Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII EXAMINATION – WINTER 2025

Subject Code: 3160712 Date: 17-11-2025

Subject Name: Microprocessor and Interfacing

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)**	Describe the components of a microprocessor and their roles.	**03**
	(b)	Detail the process by which a microprocessor communicates with memory and I/O devices, including the significance of bus organization.	**04**
	(c)	Draw the architectural diagram of 8085 microprocessor and list out the following: 1. General Purpose Registers 2. Special Purpose registers with their functions 3. Flags in the flag register with required explanation	**07**
Q.2	**(a)**	List three control signals generated by the 8085 microprocessor and their purposes.	**03**
	(b)	Explain the process of demultiplexing buses in the 8085 microprocessor.	**04**
	(c)	Describe the entire process of executing an instruction by the 8085 microprocessor, including the roles of the ALU, registers, and control unit.	**07**
		OR	
	(c)	Describe in detail the instruction cycle, including machine cycles and T-states, of the 8085 microprocessor.	**07**
Q.3	**(a)**	State the addressing modes and size of the following instructions: 1. MOV B, M 2. MVI A, 16H 3. LDA 2050H	**03**
	(b)	Explain instruction set of 8085 microprocessor.	**04**
	(c)	2100: MVI A, 55H ADI 45H identify the byte size of the ADI 45H command. Illustrate the execution process of ADI 45H by creating a diagram that includes the machine cycles it undergoes. In your diagram, indicate the states of the address bus, data bus, and control signals (*RD, *WR, IO/*M, ALE) during each T-state. Also, provide the names of the machine cycles involved.	**07**

OR

Q.3	**(a)**	Explain addressing modes of 8085 microprocessor.	**03**
	(b)	Specify the size, addressing mode, required Machine cycles, T-States and function for following instructions: 1. MOV B, M 2. SHLD 2300H	**04**
	(c)	Enlist the error in the below assembly language code MVI B,20H MVI D,99H MVI C, D LDAX 2099h ADD 01H STAX 3000H. Provide the solution after doing the correction at your end.	**07**
Q.4	**(a)**	Define the term "interfacing" in the context of microprocessors.	**03**
	(b)	Explain how interrupts are managed in the 8085 microprocessor.	**04**
	(c)	Create an assembly language program for the 8085 microprocessor that performs subraction of two 8bit numbers. Please specify the memory address of each instruction, and include a flowchart for the program.	**07**

OR

Q.4	**(a)**	Explain the purpose of the Programmable Peripheral Interface 8255A.	**03**
	(b)	Describe the process of interfacing an I/O device with the 8085 microprocessor.	**04**
	(c)	Create an assembly language program for the 8085 microprocessor that performs addition of two 8bit numbers. Please specify the memory address of each instruction, and include a flowchart for the program.	**07**
Q.5	**(a)**	Draw Block Diagram and Pin Diagram of 8259 Microcontroller.	**03**
	(b)	Describe how to use the ADI and SUI instructions in an 8085-assembly language program to perform basic arithmetic operations. Provide a short example program that adds 25H to the accumulator and then subtracts 10H from the result.	**04**
	(c)	Provide an overview of the 80286 and 80386 microprocessors, highlighting their architectural advancements compared to the 8086.	**07**

OR

Q.5	**(a)**	List and explain the interrupt available in microprocessor 8085.	**03**
	(b)	Illustrate how conditional branch instructions like JNZ (Jump if Not Zero) are used in 8085 assembly language programming. Provide an example program snippet that utilizes JNZ to perform an operation repeatedly until a condition is met.	**04**
	(c)	Provide a detailed explanation of the logical block diagram of the 8086 microprocessor and the functions of its major components.	**07**

***It is advisable to put fundamental questions of respective subject in Q1, as it is compulsory question.**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160712 Date:25-11-2024

