Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160914 Date:24/11/2021

Subject Name:Microprocessors and Microcontrollers

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)**	**Fill in the following blanks:** (1) The first operation performed by the microprocessor during execution of each instruction is _____. (2) If the memory chip size is (512 x 8), the number of chips required in making 4K-byte memory is _____. (3) The addressing mode of MOV A, 30H instruction is _____.	**03**
	(b)	Explain functions of following pins of 8085: (i) IO/M (ii) READY	**04**
	(c)	Draw and explain timing diagram of STA 5000H instruction of 8085.	**07**
Q.2	**(a)**	With the help of diagram show how de-multiplexing of address/data lines AD0- AD7 can be achieved?	**03**
	(b)	Draw and explain Port-2 architecture of 8051.	**04**
	(c)	Write an assembly language program that transfers a set of ten 8-bit numbers stored in external RAM starting from 1000H to internal RAM starting from 40H. Also, draw flowchart for the program logic.	**07**
		OR	
	(c)	Draw an interfacing scheme to interface 16K EPROM and 8K RAM with 8031. Also specify address range.	**07**

Q.3	**(a)**	Write an output after execution of each of the following set of instructions in sequence:
		MOV A, #36H
		SWAP A
		ANL A, #0FH
		MOV P0,A
			03

	(b)	Explain register banks of 8051. How banks can be selected?	**04**
	(c)	Write a subroutine that converts Hex digit into its equivalent ASCII and hence using it write a program to convert an 8-bit Hexadecimal number available in RAM at 30H into its equivalent ASCII and store the result in RAM at 40H and 41H.	**07**
		OR	
Q.3	**(a)**	Draw and explain Reset circuit of 8051.	**03**
	(b)	Explain addressing modes of 8051 with example.	**04**
	(c)	A push button switch is connected with P3.2 pin of 8051 that normally pull the pin high and when pressed, the level on pin become low. Write a program that makes an emergency alarm connected with P1.0 pin ON when the switch is pressed. The alarm should automatically goes OFF after 30 second.	**07**

Q.4	**(a)**	Explain IE register of 8051.	**03**
	(b)	Explain 8051 interrupt's priority. How the priority can be modified?	**04**
	(c)	Write a 'c' program that generates a square wave of 1 KHz frequency on P1.0 pin using timer-0 in mode-1. Show timer count calculation.	**07**

OR

Q.4	**(a)**	Differentiate between MOVX and MOVC instruction.	**03**
	(b)	Draw an interfacing scheme to interface (20X2) LCD display with 8051 microcontroller.	**04**
	(c)	Write an embedded 'C' program that displays a message "Happy New Year" in line-1 and "2021" in line-2 of LCD display.	**07**
Q.5	**(a)**	Explain SCON register of 8051.	**03**
	(b)	Draw an interfacing scheme to interface ADC0809 with 8051.	**04**
	(c)	Write a program that transmits a message "Happy New Year" using serial mode-1 at 9600 baudrate. Assume oscillator frequency =11.0592 MHz. Show timer count calculation for the specified baudrate.	**07**

OR

Q.5	**(a)**	Draw an interfacing scheme to interface 4 x 4 matrix keyboard with 8051.	**03**
	(b)	Draw an interfacing scheme to interface 4-digit common cathode seven segment display with 8051.	**04**
	(c)	Using interfacing scheme in part-b, write an embedded 'C' program that updates and displays real time second and minute on 4-digit common cathode seven segment display.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3160914 Date:01/06/2022

Subject Name:Microprocessors and Microcontrollers

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)**	List various processing modes of ARM processors with classification.	**03**
	(b)	With diagram explain complete ARM register set.	**04**
	(c)	A 10 bytes of data string is stored at starting from memory location 40h. Write an assembly language program for 8051 microcontroller to transfer this data string to memory location starting from 50h in reverse order.	**07**
Q.2	**(a)**	Explain the function of following pins in 8085 µp: HLDA & HOLD	**03**
	(b)	Illustrate how address/data lines AD0-AD7 are de-multiplexed in 8085 µp?	**04**
	(c)	A byte is stored in external memory location 2005H. Write an 8051 µc assembly language program to count number of 0's and 1's in. Draw flowchart.	**07**
		OR	
	(c)	Draw and explain timing diagram of instruction STA 2000H of 8085 µp.	**07**
Q.3	**(a)**	Explain 8051 program status word (PSW) register in brief.	**03**
	(b)	Discuss various addressing modes of 8051 microcontroller assembly language programming.	**04**
	(c)	Write a 8051 assembly language program to generate a square wave of 1.5 kHz frequency at P2.0 using Timer 0 in Mode 1 with crystal frequency of 12 MHz.	**07**
		OR	
Q.3	**(a)**	Explain editor, assembler, compiler and linker	**03**
	(b)	Explain all the bits of TCON register**.**	**04**
	(c)	Explain the Interrupt facility of 8051 microcontroller using IE and IP register. Also mention the internal priority of Interrupt and their vector locations.	**07**
Q.4	**(a)**	Write C program to get bit P1.0 and send it to P2.1 after inverting it.	**03**
	(b)	Explain interfacing of DC motor using H-bridge circuit with 8051 microcontroller.	**04**
	(c)	Write an 8051 program in embedded C to blink the LED connected to pin P1.5 at a suitable delay interval.	**07**
		OR	
Q.4	**(a)**	C programming is more preferred over assembly programming for 8051 µc. Justify your answer with proper reason.	**03**
	(b)	Explain interfacing of 8051 with ADC 0808.	**04**
	(c)	What is an assembler directive? Give at least four examples of assembler directives and explain function of each in brief.	**07**

Q.5 **(a)** Explain basic differences (1) Van neuman and Harvard architecture (2) CISC and RISC. **03**

(b) How baud rate can be set in 8051 microcontroller for serial communication? **04**

(c) Explain and Differentiate between the following instructions of 8051 microcontroller. **07**

(i) SWAP and XCHG (ii) MOVX and MOVC

(iii) Bit level ANL and byte level ANL

OR

Q.5 **(a)** Explain advantages of IDE in program development. **03**

(b) Write a short note on available data types in embedded C. **04**

(c) Explain every step of the following program and also calculate the frequency of the square wave generated at the end of program execution. (assume crystal frequency = 11.0592MHz) **07**

```
        MOV TMOD, #20H
        MOV TH1, #4H
        SETB TR1
L1    : JNB TF1, L1
BACK: CPL P1.5
        CLR TF1
        SJMP BACK
```

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