

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR  
(AUTONOMOUS)**

Siddharth Nagar, Narayanavanam Road – 517583

**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code:** MICROPROCESSORS AND MICROCONTROLLERS (20EC0416)

**Year & Sem:** II-B.Tech & II-Sem

**Course & Branch:** B.Tech – CSE & CSIT

**Regulation:** R20

**UNIT –I**

**MICROPROCESSORS, MICROCOMPUTERS AND ASSEMBLY LANGUAGE**

|           |   |            |       |
|-----------|---|------------|-------|
| <b>1</b>  | a) Define microprocessor. Explain the brief history of the evolution of the Microprocessor.   | [L2] [CO1] | [6M]  |
|           | b) Draw the block diagram of the microcomputer and explain the function of each block.  | [L2] [CO1] | [6M]  |
| <b>2</b>  | a) Define instruction and describe the different types of instructions supported by Microprocessor.   | [L2] [CO4] | [6M]  |
|           | b) Define machine language. Explain with a neat sketch number of the address lines required for an 8 KB memory chip to interface to the Microprocessor. | [L2] [CO4] | [6M]  |
| <b>3</b>  | a) Describe the function of the input devices.  | [L2] [CO2] | [6M]  |
|           | b) List and describe the different computer languages.  | [L1] [CO4] | [6M]  |
| <b>4</b>  | Explain, how computers are classified from large computers to single-chip microcontrollers.   | [L2] [CO1] | [12M] |
| <b>5</b>  | a) Illustrate with a neat sketch, how the microprocessor can be used in Microprocessor Controlled Temperature System (MCTS).                            | [L3] [CO6] | [8M]  |
|           | b) Explain the importance of the input and output devices.  | [L2] [CO2] | [4M]  |
| <b>6</b>  | a) Draw and explain the basic architecture of a microprocessor system.  | [L2] [CO3] | [8M]  |
|           | b) Define the terms: i) BIT, ii) NIBBLE, iii) BYTE iv) WORD   | [L1] [CO4] | [4M]  |
| <b>7</b>  | a) What is the need for memory? Classify different types of memory.   | [L2] [CO2] | [6M]  |
|           | b) Compare RAM and ROM memories.  | [L2] [CO2] | [6M]  |
| <b>8</b>  | a) Give examples of output devices and discuss the concept of output devices in detail.   | [L2] [CO2] | [6M]  |
|           | b) Distinguish Static RAM and Dynamic RAM   | [L4] [CO1] | [6M]  |
| <b>9</b>  | a) Sketch the functional block diagram of the microcomputer system and summarize the function of each block.  | [L3] [CO1] | [8M]  |
|           | a) Distinguish Low level and high-level Languages.  | [L4] [CO4] | [4M]  |
| <b>10</b> | a) Differentiate the Microprocessor & the Microcontroller with a suitable diagram.  | [L2] [CO1] | [8M]  |
|           | b) Explain the terms i) SSI ii) MSI iii) LSI iv) VLSI   | [L2] [CO1] | [4M]  |

