Reg. No.															

Question Paper Code	12850

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Fifth Semester

Mechanical and Automation Engineering

20ESEI501 - PLC AND MICROCONTROLLER

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Define PLC.	2	K1	CO1
2.	Differentiate XIC and XIO instruction.	2	K2	CO1
3.	Sketch the timing diagram for on delay timer.	2	K1	CO2
4.	Name the four basic math functions performed by PLCs.	2	K1	CO2
5.	List the four ports of 8051 and state the differences between them.	2	K1	CO3
6.	Specify the operation of DJNZ instruction in 8051 μC.	2	K2	CO3
7.	Give the vector sequence and priority of interrupts of 8051.	2	K1	CO4
8.	State how baud rate is calculated for serial data transfer in mode 1.	2	K1	CO4
9.	Which register is used serial communication in 8051?	2	K1	CO5
10.	What are the types of sensors used in interfacing?	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Elucidate in detail the architecture of PLC and various components in PLC with neat diagram.	13	K2	CO1
		OR			
	b)	Classify the different types of I/O modules are required to be interfaced with PLC. Explain the functioning of different PLC input and output modules with neat diagram.	13	K2	CO1
12.	a)	Write a PLC program that will increment a counter's accumulated value 1 count every 60 s. A second counter's accumulated value will increment 1 count every time the first counter's accumulated value reaches 60. The first counter will reset when its accumulated value reaches 60, and the second counter will reset when its accumulated value reaches 12.	13	K2	CO2
		OR			
	b)	Develop a PLC program for automatic bottle filling system with hardware and ladder diagram.	13	K2	CO2

13. a) With a functional block diagram, briefly discuss the architecture of the 8051 microcontroller. *13 K2 CO3*

OR

b) Classify and explain the instruction sets of 8051. *13 K2 CO3*

14. a) Write an 8051 ALP to sort block of ten data stored in external memory location from 4000h in ascending order. *13 K2 CO4*

OR

b) Write a program for generation of unipolar square waveform of 1 KHz frequency using Timer 0 of 8051 in mode 0. Consider the system frequency as 12MHz. *13 K2 CO4*

15. a) Explain in detail about the following *13 K2 CO5*
    (i) 12C Interfacing.
    (ii) Bluetooth Interfacing.

OR

b) Draw the diagram to interface a stepper motor with 8051 microcontroller and write an ALP to run the stepper motor in both forward and reverse direction with delay. *13 K2 CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Illustrate the control system design of washing machine using 8051 microcontroller programming. *15 K2 CO5*

OR

b) Explain with an example the design of Traffic Light Controller using 8051 Microcontroller. *15 K2 CO5*