SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS), PUTTUR

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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Microprocessors and Microcontrollers (23EC0414)
Course & Branch: B.Tech –ECE, CSE, CCC
Year & Semester: III - B.Tech. & I-Semester **Regulation:** R23

UNIT I
8086 ARCHITECTURE
PART-A (2 MARKS)

1	a)	Define microprocessor.	[L1][CO1][2M]
	b)	If a DS register holds the address of 1000H and data reference contains an address of 0031H, find the physical address?	[L3][CO1][2M]
	c)	What is the function of ALE signal in 8086?	[L1][CO1][2M]
	d)	Define an interrupt vector and interrupt vector table.	[L1][CO1][2M]
	e)	Describe the function of Stack Pointer in 8086.	[L1][CO1][2M]

PART-B (10 MARKS)

2	a)	List the main features of 8086 microprocessor.	[L1][CO1][5M]
	b)	Describe about the 8086-microprocessor family.	[L1][CO1][5M]
3		Draw the functional pin diagram of 8086 microprocessor and explain the function of each and every pin.	[L1][CO1][10M]
4	a)	Explain in detail about the signals used in minimum mode of operation.	[L2][CO1][5M]
	b)	Explain in detail about the signals used in maximum mode of operation.	[L1][CO2][5M]
5	a)	Draw the internal architecture of 8086 microprocessor.	[L1][CO1][5M]
	b)	Discuss about the Execution unit of 8086 microprocessor.	[L2][CO1][5M]
6	a)	List and explain the general-purpose registers of 8086 microprocessor.	[L1][CO1][5M]
	b)	Draw the flag register of the 8086 microprocessor and explain about each flag in detail.	[L1][CO1][5M]
7	a)	Discuss about the Bus Interface Unit of 8086 microprocessor.	[L2][CO1][5M]
	b)	Discuss about the importance of memory segmentation in 8086 microprocessors.	[L2][CO1][5M]
8	a)	Explain about the following: i) Pointer and Index Registers ii) Segment Registers iii) Instruction byte Queue	[L1][CO1][5M]
	b)	Define an Interrupt. Explain the series of actions that an 8086 microprocessor does in response to an when an interrupt.	[L1][CO1][5M]
9		Define the following terms. i) Segment Base ii) Instruction Pointer iii) Pipelining iv) Instruction decoder v) Accumulator	[L1][CO1][10M]
10	a)	Explain about maximum mode read cycle with suitable timing diagrams.	[L2][CO1][5M]
	b)	Explain about minimum mode write cycle with suitable timing diagrams.	[L2][CO1][5M]
11	a)	Explain about maximum mode write cycle with suitable timing diagrams.	[L2][CO1][5M]
	b)	Explain about minimum mode read cycle with suitable timing diagrams.	[L2][CO1][5M]

UNIT II

8086 PROGRAMMING

PART-A (2 MARKS)

1	a)	List the program developing steps in 8086?	[L1][CO3][2M]
	b)	Give the instruction format used by 8086 microprocessor.	[L2][CO3][2M]
	c)	Write a simple 8-bit addition program using general purpose register.	[L3][CO3][2M]
	d)	What is the difference between SAR and SHR instructions?	[L1][CO3][2M]
	e)	What are the assembly language program development tools?	[L1][CO3][2M]

PART-B (10 MARKS)

