SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

QUESTION BANK

VI SEMESTER

1906601 – MICROPROCESSORS AND MICROCONTROLLERS

(Common to ECE and Medical Electronics)

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UNIT I - THE 8086 MICROPROCESSOR			
Introduction to 8086 – Microprocessor architecture – Register and Memory Organization - Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.			
PART - A			
S.No.	**Questions**	**BT Level**	**Competence**
1	List out the functional parts of 8086 CPU?	BTL 1	Remembering
2	Define pointers and index registers?	BTL 1	Remembering
3	Differentiate between Macro and Subroutine.	BTL 2	Understanding
4	Name the different types of interrupts supported by 8086.	BTL 1	Remembering
5	List the flags present in the 8086 processor.	BTL 1	Remembering
6	What is meant by pipelining?	BTL 2	Understanding
7	Discuss about interrupt service routine?	BTL 2	Understanding
8	Write down the addressing mode of the instruction MOV AX, 55H [BX] [SI].	BTL 3	Applying
9	Calculate the physical address, when segment address is 1085H and effective address is 4537H.	BTL 4	Analyzing
10	Mention the instructions used for BCD arithmetic in 8086.	BTL 3	Applying
11	Classify the machine control instructions available in 8086.	BTL 1	Remembering
12	Define assembler.	BTL 1	Remembering
13	Show how the 2 byte INT instruction can be applied for debugging.	BTL 3	Applying
14	How would you use carry and zero flags that reflect the result of the instruction CMP BX, CX?	BTL 4	Analyzing
15	List out the purpose of segment registers in 8086?	BTL 3	Applying
16	Outline the software operations that are possible in 8086 when compared to 8085.	BTL 4	Analyzing
17	The offset address of data is 341BH and the data segment value is 123AH. Generate the physical address of the data.	BTL 4	Analyzing
18	Write the interrupt priorities of 8086.	BTL 2	Understanding
19	Mention any four miscellaneous instructions in a 16 bit processor.	BTL 4	Analyzing
20	Mention the need for modular programming.	BTL 3	Applying
21	Specify the maximum memory size that can be addressed by the 8086 Processor?	BTL 3	Applying
22	Give the difference between segment register and general purpose register?	BTL 2	Understanding
23	Outline the difference between the instructions MOV AX, 2437H and MOV AX, [2437H].	BTL 2	Understanding
24	Compare CALL and PUSH instruction.	BTL 4	Analyzing
PART – B			
1	(i) What is an assembler directive? (3) (ii) Explain any 5 assembler directive with an example (10)	BTL 1	Remembering

2	Write an 8086 ALP to convert BCD data to Binary data. (13)	BTL 3	Applying
3	Describe the internal architecture of 8086 microprocessor with neat diagrams. (13)	BTL 1	Remembering
4	(i) Define addressing mode. (3) (ii)Describe in detail about each addressing mode with an example. (10)	BTL 2	Understanding
5	Write a program to add the elements of two matrices using the 8086 instruction set. (13)	BTL 3	Applying
6	Write briefly about interrupts and its types. Explain the control flow of the microprocessor in detail when interrupt occurs. (13)	BTL 2	Understanding
7	Give detailed note about the following terms: Procedures and Macros. (13)	BTL 1	Remembering
8	(i) Distinguish between call and subroutine. (5) (ii) Give an example for the 8086 instructions: AAA, CWD, JNBE, LAHF, MOVS, RCL, ROL and SAHF. (8)	BTL 4	Analyzing
9	Test whether the input string is palindrome or not using 8086 ALP. Illustrate with a palindrome and a non-palindrome string (13)	BTL 3	Applying
10	Illustrate the functional description of 8086 microprocessor with a neat sketch. (13)	BTL 4	Analyzing
11	Write an assembly language program to search data in an array using 8086 instruction set. (13)	BTL 4	Analyzing
12	Classify the 8086 string manipulation and give detailed explanation with appropriate examples. (13)	BTL 3	Applying
13	Develop a program to transfer 50 bytes of data from memory location starting from 2000H to 3000H using the string instruction MOVSB. (13)	BTL 4	Analyzing
14	Explain the register and memory organization of the 8086 microprocessor. (13)	BTL 2	Understanding
15	Explain the data transfer group and logical group of 8086 instructions with necessary examples. (13)	BTL 2	Understanding
16	Describe the principle if linking and relocation in 8086 microprocessor. (13)	BTL 4	Analyzing
17	List the advantages of modular programming and illustrate the process by which the modules assembled separately are linked together and programs are prepared for execution. (13)	BTL 1	Remembering
PART – C			
1	Draw the flowchart and write the program to calculate division of two numbers with 8086 instruction set. (15)	BTL 2	Understanding
2	With the help of an algorithm, write an assembly language program to sort an array of 10 elements in descending order. (15)	BTL 3	Applying
3	Write an ALP to compute multiplication of two 16 bit numbers using 8086 instruction set. (15)	BTL 4	Analyzing
4	With the help of an algorithm, write an assembly language program to sort an array of 10 elements in ascending order. (15)	BTL 4	Analyzing

