Reg. No.															

Question Paper Code	13481

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Fifth Semester

Mechanical and Automation Engineering

20ESEI501 - PLC AND MICROCONTROLLER

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	The component responsible for executing the control program in a PLC is: (a) Input module (b) Output module (c) CPU (d) I/O bus	1	K1	CO1
2.	Which of these is a graphical programming language used in PLCs? (a) Ladder Logic (b) Assembly (c) Python (d) C++	1	K1	CO1
3.	A counter that increases its count every time an input is activated is: (a) down counter (b) retentive timer (c) up counter (d) cyclic timer	1	K2	CO2
4.	Which instruction is used to transfer data from one memory location to another? (a) ADD (b) MOVE (c) JMP (d) TMR	1	K1	CO2
5.	The register used for indirect addressing is: (a) A (b) DPTR (c) R0 (d) SP	1	K2	CO3
6.	The interrupt with the highest priority in 8051 is: (a) External Interrupt 0 (b) Timer 0 (c) Serial Port (d) Timer 1	1	K2	CO3
7.	For a delay generation using timers, which register is used to set mode? (a) SCON (b) TCON (c) TMOD (d) IE	1	K2	CO4
8.	The instruction used to fetch data from code memory using DPTR is: (a) MOVX A, @DPTR (b) MOV A, @R0 (c) MOVC A, @A+DPTR (d) MOV A, P1	1	K2	CO4
9.	In SPI, the master initiates communication using: (a) S (b) MISO (c) SCK (d) SS	1	K2	CO5
10.	The motor that rotates in discrete steps is: (a) DC Motor (b) Stepper Motor (c) Servo Moto (d) AC Motor	1	K2	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define PLC.	2	K1	CO1
12.	Compare XIC and XIO instruction.	2	K2	CO1
13.	List any two advantages of using PLCs over relay-based systems.	2	K1	CO1
14.	What is retentive timer on?	2	K1	CO2
15.	List any four arithmetic instructions.	2	K1	CO2
16.	What is the use of the MOVE instruction in PLC?	2	K1	CO2
17.	Classify various addressing mode in 8051 microcontroller.	2	K2	CO3
18.	Specify the operation of CALL instruction.	2	K2	CO3
19.	Why is code conversion necessary in Microcontrollers?	2	K1	CO4
20.	What is the function of the ADD and ADDC instructions in 8051?	2	K1	CO4
21.	Summarize the applications of the CAN Protocol.	2	K2	CO5
22.	Which module is commonly used to add Bluetooth functionality to 8051?	2	K1	CO5

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain in detail the architecture of PLC and various components in PLC with neat diagram.	*11*	*K2*	*CO1*
		OR			
	b)	Summarize in detail about the input and output devices available in PLC.	*11*	*K2*	*CO1*
24.	a)	Explain the UP/DOWN counter with ladder logic diagram and timing diagram.	*11*	*K2*	*CO2*
		OR			
	b)	Explain how PLC is used for motor control.	*11*	*K2*	*CO2*
25.	a)	With a functional block diagram, briefly discuss the architecture of the 8051 microcontroller.	*11*	*K2*	*CO3*
		OR			
	b)	Discuss the importance of interrupt and its structure in 8051 Microcontroller.	*11*	*K2*	*CO3*
26.	a)	Write an assembly program to add two 8-bit numbers and store the result in R0.	*11*	*K2*	*CO4*
		OR			
	b)	Write a program to continuously generate a square wave of 2 kHz frequency on pin P1.5 using timer 1. Assume the crystal oscillator frequency to be 12 MHz.	*11*	*K2*	*CO4*
27.	a)	Explain in detail about features of SPI and CAN.	*11*	*K2*	*CO5*
		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.	*11*	*K2*	*CO5*
28.	a)	Write an assembly program to multiply two 8-bit numbers stored in memory locations 40H and 41H and store the result.	*11*	*K2*	*CO4*
		OR			
	b)	Develop PLC ladder logic to automate the sequence: Pre-wash, Wash, Rinse, and Dry using timers.	*11*	*K2*	*CO2*