

Enrollment No.....



Faculty of Engineering
End Sem Examination Dec-2023
EE3EI01 PLC & Applications

Programme: B.Tech.

Branch/Specialisation: EE

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. In fixed programmable logic controller- 1
 (a) Input is fixed (b) Output is fixed
 (c) Both (a) and (b) (d) None of these
- ii. The CPU of PLC has- 1
 (a) Memory system (b) Processor
 (c) Power supply (d) All of these
- iii. The control logic in a programmable logic controller can be programmed by 1
 (a) FBD, ladder logic (b) Sequential logic
 (c) Structured text (d) All of these
- iv. The Boolean representation of this PLC program is: 1
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- (a) $ABC + D$ (b) $C + (A + B) D$
 (c) $C + D (A + B)$ (d) $C (AB + D)$
- v. The operation of a PLC retentive timer is similar to that of an: 1
 (a) electromagnetic pneumatic timer
 (b) Off-delay timer
 (c) Electro mechanical motor-driven timer
 (d) On-delay timer

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vi.	Which of the following is not usually associated with a PLC counter instruction?	1
	(a) Address (b) Preset value	
	(c) Time based (d) Accumulated value	
vii.	MCR stands for-	1
	(a) Master Control Relay (b) Master Control Reset	
	(c) Master Control Rail (d) None of these	
viii.	MOV, COP, FLL, & TOD are the group of-	1
	(a) Data flow Instructions	
	(b) Data compare Instructions	
	(c) Program Flow Instructions	
	(d) Specific Instructions	
ix.	What is the full form of PID?	1
	(a) Proportional Integral Derivative	
	(b) Proportional Integral Device	
	(c) Programmable Integral Device	
	(d) Programmable Integral Derivative	
x.	PID controllers are tuned on the frequency response of the closed loop system by-	1
	(a) Using the open loop gain corresponding to marginal stability	
	(b) Using the maximum amplitude of response	
	(c) Using maximum value of phase	
	(d) Using minimum value of phase	
Q.2	i. List the components used in Programmable Logic Controller.	2
	ii. Write short notes on fixed input/output and modular input/output.	3
	iii. Explain in detail the ladder diagram rule with suitable example.	5
OR	iv. Draw 3-inputs AND, OR and NAND gate PLC ladder diagram.	5
Q.3	i. Define rails and rungs in ladder logic programming.	2
	ii. Explain the working of NO and NC contacts using a suitable example.	3
	iii. Explain the following instructions of the PLC:	5
	(a) XIO (b) OTU (c) OUTB (d) AND	
	(e) SET	
OR	iv. What is holding register? Explain holding register in detail.	5

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Q.4	i. Write a short note on comparison functions in PLC.	3
	ii. What is a PLC counter? Draw the symbol of UP and DOWN Counters. Explain about both counters in brief.	7
OR	iii. What are timers in PLCs? Explain the operation of on delay & off delay timers using a ladder diagram.	7
Q.5	i. Explain the bit patterns in a register using an example.	4
	ii. Write an algorithm for PLC based dish washer using sequencer and timing modules.	6
OR	iii. Differentiate the operation of SKIP & MCR functions by using a suitable example.	6
Q.6	Attempt any two:	
	i. Write short note on analog PLC operation.	5
	ii. What is PID controller system? Explain PID control system in detail.	5
	iii. Write a note on PID tuning.	5