5	(i)Identify the conditions which cause the 8086 to perform the type 0 and type 1 interrupt. (8) (ii)Explain briefly about interrupt handling process in 8086. (7)	BTL 1	Remembering

UNIT II - 8086 SYSTEM BUS STRUCTURE

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure - Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

PART – A

S.No.	Questions	BT Level	Competence
1	Define Bus.	BTL 1	Remembering
2	State about External & Internal Bus.	BTL 1	Remembering
3	Name the two different modes of operation used in 8086.	BTL 1	Remembering
4	Distinguish the LOCK and TEST signal?	BTL 4	Analyzing
5	Define the term ‘ Multiprogramming’	BTL 1	Remembering
6	Explore the function of QS_1 and QS_0.	BTL 3	Applying
7	Draw the timing diagram of Interrupt acknowledgement on a minimum mode system.	BTL 3	Applying
8	Examine the signals used by 8086 to demultiplex the address/data and to control the data bus	BTL 4	Analyzing
9	Discuss about Semaphore used in 8086.	BTL 4	Analyzing
10	Discriminate the minimum mode and maximum mode of operation.	BTL 4	Analyzing
11	Illustrate the stages of pipelining.	BTL 3	Applying
12	Name the various advanced microprocessors.	BTL 1	Remembering
13	How is a clock signal generated in 8086?	BTL 4	Analyzing
14	List the advantages of multiprocessor configurations.	BTL 2	Understanding
15	What is the function of the BHE signal in 8086?	BTL 2	Understanding
16	Mention the need for a co-processor.	BTL 2	Understanding
17	Write the various bus allocation schemes in multiprocessor configurations.	BTL 1	Remembering
18	How does the main processor distinguish its instructions from the co-processor instructions when it fetches the instructions from memory?	BTL 3	Applying
19	Differentiate the closely and loosely coupled configurations	BTL 4	Analyzing
20	Describe how the synchronization is made between 8086 and its co-processor.	BTL 3	Applying
21	Give any four pin definitions for the minimum mode.	BTL 4	Analyzing
22	Draw the bus request and bus grant timings in minimum mode system.	BTL 3	Applying
23	Which pins of 8086 are used to indicate the type of transfer in minimum mode?	BTL 2	Understanding
24	What is system bus architecture? Give generalized 8086 system bus architecture.	BTL 2	Understanding

PART – B

1	Draw the pin diagram of 8086 and Examine all the signals available in the 8086 processor. (13)	BTL 4	Analyzing
2	Discuss about the 8086 based minimum mode system with a neat diagram. (13)	BTL 2	Understanding