2	a)	Draw the flowchart symbols used to represent 8086 programming.	[L1][CO3][5M]
	b)	What is an instruction? List various types of instructions in 8086.	[L1][CO3][5M]
3		What are data copy instructions? Explain any five data copy instructions with examples.	[L1][CO3][10M]
4		Discuss about the following instructions with examples. (i) ADD (ii) SBB (iii) DEC (iv) MUL (v) NEG	[L2][CO3][10M]
5	a)	Discuss about the following instructions with examples. (i) AND (ii) OR (iii) XOR	[L2][CO3][5M]
	b)	What is the difference between unconditional and conditional branch instructions? Explain with examples.	[L1][CO3][5M]
6	a)	Discuss about string manipulation instructions.	[L2][CO3][5M]
	b)	Explain any five flag manipulation instructions.	[L2][CO3][5M]
7	a)	Discuss about Processor control instructions of 8086.	[L2][CO3][5M]
	b)	List Various conditional branch instructions with its descriptions.	[L1][CO3][5M]
8		Define addressing modes? Explain various addressing modes of 8086 in detail.	[L1][CO3][10M]
9	a)	Describe about assembler directives.	[L1][CO3][5M]
	b)	Discuss about the following assembler directives. (i) DB (ii) DW (iii) DQ (iv) DT (v) ASSUME	[L2][CO3][5M]
10	a)	Write an assembly language program to add and subtract two 16-bit numbers.	[L3][CO3][5M]
	b)	Write an assembly language program to multiply two signed numbers using general purpose registers and explain by default where the result stores.	[L3][CO3][5M]
11	a)	Write an assembly language program to find factorial of a given number.	[L3][CO3][5M]
	b)	Write an assembly language program to find sum of the numbers 10H, 22H, 3BH, 46H, and 7FH.	[L3][CO3][5M]

UNIT-III
8086 INTERFACING

PART-A (2 MARKS)

1	**a)**	Define a RAM and ROM.	**[L1][CO4][2M]**
	b)	What is switch debouncing?	**[L1][CO4][2M]**
	c)	Mention any two features of Intel 8251.	**[L1][CO4][2M]**
	d)	Expand DMA and state its purpose.	**[L1][CO4][2M]**
	e)	List the applications of a stepper motor.	**[L1][CO4][2M]**

PART-B (10 MARKS)

2		Illustrate the interfacing of RAM and ROM with 8086 microprocessors with a neat diagram and address decoding.	**[L3][CO4][10M]**
3	**a)**	List the features of Intel 8255 PPI.	**[L1][CO4][4M]**
	b)	Discuss the architecture and operating modes of Intel 8255 Programmable Peripheral Interface.	**[L2][CO4][6M]**
4	**a)**	Explain about the interfacing of switches with 8086 microprocessors.	**[L2][CO4][5M]**
	b)	Differentiate between common cathode and common anode seven-segment displays.	**[L4][CO4][5M]**
5		Explain the working principle of a seven-segment display. Show how to interface it with 8086 through 8255.	**[L2][CO4][10M]**
6		Explain the applications of Software and Hardware interrupts in 8086 microprocessor.	**[L2][CO4][10M]**
7		With suitable diagram, explain the interfacing of Intel 8251 USART with 8086 microprocessors. Explain how synchronous and asynchronous modes are implemented.	**[L2][CO4][10M]**
8	**a)**	Explain the working of Intel 8237a DMA controller and its interfacing with 8086 microprocessors.	**[L2][CO4][6M]**
	b)	State four features of Intel 8237a DMA controller	**[L1][CO4][4M]**
9		Write an 8086-assembly language program to control the rotation of a stepper motor using 8255. Show the interfacing diagram and sequence of excitation.	**[L1][CO4][10M]**
10	**a)**	Discuss the interfacing techniques for Analog-to-Digital Converters with 8086 microprocessors.	**[L2][CO4][5M]**
	b)	With suitable diagram explain the interfacing of Digital-to-Analog converter with 8086 microprocessors.	**[L2][CO4][5M]**
11		Why is Intel 8259 Programmable Interrupt Controller needed in 8086 systems? Explain its operation and priority modes	**[L4][CO4][10M]**

UNIT – IV

MICROCONTROLLER

PART-A (2 MARKS)

1	**a)**	List the features of 8051 microcontroller.	**[L1][CO2][2M]**
	b)	List out the special function registers in 80851 microcontrollers.	**[L1][CO2][2M]**
	c)	Discuss about Data Pointer.	**[L2][CO2][2M]**
	d)	Explain about the function of a program counter.	**[L2][CO2][2M]**
	e)	Define Addressing Mode. List the different types of addressing modes.	**[L1][CO3][2M]**

PART-B (10 MARKS)

