Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80024

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025
Fifth Semester
Electrical and Electronics Engineering
U23EEV42– PLC & SCADA
(Regulation 2023)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Infer the significance of PLCs in the field of automation.	2	K2	CO1
2.	Compare the structure of Programmable Logic Controllers with Computers.	2	K2	CO1
3.	Interpret the advantages that PLCs over the relay-based control systems.	2	K2	CO2
4.	Name any two PLC programming languages.	2	K1	CO2
5.	Infer the features of retentive and cascade counters.	2	K2	CO3
6.	Analyze the possibilities of combining counter and timer functions for the given application. "Start packaging machine only if 100 parts are counted and at least 30 seconds have passed."	2	K2	CO3
7.	Recall any two data compare instructions with examples.	2	K1	CO4
8.	Infer the function of watchdog timer in PLC.	2	K2	CO4
9.	Tell the types of telemetry system used in PLC based automation.	2	K2	CO5
10.	Define SCADA and label the different types.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

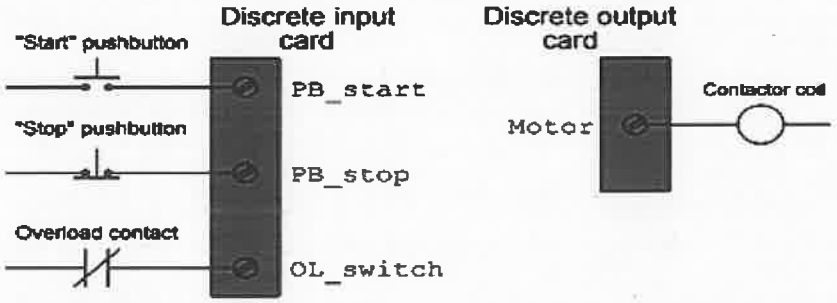
Q.No.		Questions	Marks	KL	CO
11.	a)	Explain the functional blocks of PLC and explain the expanded PLC architecture with a neat sketch.	13	K2	CO1

			(OR)		
	b)	i.	Compare discrete I/O modules with analog I/O modules.	7	K2 CO1
		ii.	Infer the concept of PLC workstations with necessary diagrams.	6	
12.	a)		Infer the role of program counter in PLCs, types of PLC counters (function based) and components of PLCs.	13	K2 CO2
			(OR)		
	b)		Develop a ladder programming to operate the motors with the following constraints. i. System start-ups include three motors with cooling fan in a sequence with a delay of 5 sec between each start up i.e. motor-2 starts after 5 sec of motor-1 and motor-3 starts at a delay of 5 sec w.r.t motor-2. ii. Beforemotor-1 starts, cooling fan motors of all motors should start. iii. During shut down motor-3 shuts first and motor-2 after 5 sec of motor-3 and motor-1 shut after 5 sec of motor-2 and finally all cooling fan motors shut.	13	K3 CO2
13.	a)		Build an ON delay timer with control for an application along with its timing diagram.	13	K3 CO3
			(OR)		
	b)		Develop a closed loop control system of an ON / OFF water heating system using PLC and discuss the merits over conventional control.	13	K3 CO3
14.	a)	i.	Compare jump and subroutine instructions in PLC programming with suitable examples.	7	K2 CO4
		ii.	Infer the applications of arithmetic instructions in industrial control applications.	6	
			(OR)		
	b)		Infer the working of ON/OFF liquid heating system with temperature sensor and heater control. Explain with suitable examples.	13	K2 CO4
15.	a)	i.	Model SCADA architecture to explain the process monitoring and control with a sketch.	7	K3 CO5
		ii.	Infer the significant role of RTU, MTU, HMI in SCADA system.	6	K2 CO5
			(OR)		
	b)		Develop a SCADA based control strategy for an automated irrigation system using telemetry and computer based monitoring.	13	K3 CO5

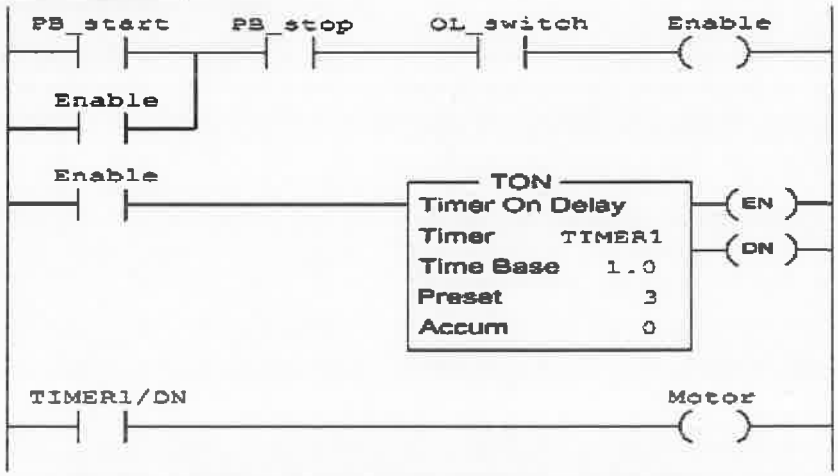
PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Construct a ladder diagram for the following applications and explain the process flow with the required control functions.		K3	CO3
		i. Bottle filling plant (closed loop).	7		
		ii. Traffic light controller.	8		
		(OR)			
	b)	A PLC has been programming to control the starting and stopping of a three-phase electric motor and the program is supposed to require that the operator press and hold the "Start" push button for at least three seconds before the motor starts and runs. The partial wiring diagram and offline PLC program display for the system is given below.	15	K3	CO2



PLC Program



Answer the followings for the above application.

i. Identify the status of start, stop and control relay before motor starting.

ii. Identify the problem(s) in the PLC ladder program

iii. Modify the program so that it will work, as it should.