3	Draw the timing diagram for Read and write cycle in minimum mode operation and explain. (13)	BTL 3	Applying
4	Describe the maximum mode configuration of 8086 with a neat diagram. Mention the functions of various signals. (13)	BTL 2	Understanding
5	Explain the operations of I/O programming in detail. (13)	BTL 1	Remembering
6	Explain the closely coupled configuration of the multiprocessor system with a suitable diagram. (13)	BTL 1	Remembering
7	How did the CPU interact with the independent processor in a closely coupled configuration? Support your answer with a flowchart. (13)	BTL 4	Analyzing
8	(i) What are the problems that are to be considered in designing a multiprocessor system? (7) (ii) What are the techniques for reducing contentions? (6)	BTL 4	Analyzing
9	With the help of timing diagram, explain the Read and Write cycle in maximum mode operation of the 8086 microprocessor. (13)	BTL 3	Applying
10	(i) Distinguish between loosely coupled and closely coupled multiprocessor systems. (6) (ii) Differentiate Maximum mode from minimum mode of 8086. (7)	BTL 4	Analyzing
11	Explain how coprocessor is interfaced with CPU and synchronized. (13)	BTL 3	Applying
12	Describe the loosely coupled configuration with a neat diagram. (13)	BTL 1	Remembering
13	Discuss about the signals that are specific to minimum mode operation? (13)	BTL 1	Remembering
14	Discuss the hardware enhancements of 80186 and 80286 microprocessors compared to 8086. (13)	BTL 2	Understanding
15	Enumerate I/O programming by its major input and output operation. (13)	BTL 3	Applying
16	Explain multiprogramming by comparing with multiprocessing. (13)	BTL 4	Analyzing
17	Explain the basic bus access control and arbitration schemes used in loosely coupled multiprocessor system. (13)	BTL 2	Understanding
PART – C			
1	Design an 8086 based system for the following specifications (i) 8086 in Minimum mode (5) (ii) 4K ROM (5) (iii)128 RAM (5) Draw the complete schematic of the design indicating the address map.	BTL 4	Analyzing
2	With the help of a neat sketch, describe the interconnection of a coprocessor 8087 with 8086 (15)	BTL 1	Remembering
3	Examine the signals in interfacing the bus controller with 8086 microprocessor in maximum mode. (15)	BTL 4	Analyzing
4	With necessary illustrations write the pipelining process of 80486. (15)	BTL 3	Applying
5	With a neat diagram, explain the architecture of 80286 with functional description of signals. (15)	BTL 2	Understanding

UNIT III - I/O INTERFACING			
Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller.			
PART – A			
S.No.	**Questions**	**BT Level**	**Competence**
1	State the advantage and disadvantage of parallel communication over serial communication.	BTL 2	Understanding
2	Define the terms A/D & D/A convertor.	BTL 1	Remembering
3	List the four display modes of 8279 keyboard and display controller	BTL 1	Remembering
4	What are the applications of programmable interval timer?	BTL 2	Understanding
5	Specify the different types of peripheral interfacing used in 8086.	BTL 1	Remembering
6	Write the various modes of 8254 timer.	BTL 1	Remembering
7	Classify the output modes used in 8279.	BTL 1	Remembering
8	Formulate the frequency transmit clock (TxC) required by an 8251 in order to transmit data at 4800 Baud with a Baud rate factor of 16?	BTL 4	Analyzing
9	Point out the modes used by the DMA processor to transfer data.	BTL 4	Analyzing
10	What is meant by key bouncing?	BTL 1	Remembering
11	How would you use the terminal count register?	BTL 3	Applying
12	Draw the format of Read back Command register of 8254.	BTL 3	Applying
13	Mention the applications of 8251 IC chip?	BTL 3	Applying
14	Find the necessity of handshake signals in mode-2 configurations of 8255.	BTL 4	Analyzing
15	Discuss the features of mode 1 used in 8255?	BTL 2	Understanding
16	Configure the control word for the following specifications of 8255, In mode 0 operation, Ports A and B are input ports and C is an output port.	BTL 4	Analyzing
17	Evaluate the value of ICW4 such that the 8259 is configured for use in an 8086 system, with normal EOI, buffered-mode master, and special fully nested-mode disabled.	BTL 3	Applying
18	Analyze the priority scheme for OCW_2 equals 67_{16}?	BTL 4	Analyzing
19	What is the purpose of control word used in 8255?	BTL 2	Understanding
20	Identify the address lines and data lines for accessing 32K x 8 memory?	BTL 3	Applying
21	What is the need for interfacing?	BTL 2	Understanding
22	Why program controlled I/O is unsuitable for high speed data transfer?	BTL 4	Analyzing
23	What is the use of V_{ref} pin in the ADC?	BTL 2	Understanding
24	What is the internal operating frequency of 8279? How can you derive it from any available clock signal?	BTL 3	Applying
PART – B			
1	Explain the Functional diagram of Programmable Interrupt Controller in detail. (13)	BTL 1	Remembering
2	Describe the 8255 programmable peripheral interface and its operating modes. (13)	BTL 1	Remembering

