Code No. : 17355 N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (E.E.E.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24
Programmable Logic Controllers (PE-IV)

Time: **3 hours**   Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Compare the functioning of a PLC and SCADA giving differences and similarities.	2	1	1	1,2
2.	Discuss various steps in constructing a ladder diagram.	2	1	1	1,3
3.	Output 120 should be ON when input 7, 8 and input 9 are ON, or, if input 17, 18 and 19 are ON. Also output 122 should be OFF when all the 6 inputs are ON. Draw the ladder diagram and logic gate diagram and give a Boolean expression for the same.	2	4	2	1,5
4.	A conveyor motor should run when any of the input buttons 1,2,3,4 is pressed. The motor should stop when the button is released. The conveyor motor should stop if any of the buttons 11,12,13,14 is pressed. Draw a logic gate diagram for the same.	2	4	2	1,5
5.	List the comparison functions and explain any one of the functions.	2	2	3	1,2
6.	Explain the function of Holding Register in PLC CPU.	2	1	3	1,2
7.	Explain how FAL function can be used in a ladder diagram.	2	1	4	1,2
8.	Explain about BIT FALLOW function.	2	2	4	1,2
9.	Draw the block diagram of PID controller.	2	3	5	1,2
10.	Draw the functional block of a PID controller in the PLC system.	2	3	5	1,2
	Part-B (5 × 8 = 40 Marks)				
11. a)	Explain the function of interfacing CPU processor of the PLC system with a neat block diagram.	4	1	1	1,2
b)	With a neat schematic diagram explain about the input/output modules interfacing.	4	1	1	1,2
12. a)	With neat diagram explain PLC programming I/P instructions.	4	3	2	1,2

			M	L	CO	PO
	b)	Draw and explain ladder logic program, power diagram of 3-phase induction motor control with PLC for forward –stop- reverse direction with mutual interlocks.	4	3	2	1,2
13.	a)	When the lights are turned off in a building, an exit door light is to remain on for an additional 5 min, and the parking area lights are to remain on for an additional 10 min after the door light goes off. Write a ladder program to implement this process and explain.	4	4	3	1,5
	b)	With a neat sketch explain about nested subroutine.	4	2	3	1,2
14.	a)	Explain the following Arithmetic functions: MULTIPLICATION, DIVIDE and SQUAREROOT.	4	2	4	1,5
	b)	Explain use of PLC sequencer to control basic Robot model.	4	2	4	1,2,5
15.	a)	How the 8-bit PLC CPU takes the signal from 0-300 V potentiometer draw appropriate conversion diagram, i/p terminal supports up to 15V, the potentiometer o/p is 115V.	4	4	5	1,2
	b)	Describe one method of PID tuning control implementation using a PLC.	4	4	5	1,2
16.	a)	List and explain any 5 merits and 2 demerits of the PLC system.	4	2	1	1,2
	b)	Draw the flow chart and ladder logic diagram for the paint spray process control system.	4	4	2	1,2
17.		Answer any *two* of the following:				
	a)	Draw the suitable timing diagram and ladder logic program for the i) ON-Delay ii) OFF Delay iii) Limited OFF time iv) Limited ON time.	4	4	3	1,2,5
	b)	Explain the sequencer circuit function with suitable dishwasher example.	4	2	4	1,2,5
	c)	Explain the PLC Analog Output application examples. • Analog In/Discrete out. • BCD in/ Analog output	4	2	5	1,2

M : Marks;   L: Bloom's Taxonomy Level;   CO; Course Outcome;   PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	30%
iii)	Blooms Taxonomy Level – 3 & 4	50%

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