2		Draw the internal architecture of 8051 microcontroller and explain the function of each block present in it.	**[L1][CO2][10M]**
3	**a)**	Describe the internal RAM structure in the 8051 microcontrollers.	**[L1][CO2][5M]**
	b)	Review the PSW Register in 8051 microcontrollers.	**[L2][CO2][5M]**
4		Draw and explain the pin diagram of 8051 microcontroller.	**[L1][CO2][10M]**
5	**a)**	Discuss about various functions of 8051 ports.	**[L2][CO2][5M]**
	b)	Analyze the functionality of I/O pins ports and circuits in 8051 microcontrollers.	**[L4][CO2][5M]**
6	**a)**	Discuss any 3 logical operation instructions of 8051 microcontroller.	**[L2][CO3][5M]**
	b)	Give result for the following instructions with A=32, R1=77 A) ANL A,R1 B) CPL A C) XRL A,R1	**[L2][CO3][5M]**
7	**a)**	Discuss RR , RLC, and SWAP instructions with example.	**[L2][CO3][5M]**
	b)	Explain ADD, SUBB, DIV instructions of 8051 microcontroller with example.	**[L2][CO3][5M]**
8	**a)**	Differentiate between Jump and Call instructions.	**[L4][CO3][5M]**
	b)	Explain the following instructions A) PUSH B) POP C) XCHD	**[L2][CO3][5M]**
9		Describe the different types of addressing modes supported by 8051 with suitable examples.	**[L2][CO3][10M]**
10	**a)**	Write an ALP to place the number 34H in register R5, R6, and R7 using immediate and register addressing modes.	**[L3][CO3][5M]**
	b)	Write an ALP to put the number 8DH in RAM locations 3050H and 3054H.	**[L3][CO3][5M]**
11	**a)**	Develop an assembly program of 8051 microcontroller for addition of two 8-bit numbers in internal memory location 30H and 40H and store the result in a memory location 50H.	**[L3][CO3][5M]**
	b)	Give three different ways to clear the contents of the ‘A’ register.	**[L2][CO2][5M]**

UNIT V

INTERFACING MICROCONTROLLER

PART-A (2 MARKS)

1	**a)**	Define TMOD register in 8051.	**[L1][CO2][2M]**
	b)	What is the difference between Timer and Counter in 8051?	**[L1][CO2][2M]**
	c)	What is an Interrupt Service Routine (ISR)?	**[L1][CO2][2M]**
	d)	Define key debouncing.	**[L1][CO4][2M]**
	e)	Define a step angle in stepper motor.	**[L1][CO4][2M]**

PART-B (10 MARKS)

2		Explain the different modes of 8051 timers with neat diagrams. Write an assembly language program to generate a 1ms delay using Timer 1.	**[L2][CO3][10M]**
3		Describe the working of the 8051 serial communication system. How is the baud rate generated using Timer 1? Write an example program for transmitting "HELLO".	**[L2][CO3][10M]**
4		Discuss the types of interrupts in the 8051 microcontrollers. Explain the interrupt vector table and the role of IE and IP registers with an example program.	**[L2][CO2][10M]**
5		Explain the interfacing of a 16×2 LCD with the 8051 microcontroller. Write the steps and initialization commands required to display `"WELCOME"`.	**[L2][CO6][10M]**
6		How is a 4×4 matrix keyboard interfaced with the 8051? Explain the row–column scanning technique with an example program to detect a key press.	**[L2][CO6][10M]**
7		Explain the interfacing of an ADC0809 with the 8051 microcontrollers. Draw the block diagram and write a program to read analog voltage values.	**[L2][CO6][10M]**
8		Describe how DAC0808 is interfaced with 8051. Explain the procedure to generate a triangular waveform using DAC. Also, mention how a temperature sensor (LM35) can be interfaced.	**[L2][CO6][10M]**
9	**a)**	Explain in detail how 8051 interfaces with external program and data memory.	**[L2][CO4][5M]**
	b)	State the function of ALE and PSEN pins in external memory interfacing.	**[L1][CO6][5M]**
10		Explain the interfacing of a stepper motor with 8051 using ULN2003 driver IC. Write the sequence of operations required to rotate the motor clockwise and anticlockwise.	**[L2][CO6][10M]**
11	**a)**	Compare PIC Microcontroller and ARM Processors.	**[L5][CO5][5M]**
	b)	Discuss the advantages and disadvantages of Microprocessors compared to Microcontrollers.	**[L2][CO5][5M]**