3	(i) Illustrate how to interface an LCD display with an 8086 microprocessor. (7) (ii) Write a program to display a character using an LCD display. (6)	BTL 2	Understanding
4	With a neat diagram and explain the internal structure of keyboard and display controller. (13)	BTL 1	Remembering
5	Discuss how microprocessors are interfaced with I/O and memory in detail. (13)	BTL 2	Understanding
6	Draw a circuit diagram to interface a keyboard and a seven segment LED using 8279. (13)	BTL 3	Applying
7	Choose an integrated chip to be used for Analog to Digital conversion and explain how it is interfaced with the 8086 processor. (13)	BTL 3	Applying
8	Discuss how 8257 is interfaced with 8086 and also explain the various register formats. (13)	BTL 2	Understanding
9	Describe the internal architectural diagram of the 8237 and explain how it functions as a DMA controller. (13)	BTL 1	Remembering
10	Pointout the features and explain the operation of 8254 Programmable Interval Timer with diagram, and also explain the various modes of operation. (13)	BTL 4	Analyzing
11	Design the steps for interfacing an alarm controller with an 8086 microprocessor with a diagram and explain in detail. (13)	BTL 3	Applying
12	(i) Why is DAC required? Explain DAC interface with diagram (7) (ii) How A/D converter interfaced with 8086? (6)	BTL 2	Understanding
13	(i) Compare serial and parallel communication. (3) (ii) Compare the different Modes of operation of 8253/8254 timer. (10)	BTL 4	Analyzing
14	Draw a circuit diagram to interface 8251 with 8086 and explain. (13)	BTL 3	Applying
15	(i) What are the requirements to be met while interfacing I/O devices to microprocessor? (5) (ii) Distinguish between Programmed I/O and Interrupt Driven I/O. (8)	BTL 2	Understanding
16	(i) Write the differences between memory mapped I/O and peripheral mapped I/O. (5) (ii) Draw and explain the interfacing scheme of 8255 and 8086 in memory mapped I/O. (8)	BTL 4	Analyzing
17	Configure the master slave connection between two 8259 using 8086 processor with neat diagram. (13)	BTL 4	Analyzing
PART – C			
1	Design a traffic light control system using 8086 microprocessor interface diagram and Write ALP for the same. (15)	BTL 3	Applying
2	Interface eight 7 segment digits (common cathode) to 8086 through 8279 and write an 8086 ALP to display 1 to 8. (15)	BTL 2	Understanding
3	Draw the complete interfacing diagram for interfacing an 8-bit channel A/D Converter like ADC 0808/0809 to an 8086 CPU. Test a sample, one at a time from each channel of analog inputs and display it at a special display port & wait	BTL 1	Remembering

	for 2 seconds for each channel. (15)		
4	Two 8086 based A and system B are available for use. Establish communication between the two systems A and B using RS232C. Write a program in 8086 ALP to transmit the string of characters terminated by a carriage return from A to B in asynchronous format. Explain the connection between A and B. (15)	BTL 4	Analyzing
5	Configure the connection between 12 bit DAC and 8086 with necessary interfacing diagram and write program to generate triangular waveform of period 10ms for CPU runs at 5MHz clock frequency. (15)	BTL 4	Analyzing

UNIT IV-MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins- Ports and Circuits - Instruction set - Addressing modes - Timers - Serial Port - Interrupts - Assembly language programming.