**UNIT –II**  
**8085 MICROPROCESSOR ARCHITECTURE**

|           |   |             |              |
|-----------|---|-------------|--------------|
| <b>1</b>  | a) Illustrate the timing and control signals generation in 8085 microprocessor.   | [L3 ] [CO2] | <b>[6M]</b>  |
|           | b) Differentiate RLC and RRC instructions with suitable example   | [L4] [CO4]  | <b>[6M]</b>  |
| <b>2</b>  | a) Explain the functions of a program counter, stack pointer & ALU in 8085µP.   | [L2] [CO2]  | <b>[6M]</b>  |
|           | b) Draw the flag register of the 8085 microprocessor and explain each bit in detail.  | [L1] [CO2]  | <b>[6M]</b>  |
| <b>3</b>  | a) Draw the pin diagram of the 8085 microprocessor and categorize the pins based on function.   | [L4] [CO2]  | <b>[8M]</b>  |
|           | b) Outline the role of the following pins in the 8085 microprocessor<br>i) READY    ii) ALE    iii) HOLD & HLDA.  | [L2] [CO2]  | <b>[4M]</b>  |
| <b>4</b>  | a) With a neat sketch explain, the De-multiplexing of the Bus AD7-AD0 in 8085.  | [L2] [CO2]  | <b>[6M]</b>  |
|           | b) Discuss the different types of registers used in the 8085 microprocessor.  | [L2] [CO2]  | <b>[6M]</b>  |
| <b>5</b>  | a) Explain the role of control & status signals in the 8085 microprocessor.   | [L2] [CO2]  | <b>[6M]</b>  |
|           | b) Define an interrupt and explain the different types of interrupts available in the 8085 microprocessor.  | [L2] [CO2]  | <b>[6M]</b>  |
| <b>6</b>  | Discuss how data flow from memory to Microprocessor with a timing diagram.  | [L2] [CO2]  | <b>[12M]</b> |
| <b>7</b>  | a) List out the important features of 8085 microprocessor.  | [L1] [CO2]  | <b>[4M]</b>  |
|           | b) Sketch neat the block diagram of 8085 Architecture and explain the function of each block.   | [L3] [CO3]  | <b>[8M]</b>  |
| <b>8</b>  | a) Explain the Data transfer instructions of the 8085 microprocessor with an example.   | [L2] [CO4]  | <b>[6M]</b>  |
|           | b) Describe the Logical instructions of the 8085 microprocessor with an example.  | [L2] [CO4]  | <b>[6M]</b>  |
| <b>9</b>  | Explain the following instructions of 8085 microprocessor with an example.<br>i) Arithmetic instructions ii) Stack control instructions.  | [L2] [CO4]  | <b>[12M]</b> |
| <b>10</b> | a) Determine the content of the 9002 memory location after executing the following program<br><br>LDA 9000<br>MOV B, A<br>LDA 9001<br>ADD B<br>STA 9002<br>HLT<br><br>if 9000 has 02H and 9001 has 07H. | [L3] [CO4]  | <b>[6M]</b>  |
|           | b) Explain the instruction, data formats & data storage in 8085 microprocessor.   | [L2] [CO4]  | <b>[6M]</b>  |

**UNIT –III**  
**THE 8051 ARCHITECTURE**

|           |  |            |       |
|-----------|--|------------|-------|
| <b>1</b>  | Draw the internal architecture of 8051 microcontroller and explain the function of each block present in it. | [L2] [CO3] | [12M] |
| <b>2</b>  | a) Describe the importance of the I/O port in the microcontroller.   | [L2] [CO2] | [2M]  |
|           | b) Analyze the functionality of I/O ports present in 8051 microcontroller.                                   | [L4] [CO5] | [6M]  |
|           | c) Explain the different types of directives used in microcontroller.  | [L2] [CO4] | [4M]  |
| <b>3</b>  | a) Explain the importance of memory in microcontroller.  | [L2] [CO2] | [2M]  |
|           | b) Describe how the RAM memory is organized in 8051 microcontroller.   | [L2] [CO5] | [6M]  |
|           | c) Discuss different busses used to communicate by the processor to the I/O and memory                       | [L2] [CO5] | [4M]  |
| <b>4</b>  | a) List the applications of the timers and counters in 8051 microcontrollers.                                | [L1] [CO6] | [4M]  |
|           | b) Illustrate the operation of timers present in 8051 microcontroller.                                       | [L3] [CO3] | [8M]  |
| <b>5</b>  | a) List the features of 8051 microcontroller.  | [L1] [CO5] | [6M]  |
|           | b) Discuss the applications of microcontrollers in the industry.   | [L2] [CO6] | [6M]  |
| <b>6</b>  | a) Describe the functions of various 16-bit registers in the 8051 microcontroller.                           | [L2] [CO2] | [4M]  |
|           | b) Draw the flag register of 8051 microcontroller and describe the functionality of each flag in detail.     | [L2] [CO3] | [4M]  |
|           | c) Summarize the role of TMOD Register with a neat sketch.   | [L2] [CO3] | [4M]  |
| <b>7</b>  | Draw the pin diagram of 8051 microcontroller and describe the functionality of each pin in detail.           | [L2] [CO3] | [12M] |
| <b>8</b>  | a) Compare serial communication and parallel communication.  | [L4] [CO4] | [4M]  |
|           | b) Explain how the 8051 microcontroller transfers the serial data input and output using UART.               | [L2] [CO5] | [4M]  |
|           | c) Explain SBUF register   | [L2] [CO3] | [4M]  |
| <b>9</b>  | a) Distinguish the microprocessors and microcontrollers.   | [L4] [CO1] | [4M]  |
|           | b) Explain the different types of interrupts in the 8051 microcontroller.                                    | [L2] [CO2] | [4M]  |
|           | c) Describe the vector address of interrupts in 8051 microprocessor.   | [L2] [CO2] | [4M]  |
| <b>10</b> | a) Explain the modes of operation using SCON register in 8051 $\mu$ C  | [L2] [CO3] | [8M]  |
|           | b) Define and draw the formats for IE, IP and TCON register.   | [L1] [CO3] | [4M]  |

