VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD
Accredited by NAAC with A++ Grade
M.E. (E.E.E.) II-Semester Main Examinations, August-2023
Programmable Logic Controllers and Applications (PE-III)
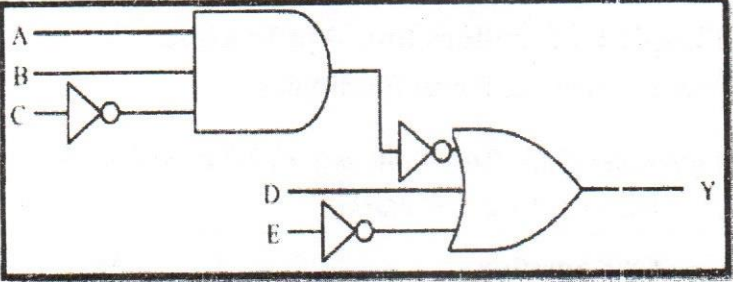### (Power Systems & Power Electronics)

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	4	1	1,2,3,4
2.	Explain the differences between motor start button and simple on-off switch	2	1	1	1,2,3,4
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 ON when all the 6 inputs are ON. Draw the ladder diagram and logic gate diagram for the given program.	2	4	2	1,2,3,4,5
4.	A conveyor motor should run when any of the input buttons 1,2,3,4 is pressed. The motor should not 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	1,2,3,4,5
5.	Convert the binary value of "101110" to Gray code, convert gray code of 101100 to binary code.	2	4	3	1,2,3,4
6.	List the types of comparison functions.	2	1	3	1,2,3,4
7.	Explain the use of SKIP function in the PLC ladder logic.	2	2	4	1,2,3,4
8.	Explain about BIT PICK, and BIT CLEAR.	2	2	4	1,2,3,4
9.	Draw the block diagram representation of the PID controller in the PLC.	2	3	5	1,2,3,4
10.	Draw the declaration of PID controller in the PLC.	2	3	5	1,2,3,4
	Part-B (5 × 8 = 40 Marks)				
11. a)	Explain the function of each block of the PLC system with a neat block diagram.	4	2	1	1,2,3,4
b)	With a neat schematic diagram explain about the input/output modules interfacing.	4	2	1	1,2,3,4
12. a)	Draw the flow chart and ladder logic diagram for the paint spray process control system.	4	4	2	1,2,3,4,5

			M	L	CO	PO
	b)	Draw a ladder diagram for the given logic gate diagram also write the Boolean expression for it.	4	4	2	1,2,3,4,5

			M	L	CO	PO
13.	a)	Draw the suitable timing diagram and ladder logic program for the i) Multiple OFF-Delay ii) One shot operation iii) Multiple ON-Delay iv) Repeat Cycling	4	4	3	1,2,3,4,5
	b)	Explain the function of "counter". Draw the ladder diagram for the paint spray pump is ON for 25 sec when the part count is reached to 20 on the conveyor belt.	4	4	3	1,2,3,4,5
14.	a)	With a neat sketch explain about the two axis model robot.	4	2	4	1,2,3,4,5
	b)	With a neat sketch explain about nested subroutine.	4	2	4	1,2,3,4
15.	a)	With a suitable example explain about the Analog input/ Digital output PLC operation.	4	2	5	1,2,3,4
	b)	How the 8-bit PLC CPU takes the signal from 0-230 V potentiometer, draw the appropriate conversion diagram, i/p terminal supports up to 5V, and the potentiometer output is 57V.	4	1	5	1,2,3,4
16.	a)	List and explain any 5 merits and 2 demerits of the PLC system	4	1	1	1,2,3,4
	b)	Draw and explain ladder logic program, power diagram of 3-phase induction motor control with PLC for forward – reverse direction instant control with mutual interlocks.	4	3	2	1,2,3,4,5
17.		Answer any *two* of the following:				
	a)	Explain about different types of arithmetic functions. how they are implemented in the PLC ladder logic.	4	2	3	1,2,3,4
	b)	Explain about the following functions in register bit operations. Shift Left ii) Shift Right iii) Rotate Left iv) Rotate Right	4	2	4	1,2,3,4
	c)	How the response of a process control curves vary with different PID tunings explain with neat diagrams.	4	1	5	1,2,3,4

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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