PART – A

S.No.	Questions	BT Level	Competence
1	What are the size of memory systems used in 8051 microcontroller?	BTL 1	Remembering
2	Identify the different operand types used in 8051.	BTL 1	Remembering
3	List the counters available in 8051.	BTL 1	Remembering
4	How the selection of a particular register bank is done in 8051?	BTL 2	Understanding
5	Which ports of 8051 are bit addressable?	BTL 2	Understanding
6	Point out the advantage of bit addressability for 8051 ports?.	BTL 2	Understanding
7	Mention the significance of the GATE bit in the TMOD control register?	BTL 1	Remembering
8	What happens in power down mode of 8051 Microcontroller?	BTL 4	Analyzing
9	Write the function of the SM2 bit present in the SCON register in 8051?	BTL 1	Remembering
10	List the functions supported by SFR of 8051.	BTL 2	Understanding
11	What is meant by PSW in 8051?	BTL 1	Remembering
12	Outline the function of CJNE, DJNZ instruction.	BTL 3	Applying
13	Identify the port used as multifunction port and list the signals.	BTL 3	Applying
14	Give two example of bit manipulation instructions?	BTL 3	Applying
15	Distinguish between microprocessor & microcontroller.	BTL 4	Analyzing
16	What is the time duration for one state and one machine cycle if a 6 MHz crystal is connected to 8051?	BTL 4	Analyzing
17	Find out any two instructions which affects all flags of 8051 Microcontroller?	BTL 4	Analyzing
18	Define addressing mode and list the types.	BTL 3	Applying
19	Write the serial port interrupts of 8051.	BTL 3	Applying
20	For a 8051 Microcontroller system of 11.0592 MHz, find how long it takes to execute each of the following instructions: (a) DEC R3 (b) SJMP	BTL 4	Analyzing
21	Perform the following operations using bit addressable instructions:	BTL 4	Analyzing

	Start Timer 1, Stop Timer 0		
22	A given 8051 chip has a speed of 16MHz. Generate the range of frequency that can be applied to the XTAL1 and XTAL2 pins?	BTL 3	Applying
23	Write a delay subroutine using RAM location 45H as the counter.	BTL 2	Understanding
24	Draw the bit addressable format of TCON register.	BTL 2	Understanding
PART – B			
1	Discuss in detail about the instruction sets of 8051 microcontroller. (13)	BTL 2	Understanding
2	Illustrate the architectural features of 8051 microcontroller with necessary diagram. (13)	BTL 1	Remembering
3	Describe interrupts and interrupt programming with respect to 8051 microcontroller with neat diagram. (13)	BTL 2	Understanding
4	Analyze the internal RAM structure and SFR memory of 8051. (13)	BTL 4	Analyzing
5	(i) Explain in detail about arithmetic and control instruction set in 8051. (7) (ii) Write a program to add any two 16-bit data using 8051. (6)	BTL 3	Applying
6	(i) With neat diagram explain port 1 pin configurations. (6) (ii) Draw the bit pattern of program status word of 8051 and explain the significance of each bit with examples. (7)	BTL 1	Remembering
7	Discuss in brief the various registers present in 8051 microcontroller. (13)	BTL 2	Understanding
8	Illustrate the internal memory organization of 8051 microcontroller. (13)	BTL 3	Applying
9	Classify the different addressing modes in 8051 microcontroller with an example. (13)	BTL 4	Analyzing
10	(i) Tabulate the comparisons of CALL, RET and PUSH, POP instructions. (7) (ii) Describe the following 8051 instructions with an example: DA, MUL, SWAP and SJMP. (6)	BTL 4	Analyzing
11	Write short notes on TCON and SCON registers with necessary diagram. (13)	BTL 4	Analyzing
12	Examine the function of 8051 microcontroller instructions for performing data transfer and logical operations with suitable examples. (13)	BTL 3	Applying
13	(i) Name some SFR's in 8051and explain in detail. (7) (ii) Write an ALP in 8051 to convert a 16 bit binary number to ASCII. (6)	BTL 3	Applying
14	(i) Write the program to find square of a number using 8051 instruction set? (8) (ii) Write an 8051 ALP to multiply two numbers are 45H and 9AH. (5)	BTL 1	Remembering
15	Summarize the various types and functions of I/O ports with necessary diagrams. (13)	BTL 4	Analyzing
16	List the external hardware interrupts of 8051. Explain how they are activated. (13)	BTL 1	Remembering
17	Draw the register format of IE and IP registers of 8051 and explain in detail. (13)	BTL 2	Understanding

