

**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][CO1][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)**

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

**PART-B (10 MARKS)**

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

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

**PART-B (10 MARKS)**

<b>2</b>		Illustrate the interfacing of RAM and ROM with 8086 microprocessors with a neat diagram and address decoding.	[L3][CO4][10M]
<b>3</b>	<b>a)</b>	List the features of Intel 8255 PPI.	[L1][CO4][4M]
	<b>b)</b>	Discuss the architecture and operating modes of Intel 8255 Programmable Peripheral Interface.	[L2][CO4][6M]
<b>4</b>	<b>a)</b>	Draw the pin diagram of 8255 PPI.	[L1][CO4][4M]
	<b>b)</b>	Interface an 8255 with 8086 to work as an I/O port. Initialize port A as output port, port B as input port and port C as output port. Port A address should be 0740H. Write a program to sense switch positions SW <sub>0</sub> – SW <sub>7</sub> connected at port B. The sensed pattern is to be displayed on port A, to which 8 LEDs are connected.	[L3][CO4][6M]
<b>5</b>		Interface a common cathode type 7-segment LED to 8086 using 8255. Initialize Port A of 8255 as output port whose address is 80H. Write an ALP to display the numeric values from 0 to 9 with delay in between each numeric value.	[L3][CO4][10M]
<b>6</b>		Explain the applications of Software and Hardware interrupts in 8086 microprocessor.	[L2][CO4][10M]
<b>7</b>		Draw the internal architecture of 8251 USART and explain each block in detail.	[L2][CO4][10M]
<b>8</b>		Draw the internal architecture of Intel 8237a DMA controller and explain about each register in it.	[L2][CO4][10M]
<b>9</b>	<b>a)</b>	With neat sketch discuss about stepper motor.	[L2][CO4][5M]
	<b>b)</b>	Draw the internal architecture of 8259 Programmable Interrupt Controller and explain its operation.	[L2][CO4][5M]
<b>10</b>		Explain about the interfacing of 8-bit 0808 Analog to Digital Converter to the 8086 microprocessors. Write necessary Assembly Language Program.	[L2][CO4][10M]
<b>11</b>		Discuss about the interfacing of 8-bit 0800 Digital to Analog Converter to the 8086 microprocessors. Write necessary Assembly Language Program.	[L3][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)	Explain about Special Function Registers of 8051.	[L1][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) XCH	[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 30H and 34H.	[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)**

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

**PART-B (10 MARKS)**

<b>2</b>	<b>a)</b>	Explain about 8051 timers/counters with neat diagrams.	[L2][CO3][5M]
	<b>b)</b>	Write a program to create a delay of 25msec using Timer0 in mode 1 and blink all the Pins of P0.	[L1][CO3][5M]
<b>3</b>	<b>a)</b>	Describe about the 8-bits of SCON register.	[L2][CO3][5M]
	<b>b)</b>	Discuss about various serial data transmission modes.	[L2][CO3][5M]
<b>4</b>	<b>a)</b>	What is an Interrupt? Explain about Interrupt Enable register.	[L2][CO3][5M]
	<b>b)</b>	Describe about Interrupt Priority register.	[L2][CO3][5M]
<b>5</b>		How is a 4×4 matrix keyboard interfaced with the 8051? Explain the row–column scanning technique.	[L2][CO6][10M]
<b>6</b>		Explain the interfacing of an Analog to Digital Converter with the 8051 microcontrollers.	[L2][CO6][10M]
<b>7</b>		Describe how Digital to Analog Converter is interfaced with 8051.	[L2][CO6][10M]
<b>8</b>		With a neat sketch, explain the interfacing of two 2KB of EPROMs and two 4K bytes of static RAMs with 8051.	[L2][CO6][10M]
<b>9</b>	<b>a)</b>	Explain the architectural differences between a Microprocessor and a Microcontroller.	[L2][CO5][5M]
	<b>b)</b>	Compare PIC Microcontroller and ARM Processors.	[L5][CO5][5M]
<b>10</b>		What are the advantages, Disadvantages, and applications of Microprocessors and Microcontrollers.	[L1][CO5][10M]
<b>11</b>		What are the advantages, disadvantages, and applications of PIC Microcontroller and ARM Processors.	[L1][CO5][10M]