Subject Name:Microprocessor and Interfacing

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)**	List the key parts of a microprocessor and give a short explanation of their functions.	**03**
	(b)	Explain memory and I/O operations in a microprocessor.	**04**
	(c)	Describe the architecture of the 8085 microprocessor with a neat diagram.	**07**
Q.2	**(a)**	Explain Assembler, Debugger and Linker with an example.	**03**
	(b)	Explain Read/ Write control signals for memory and I/O.	**04**
	(c)	Draw and Explain Timing Diagram of MVI A, 45h.	**07**
		OR	
	(c)	Identify the machine cycles in the following instructions 1. SUB B 2. ADI 47H 3. STA 2050H 4. PUSH B	**07**
Q.3	**(a)**	Explain the function of the program counter and stack pointer in the 8085 microprocessor.	**03**
	(b)	Describe the instruction cycle and machine cycles of the 8085 microprocessor.	**04**
	(c)	Create an assembly program that demonstrates the process of demultiplexing the address and data bus in the 8085 microprocessor, and provide an explanation of how it works.	**07**
		OR	
Q.3	**(a)**	What is the role of the ALU and control unit in the 8085 microprocessor?	**03**
	(b)	Explain the memory interfacing with the 8085 microprocessor.	**04**
	(c)	Construct an 8085-assembly language program that takes two values and executes arithmetic addition, subtraction, and a logical AND operation.	**07**
Q.4	**(a)**	Define I/O ports and describe their role in the process of microprocessor interfacing.	**03**
	(b)	Explain the working of the 8255 Programmable Peripheral Interface.	**04**
	(c)	Discuss the interrupt architecture of the 8085 microprocessor, focusing on both hardware and software interrupt types.	**07**
		OR	
Q.4	**(a)**	Define the concepts of stack and subroutines in the context of the 8085 microprocessor.	**03**

	(b)	Describe how the 8259A Programmable Interrupt Controller functions and how it is utilized in microprocessor systems.	**04**
	(c)	Create an 8085-assembly language routine to implement a delay, utilizing both counters and the stack.	**07**
Q.5	**(a)**	Describe the concept of segmentation in the 8086 microprocessor.	**03**
	(b)	Compare the minimum mode and maximum mode of the 8086 microprocessor.	**04**
	(c)	Summarize the architecture and programming model of the 80386 microprocessor.	**07**

OR

Q.5	**(a)**	Describe the pin configuration of the 8086 microprocessor in detail.	**03**
	(b)	How does the 80286 microprocessor improve upon the 8086, particularly in terms of memory management?	**04**
	(c)	Summarize the programming model and data types available in the 80286 microprocessor.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – WINTER 2023

Subject Code:3160712 Date:05-12-2023

Subject Name: Microprocessor and Interfacing

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)**	Explain the difference between a microprocessor and a microcomputer.	**03**
	(b)	Define significance of ALE pin with example or a diagram.	**04**
	(c)	Draw and Explain Pin diagram of 8085.	**07**
Q.2	**(a)**	Explain Assembler, Debugger and Linker with an example.	**03**
	(b)	Explain Read/ Write control signals for memory and I/O.	**04**
	(c)	Draw and Explain Timing Diagram of MVI A, 45h.	**07**
		OR	
	(c)	List instruction set of 8085. Also explain timing diagram of two-byte instructions.	**07**
Q.3	**(a)**	Find the ending address of an 8K-byte memory if the starting address is *'0'*	**03**
	(b)	What are the contents in Register H and L after executing the following 8085 program? MVI L, 01H MVI H, 00H INX H	**04**
	(c)	Write an assembly language program to find the larger number from given two numbers stored at 2501H = 98H, 2502H = 87H result store at 2503H.	**07**
		OR	
Q.3	**(a)**	What is the ending address of a 2K-bytes memory whose starting address is 3000H.?	**03**
	(b)	What are the states of the Carry (C), Zero (Z) flags and content in Accumulator (A) after executing the following 8085 program? MVI L, 01H MVI A, 00H SUB L	**04**
	(c)	Write an assembly language program to find the smaller number from given two numbers stored at 2501H = 84H, 2502H = 99H result store at 2503H.	**07**
Q.4	**(a)**	Explain General purpose Data register.	**03**
	(b)	Explain Indirect and Immediate addressing mode with example.	**04**
	(c)	Explain 8085 Programming model and classify instruction set on the basis of different addressing modes.	**07**
		OR	
Q.4	**(a)**	Explain various flags use in 8085.	**03**

	(b)	Give comparison of Memory mapped I/O and Peripheral mapped I/O.	**04**
	(c)	Explain One byte, Two byte, Three byte and write short note on different types of instruction sets.	**07**
Q.5	**(a)**	Differentiate between maskable and non-maskable interrupts.	**03**
	(b)	Explain various types of conditional jump instructions with example.	**04**
	(c)	Draw and explain the architecture of SUN SPARC microprocessor.	**07**

OR

Q.5	**(a)**	Differentiate vectored and non-vectored interrupts.	**03**
	(b)	How many interrupts are there in 8085? Name them. Explain the characteristics in terms of maskability, vectoring and priority.	**04**
	(c)	Give ARM architecture features and explain block diagram of ARM.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160712 Date:14-12-2022

