

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VII EXAMINATION – WINTER 2025****Subject Code:3160914****Date:02-12-2025****Subject Name: Microprocessors and Microcontrollers****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.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Draw the RAM allocation in 8051.	03
	(b) Compare between microprocessor & microcontroller.	04
	(c) Explain the function of following pins in 8085. 1. ALE 2. INTA 3. READY 4. HLDA	07
Q.2	(a) Differentiate between MOVX and MOVC instructions.	03
	(b) Explain demultiplexing of AD0-AD7 in 8085.	04
	(c) State and explain various addressing modes of 8051.	07
OR		
(c)	Draw & explain block diagram of 8085.	07
Q.3	(a) List conditional jump instructions. Explain any one.	03
	(b) Explain the available data types in embedded C	04
	(c) Explain all the bits of PSW register in 8051.	07
OR		
Q.3	(a) List all assembly directives.	03
	(b) Differentiate between Van neuman and Harvard architecture	04
	(c) With neat sketch explain timing diagram of instruction STA 2000H in 8085	07
Q.4	(a) What is stack memory? How it can be accessed?	03
	(b) Explain in brief the editor, assembler, compiler.	04
	(c) Write a short note on interrupts in 8051.	07
OR		
Q.4	(a) What is the function of SBUF register in 8051?	03
	(b) Explain all the bits of TCON register.	04
	(c) Write a short note on serial communication.	07
Q.5	(a) Give the vector addresses of various interrupts in ARM processor.	03
	(b) Explain interfacing of 8051 with ADC 0808.	04
	(c) Write an assembly program to add ten numbers stored from memory location 30H onwards and store the result at 50H.	07
OR		
Q.5	(a) List the advantages of C language over assembly.	03
	(b) Explain SBUF register in 8051.	04
	(c) Write a C program to generate square wave of 1 KHz frequency at P1.0 (use 12 MHz clock)	07

Enrolment No./Seat No _____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160914

Date:20-11-2024

Subject Name:Microprocessors and Microcontrollers

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
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		Marks
Q.1	(a) State the difference between RISC and CISC architecture	3
	(b) What is the size of address and data bus in 8085? Are they unidirectional or bidirectional? Show, how a 2K memory can be interfaced with 8085?	4
	(c) Draw and explain architectural block diagram of 8085 microprocessor	7
Q.2	(a) Give the function of RS0 and RS1 bits in PSW register of 8051	3
	(b) State the significance of PC and DPTR register of 8051	4
	(c) Draw and explain timing diagram of MVI instruction of 8085 microprocessor	7
OR		
	(c) Draw and explain the internal RAM structure of 8051. Show register banks and bit addressable area of 8051	7
Q.3	(a) Explain the function of the following pins in 8051 (i) INT0 (ii) RXD (iii) EA	3
	(b) Explain the following instructions of 8051 giving appropriate examples (i) CJNE (ii) JBC	4
	(c) Discuss the different types of bit manipulation instructions available with 8051	7
OR		
Q.3	(a) Write an ALP to divide the data in RAM location 3FH by the number 12. Put the quotient in R4 and remainder in R5.	3
	(b) Write an ALP to subtract the contents of register R2 from the number F3H and put the result in external RAM location 5678H	4
	(c) With the help of appropriate examples, discuss the different types of rotate instructions available with 8051	7
Q.4	(a) A certain instruction requires two machine cycles for execution. If the clock frequency is 11.0592 MHz determine the time required to execute the instruction	3
	(b) What is the significance of GATE bit in TMOD register?	4
	(c) Give the format of TCON register and explain the function of each bit.	7
OR		
Q.4	(a) Give difference between simplex, half duplex and full duplex transmission	3
	(b) Write an assembly language program for 8051 to transfer the letter "A" serially at 4800 baud continuously. Assume XTAL = 11.0592 MHz	4

- (c) Write a C program to alternately display 55H and AAH on P1 port with some delay 7
- Q.5** (a) Give interrupt vector table of 8051. Discuss their priorities 3
(b) Discuss the format of IE register and explain the function of each bit 4
(c) Draw and explain how 8051 can be connected to external 8K RAM. Which ports are used for address and data lines? 7
- OR**
- Q.5** (a) What is meant by pipelining? How it affects execution speed? 3
(b) Discuss the format CPSR register in ARM. State the different operating modes of the processor. 4
(c) What is stepper motor? State some of its applications. Draw and discuss how 8051 can be interfaced with stepper motor? 7