**UNIT –IV**  
**PROGRAMMING THE 8051**

|           |   |            |             |
|-----------|---|------------|-------------|
| <b>1</b>  | a) Describe the different types of addressing mode supported by 8051 with suitable examples.  | [L2] [CO4] | <b>[8M]</b> |
|           | b) Explain the moving data instructions of 8051 microcontroller with an example.  | [L2] [CO4] | <b>[4M]</b> |
| <b>2</b>  | a) Describe the DJNZ reg, label instruction with an example.  | [L2] [CO4] | <b>[4M]</b> |
|           | b) Explain the function of DAA and PUSH instruction with an example.  | [L2] [CO4] | <b>[4M]</b> |
|           | c) Explain the different types of directives used in microcontroller.   | [L2] [CO4] | <b>[4M]</b> |
| <b>3</b>  | a) Describe how instruction MOVC A, @A+DPTR can be used in reading data from a table.   | [L2] [CO4] | <b>[6M]</b> |
|           | b) Discuss the logical operations Instructions of 8051 microcontroller with an example.   | [L2] [CO4] | <b>[6M]</b> |
| <b>4</b>  | a) List various arithmetic operations performed in 8051 microcontroller.  | [L1] [CO4] | <b>[6M]</b> |
|           | b) Explain any three arithmetic operations Instructions of 8051 microcontroller with an example.  | [L2] [CO4] | <b>[6M]</b> |
| <b>5</b>  | a) Discuss the following instructions of 8051 microcontroller with an example. (i) Bit-level instructions (ii) Byte level instructions                        | [L2] [CO4] | <b>[8M]</b> |
|           | b) Explain, how the stack can be used in the subroutine process in 8051 microcontroller.  | [L2] [CO4] | <b>[4M]</b> |
| <b>6</b>  | a) Differentiate between Jump and Call instructions.  | [L4] [CO4] | <b>[6M]</b> |
|           | b) Explain Jump and Call instructions of 8051 microcontroller with an example.  | [L2] [CO4] | <b>[6M]</b> |
| <b>7</b>  | a) Develop and write an assembly program of 8051 microcontroller to multiply two 8-bit numbers and store the result in a memory location                      | [L3] [CO6] | <b>[6M]</b> |
|           | b) Compare CALL and PUSH instructions   | [L4] [CO4] | <b>[6M]</b> |
| <b>8</b>  | a) Explain how the 8051 microcontroller performs rotate and swap operations with an example.  | [L2] [CO4] | <b>[8M]</b> |
|           | b) Describe the operation of return instruction in 8051 microcontroller with a suitable example.  | [L2] [CO4] | <b>[4M]</b> |
| <b>9</b>  | a) Develop and write an assembly program of 8051 microcontroller to divide two 8-bit numbers and store the result in a memory location.                       | [L3] [CO6] | <b>[6M]</b> |
|           | b) Develop an assembly program of 8051 microcontroller to subtract two 8-bit numbers and store the result in a memory location.                               | [L3] [CO6] | <b>[6M]</b> |
| <b>10</b> | a) Develop and write an assembly program of 8051 microcontroller to logically AND two 8-bit numbers and store the result in a memory location.                | [L3] [CO6] | <b>[6M]</b> |
|           | b) Develop and write an assembly program of 8051 microcontroller to find the largest number among given 10 numbers and store the result in a memory location. | [L3] [CO6] | <b>[6M]</b> |