Subject Name:Microprocessor and Interfacing

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)**	Discuss various types of addressing modes of 8085.	**03**
	(b)	What are the advantages of an assembly language in comparison with high level languages?	**04**
	(c)	Draw and explain the block diagram of a microprocessor 8085.	**07**
Q.2	**(a)**	How does the microprocessor differentiate among a positive number, negative number and a bit pattern?	**03**
	(b)	LOOP: LXI H, 1234H DCX H JNZ LOOP Find out the mistake(s) in the above program and write the correct program so that it does not become infinite loop.	**04**
	(c)		**07**

TUBE LIGHT	PC	POWER BANK	LAPTOP	LAMP	I-PAD	FAN	AC
Assume that above electronic items are plugged in single electric board.							

Here switch S7, S6, S5, S4, S3, S2, S1 and S0 are connected to the data line D7, D6, D5, D4, D3, D2, D1 and D0 respectively. When all the switches are **OFF**, the microprocessor reads the data **FFH** (for all switches **ON** the data will be **00H**). Initially all the switches are **ON**.

Write assembly language program for the following scenarios:

1. **Krunal** prefer to do work in night only if **AC, LAMP** and **LAPTOP** are ON.
2. **Chirag** never use **I-PAD** if **PC** and **POWERBANK** are ON.
3. **Arkil** feels comfortable to work on **PC** if **AC** and **TUBE LIGHT** are ON.
4. **Avadh** never take concern of electricity bill and work only if **POWER BANK** and **LAMP** are OFF.
5. In day time we prefer to do work with availability of **FAN** and **PC**.

OR

	(c)	Write an assembly language program to provide the given ON/OFF time to traffic lights (Red, Green, and Yellow) and two pedestrian signs (Walk	**07**

and Don't Walk). The signal lights are turned ON/OFF by the data bits of PORT1 and gives output as shown below,

No	Light	Data Bits	On Time
1	Red	D1	40 Seconds
2	Green	D3	30 Seconds
3	Yellow	D5	10 Seconds
4	Walk	D6	30 Seconds
5	Don't Walk	D7	50 Seconds

The traffic and pedestrian flows are in the same direction; the pedestrian should cross the road when the Green light is ON. Also write Delay subroutine to generate appropriate delay. Assume to turn ON Light, a "0" logic level required at corresponding data bits of the output port.

Q.3 **(a)** What are the states of the Auxiliary Carry (AC), Carry (CY), sign(S) and parity (P) flags after executing the following 8085 program? **03**

```
MVI L, 5DH
MVI A, 6BH
ADD L
```

(b) Explain 8085 Programming model and classify instruction set on the basis of different addressing modes. **04**

(c) 2100 LXI H, 1234H **07**
MVI A, 55H
ADD M

What is the size of ADD M instruction? Name the machine cycles. Draw machine cycle and T-state diagram and specify the content of address bus, data bus and control signals *RD, *WR, IO/*M and ALE signals and status signals S1 and S0 for every T states of ADD M instruction only.

OR

Q.3 **(a)** What are the states of the Auxiliary Carry (AC), Carry (CY), sign(S) and parity (P) flags after executing the following 8085 program? **03**

```
MVI A, A9H
MVI B, 57H
ADD B
ORA A
```

(b) Explain One byte, Two byte, Three byte and write short note on different types of instruction sets. **04**

(c) Specify the addressing mode, required Machine cycles, T-States and function for following instructions : **07**

```
MVI M, 45H
RAL
LHLD 2300H
```

Q.4 **(a)** Difference between RLC and RAL instruction. **03**

(b) Differentiate between maskable and non-maskable interrupts. **04**

(c) What is a flag Register? Enlist and explain various types of flags. **07**

OR

Q.4 **(a)** Difference between RRC and RAR instruction. **03**

	(b)	What is vectored and non-vectored interrupts?	**04**
	(c)	Describe the functions of (1) READY PIN (2) ALE (3) HOLD (4) X1 and X2 (5) SID and SOD (6) IO/M 22. (7) HLDA	**07**
Q.5	**(a)**	List features of 80386 microprocessor.	**03**
	(b)	Draw block diagram of SUN SPARC architecture.	**04**
	(c)	Explain the internal Block diagram of 8259A.	**07**
		OR	
Q.5	**(a)**	List features of 80486 microprocessor.	**03**
	(b)	Draw logical block diagram of ARM 7 architecture.	**04**
	(c)	Explain the internal Block diagram of 8255A.	**07**

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