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	Marks
Q.1 (a) Explain basic differences between CISC and RISC processor.	03
(b) Write one instruction each using the following addressing modes. a. Immediate b. Register c. Register indirect d. Direct	04
(c) Draw the block diagram of 8051 microcontroller. Explain the working of a) Stack and Stack pointer b) Program Counter and Data Pointer.	07
Q.2 (a) Explain the following Pin function of 8051 microcontroller. 1) RXD 2) PSEN 3)ALE	03
(b) Compare MOVX and MOVC instructions.	04
(c) Briefly explain the JMP & CALL instruction available in 8051.	07
OR	
(c) Write an assembly program to add 10 bytes in external RAM location 4000H.Store the result at external memory location 3000H	07
Q.3 (a) What is the function of the bits TMOD.1 & TMOD.2?	03
(b) Explain the Timer in Mode 0 in 8051.	04
(c) Write an 8051 C program to toggle all the bits of port 0 continuously. Use timer 0 to generate 10 sec between each toggle.	07
OR	
Q.3 (a) Find out the Hex number to be loaded in Timer 0 to produce delay of 4.096ms in mode 0 operation.Assume clock frequency of 12MHz.	03
(b) Explain TCON Register for 8051 Microcontroller	04
(c) Write an assembly language program to generate square wave at 10 KHz frequency with timer 0 with mode 2 on Port pin P0.1.	07
Q.4 (a) What is the function of SBUF register in 8051?	03

- (b) Explain how interrupt priority can be changed using IP register. Also explain the default priorities assigned to interrupts in 8051 microcontroller. **04**
- (c) Write an 8051 program to transfer WELCOME serially at 9600 baud rate(8 bit data and 1 stop bit) continuously. **07**
- OR**
- Q.4** (a) Explain the bit contents of IE register. **03**
- (b) Give comparison between Asynchronous and Synchronous serial data transfer **04**
- (c) Explain SCON register in 8051 microcontroller. **07**
- Q.5** (a) Draw and explain 8051 connection to external RAM (8K x 8) **03**
- (b) List the features of ADC 0804 **04**
- (c) Interface a DAC to 8051 microcontroller and write an assembly language program to generate triangular wave using DAC interface. **07**
- OR**
- Q.5** (a) List the vector addresses of various interrupts in ARM processor. **03**
- (b) Draw an interfacing diagram to interface 4 x 4 matrix keyboard with 8051. **04**
- (c) Discuss how the speed and direction of DC motor can be controlled using microcontroller. **07**

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1. Attempt all questions.
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		MARKS
Q.1	(a) For 8051 μ c operations define: pulse, state and machine cycle.	03
	(b) Draw programming model of 8085 microprocessor and explain flag register in brief.	04
	(c) A 10 bytes of data string is stored at starting from memory location 50h. Write an assembly language program for 8051 μ c to find out maximum value from this data string and store that value at register B .	07
Q.2	(a) What is the function of following pins in 8085: HOLD, READY & RESET OUT	03
	(b) Draw and explain in brief timing diagram for instruction MVI A, 32h.	04
	(c) List various processing modes of ARM processors with classification and explain complete ARM register set.	07
OR		
	(c) Write assembly language program for 8051 μ c to count number of 0's and 1's in a byte stored in external memory location C500H. Draw flowchart.	07
Q.3	(a) Discuss the internal RAM structure of 8051.	03
	(b) Discuss various addressing modes of 8051 microcontroller assembly language programming.	04
	(c) Write a for assembly language program for 8051 μ c to toggle all bits at PORT 2 with a time delay of 20 ms without using timers.	07
OR		
Q.3	(a) Explain basic differences (1) Van neuman and Harvard architecture (2) CISC and RISC.	03
	(b) What are tri-state devices & why they are essential in bus oriented system?	04
	(c) Explain the operation of the following instructions of 8051 microcontroller in detail: (i) MOVX (ii) CJNE (iii) DJNZ (iv) XCHD	07
Q.4	(a) Differentiate between SJMP, AJMP and LJMP for 8051 μ c programming.	03
	(b) How baud rate can be set in 8051 microcontroller for serial communication?	04
	(c) Explain the role of SBUF & SCON registers in serial transfer in 8051.	07
OR		
Q.4	(a) List out steps in executing an interrupt for 8051 μ c.	03
	(b) Explain IE register in brief.	04

- (c) Write a C program using interrupts to make timer 0 to generate a square wave of 5 KHz frequency on P0.1. Assume XTAL =11.0592 MHz. **07**
- Q.5** (a) Explain editor, assembler, compiler and linker. **03**
(b) What is the normal operating frequency of ADC0804? When interfacing ADC0804 with 8051 μ c, what care need to be taken if CLK input is from 8051 μ c? **04**
(c) Draw interfacing diagram of 8051 μ c to DAC808. For the same connection, consider a switch SW connected to pin P0.1. Write an 8051 μ c program: When SW =0, the DAC output gives a staircase waveform otherwise no action when SW=1. **07**
- OR**
- Q.5** (a) In what way is the ADC0808 is different from ADC0804? **03**
(b) Draw interfacing diagram for interfacing of DC motor to 8051 μ c using optoisolator and using a MOSFET transistor. **04**
(c) Discuss the interfacing of seven segment display with 8051 with necessary diagram. **07**