**UNIT –V**  
**APPLICATIONS**

|           |   |            |              |
|-----------|---|------------|--------------|
| <b>1</b>  | a) With a neat sketch, show the interfacing of a 4x4 matrix keypad with an 8051 microcontroller.                                      | [L3] [CO5] | <b>[6M]</b>  |
|           | b) Describe the key bouncing problem and de-bouncing solutions.   | [L2] [CO5] | <b>[6M]</b>  |
| <b>2</b>  | Describe with a schematic, the scanning of the 4x4 matrix keyboard in an 8051 based system and discover the key pressed.              | [L4] [CO5] | <b>[12M]</b> |
| <b>3</b>  | a) With the help of a neat sketch, show the interfacing of LCD Display with 8051 microcontroller and explain its operation.           | [L3] [CO5] | <b>[8M]</b>  |
|           | b) Explain the operation of the LCD Display with a suitable diagram.  | [L2] [CO5] | <b>[4M]</b>  |
| <b>4</b>  | a) List instruction command codes for programming an LCD.   | [L1] [CO4] | <b>[8M]</b>  |
|           | b) Distinguish LED and LCD display devices.   | [L4] [CO5] | <b>[4M]</b>  |
| <b>5</b>  | a) Explain the commands used before sending data to 16x2 LCD display.   | [L2] [CO4] | <b>[6M]</b>  |
|           | b) Draw and explain the pin Diagram of 16x2 LCD.  | [L2] [CO5] | <b>[6M]</b>  |
| <b>6</b>  | a) With the help of a neat sketch, show the interfacing of 7- segment display with an 8051 microcontroller and explain its operation. | [L3] [CO5] | <b>[8M]</b>  |
|           | b) Explain the operation of the 7-Segment display with a suitable diagram.  | [L2] [CO5] | <b>[4M]</b>  |
| <b>7</b>  | a) With the help of a neat sketch, show the interfacing of ADC 0808 with 8051 microcontroller and explain its operation.              | [L3] [CO5] | <b>[8M]</b>  |
|           | b) Describe the working principle of Analog to Digital Converter with a suitable diagram.   | [L2] [CO6] | <b>[4M]</b>  |
| <b>8</b>  | a) With the help of a neat sketch, show the interfacing of DAC 1408 with an 8051 microcontroller and explain its operation.           | [L3] [CO5] | <b>[8M]</b>  |
|           | b) Describe the working principle of the Digital to Analog Converter with a suitable diagram.   | [L2] [CO6] | <b>[4M]</b>  |
| <b>9</b>  | Design and explain the real-time application using 8051 Microcontroller with suitable block diagram.                                  | [L3] [CO6] | <b>[12M]</b> |
| <b>10</b> | a) Define Interrupt and classify the interrupts.  | [L2] [CO2] | <b>[6M]</b>  |
|           | b) Explain multiple interrupts present in 8051 microcontroller.   | [L2] [CO2] | <b>[6M]</b>  |