Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:3154105 Date:05-12-2024

Subject Name: Microcontrollers and PLC

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain difference between microprocessor and microcontroller.	**03**
	(b)	Explain EQU & DB assembler directives of 8051 microcontroller.	**04**
	(c)	Write operation of the following instructions 1] SWAP A [2] MOVX A,@DPTR [3] DIV AB [4] RR A [5] XCHD A,R1 [6] MOVC A,@A+DPTR 7) MOV A,30H	**07**
Q.2	**(a)**	List the factors to be considered for selection of microcontroller for application.	**03**
	(b)	Differentiate between Control and Conditional flag. Explain flag register of 8051 microcontroller.	**04**
	(c)	List different addressing modes of programing instruction of 8051 microprocessor. Also explain them with a suitable example.	**07**
		OR	
	(c)	Draw and explain internal memory organization of 8051 microcontroller.	**07**
Q.3	**(a)**	Describe the functions of following 8051 pins. (i) XTAL1 (ii) ALE (iii) RxD	**03**
	(b)	Discuss PUSH and POP Instruction.	**04**
	(c)	Explain PC and DPTR with their significance. Write program to interchange contents of PC and DPTR.	**07**
		OR	
Q.3	**(a)**	Describe each bit of 8051 microcontroller PSW (flag) register.	**03**
	(b)	Write difference between ACALL and LCALL instruction with example.	**04**
	(c)	Write a program to transfer block of 10 data from internal memory locations to External memory locations for 8051 controller.	**07**
Q.4	**(a)**	Describe TMOD Special Function registers.	**03**
	(b)	List out 8051 interrupts with their ROM location.	**04**
	(c)	Interface a seven segment common cathode display with microcontroller 8051. Write an ALP to display numbers from 0 to 9 at every second.	**07**
		OR	
Q.4	**(a)**	Develop a ladder diagram for AND & EX -OR Logic gates.	**03**
	(b)	Draw the block diagram of PLC.	**04**
	(c)	Draw SFC and ladder diagram for traffic light sequence operation.	**07**
Q.5	**(a)**	Describe the Input Module block diagram.	**03**
	(b)	Explain the various programming languages in PLC.	**04**
	(c)	Write a PLC ladder logic equivalent for NAND and NOR as universal gates.	**07**
		OR	
Q.5	**(a)**	Explain the ON-Delay timer.	**03**
	(b)	Develop ladder diagram for 4 to 1 Multiplexer.	**04**
	(c)	Describe the various types of Jump instructions.	**07**

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