

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - V EXAMINATION - SUMMER 2025

Subject Code: 3154105

Date: 20-05-2025

Subject Name: Microcontrollers and PLC

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

	Marks
Q.1 (a) Explain JUMP instruction of 8051 microcontroller with example.	03
(b) Explain the interfacing of a 4x4 keypad with the 8051 microcontroller.	04
(c) Explain addressing modes supported by 8051 microcontroller.	07
Q.2 (a) Briefly describe the Interrupt structure in the 8051.	03
(b) Explain Four directives of 8051- ORG, END DB, EQU.	04
(c) Draw interfacing circuit of LCD with microcontroller 8051. Explain the function of each pin of LCD.	07
OR	
(c) Interface 16x2 LCD with 8051. Write a C-program to display a "TMR" in the first row and "EXAM" in the second row, continuously.	07
Q.3 (a) Draw the internal structure of Port 0.	03
(b) Draw circuit diagram of XTAL connection and power on RESET circuits for the 8051 microcontroller.	04
(c) Describe TMOD register and explain various modes of timers in 8051 microcontroller.	07
OR	
(a) Write a program to transfer the content of register R0 of Bank 0 to register R7 of bank1.	03
(b) Explain PSW Register of 8051 microcontrollers.	04
(c) Draw the architecture of 8051 microcontroller and discuss in detail.	07
Q.4 (a) Explain Interlocking and latching concept for PLC with example.	03
(b) Explain TOFF timer of PLC with timing diagram.	04
(c) Develop a ladder diagram to convert temperature from °C to °F using basic math instructions.	07

OR

- (a)** What is scan time in PLC? Explain total scan time. **03**
- (b)** Explain CTU (up-counter) operation in PLC with proper timing diagram. **04**
- (c)** Prepare LLD for An automatic car parking system, when the parking area is full with 8 cars the red bulb at entry should 'ON' to indicate it is full. If the number of cars within the parking area is less than 8 the green bulb should 'ON' to indicate that the space for parking is available. **07**

- Q.5**
- (a)** List out various programming languages of PLC. **03**
 - (b)** Why electrical isolation is needed in PLC? How it is provided in PLC? Explain it in brief. **04**
 - (c)** Prepare LLD for Output A is ON after 10 second of push button B is pressed, then again Output A on for 5 second and then goes OFF for 10 second. **07**

OR

- (a)** List out factors to be considered for selecting PLC. **03**
- (b)** Prepare truth table and LLD for following logic gates **04**
1) NOR 2) AND 3) NAND 4) XOR
- (c)** Prepare LLD to maintain water level in Open water Tank by switching Water pump. Use two limit switches to detect LOW and HIGH level of the tank. **07**
