumerate the different sequencer instructions along with their operation	*CO4*	*PO2*	**06**
		c)	With suitable example illustrate operation of JSR , SBR and RET in PLC ladder programming	*CO4*	*PO2*	**06**
			UNIT - V			
	9	a)	Demonstrate the applicability of functional levels of DCS in manufacturing automation	*CO3*	*PO2*	**10**
		b)	Illustrate the hierarchical database organization with a neat diagram	*CO3*	*PO2*	**10**
			OR			
	10	a)	Explain the primary functions of field stations with its internal structure.	*CO3*	*PO2*	**10**
		b)	With neat diagram explain the hierarchical system of Power Plants	*CO3*	*PO2*	**10**

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