GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (OLD) EXAMINATION – WINTER 2022

Subject Code:151001   **Date:17-01-2023**
Subject Name:Microcontroller and Interfacing
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.**

Q.1	**(a)**	Draw and explain architecture of 8051 Microcontroller in detail.	**07**
	(b)	Explain following instructions	**07**

        [1] SWAP A   [2] ADD A, B   [3] XCHD A, R0

        [4] MUL AB   [5] RL A   [6] DIV AB   [7] MOV A, @R0

Q.2	**(a)**	Explain pin configuration with circuit diagram for port 0 and port 1.	**07**
	(b)	Draw and explain RESET and clock circuit of 8051 microcontroller. What is the purpose of capacitor in RESET circuit?	**07**

OR

	(b)	Explain Serial data transmission modes in detail.	**07**

Q.3	**(a)**	Write program to generate square wave on port pin P2.0 with frequency of 10 KHz. Use timer interrupt. Use timer 0 in mode 2. Assume crystal frequency 12 MHz	**07**
	(b)	Write an 8051 C program to toggle all bits of P2 continuously every 500 ms.Use Timer 1, Mode 1 to create the delay.	**07**

OR

Q.3	**(a)**	Explain how two 16 bit counters T0 and T1 are programmed to count internal clock pulse as a timer and are programmed to count external pulses as a counter.	**07**
	(b)	Assume that ROM space starting at 350h contains "BEST LUCK", Write a program to transfer the bytes into RAM location at 50h.	**07**

Q.4	**(a)**	Discuss interfacing of the LCD with 8051 microcontroller. Draw interfacing diagram. Write program to display message "ALL THE BEST" on the LCD screen.	**07**
	(b)	Interface two Seven Segment Display with 8051 Microcontroller and display 00 to 99 with approximate delay of 1 second.	**07**

Q.4 **(a)** Draw and explain interfacing of 4x4 matrix keyboard with 8051 microcontroller. Write program to read switch. **07**

(b) Draw interfacing diagram to interface push-button switch at port pin P3.3 and relay with transistor circuit at port pin P2.0. Write program such that when push-button key is pressed, relay should become ON. When push-button key is pressed again relay should become OFF (i.e. toggling of relay by push-button switch). **07**

Q.5 **(a)** Draw interfacing diagram of DAC with 8051 microcontroller. Write program to generate sinewave at the output of DAC. Use lookup table to store hex values **07**

(b) Explain interfacing of stepper motor with microcontroller. Write program to rotate stepper motor in clockwise direction continuously in full step mode. **07**

OR

Q.5 **(a)** Explain interfacing of 8051 with ADC0804 chip. **07**

(b) What are the interrupts available in the 8051 microcontroller? Explain interrupt enable (IE) SFR and Interrupt priority (IP) SFR. **07**

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