PART – C			
1	(i) Write a brief note on external data move operations in 8051. (8) (ii) Write an 8051 ALP to add three BCD numbers stored in internal RAM locations 25H, 26H and 27H and put the result in RAM locations 31H (MSB) and 30H (LSB). Use Register R0 to store the intermediate result. (7)	BTL 2	Understanding
2	Two 8051s are interfaced for full-duplex communication. Assuming the crystal frequency of both to be 11.0592 MHz, develop the software necessary for serial communication with a baud rate of 4800. (15)	BTL 3	Applying
3	Write a program to calculate the average of an array of unsigned positive integers. The array starts from 31H, and the number of terms in the array is available in location 30H. Store the calculated average in the location 2FH. (15)	BTL 4	Analyzing
4	An array of 20 numbers is stored in the internal data RAM starting from the location 40H. Write a program to (a) Sort the array in ascending order. (10) (b) Modify the above program for sorting in descending order. (5)	BTL 4	Analyzing
5	Summarize the various modes of 8051 timers with their associated registers. (15)	BTL 1	Remembering

UNIT V- INTERFACING MICROCONTROLLER			
LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor, Traffic Light Control and Waveform generation. Comparison of Microprocessor, Microcontroller, PIC and ARM processors			
PART – A			
S.No.	**Questions**	**BT Level**	**Competence**
1	List the types of sensors used for interfacing?	BTL 1	Remembering
2	Write the types of ADC?	BTL 2	Understanding
3	What is the necessity to interface DAC with microcontroller?	BTL 1	Remembering
4	How to change the stepper motor direction?	BTL 2	Understanding
5	Conclude the features of ARM Processor.	BTL 4	Analyzing
6	List the types of address decoding in accessing external memory?	BTL 2	Understanding
7	How the stepper motor is interfaced with 8051.	BTL 3	Applying
8	Under which condition 8051 with internal 4K program memory would access external program memory?	BTL 4	Analyzing
9	Identify the usage of the following instruction MOVC A, @A + DPTR.	BTL 3	Applying
10	How many machine cycles are necessary for MOVX instruction to read a byte from external data memory?	BTL 3	Applying
11	Sketch the ADC interfaced with 8051.	BTL 1	Remembering
12	Differentiate between the LED and LCD display	BTL 4	Analyzing
13	What is the need for RS pin in an LCD?	BTL 3	Applying
14	Mention the applications of microcontroller.	BTL 1	Remembering
15	Examine square wave signal be given to drive segment lines of LCD display?	BTL 4	Analyzing

16	How does the status of EA pin affect the access to internal and external program memory?	BTL 4	Analyzing
17	How does 8051 differentiate between the external and internal program memory?	BTL 3	Applying
18	Name the important electrical properties of IC1408.	BTL 1	Remembering
19	What is the need to use a driver IC to interface stepper motor with 8051 microcontroller?	BTL 4	Analyzing
20	Draw the waveform for external data memory data cycle.	BTL 1	Remembering
21	What is meant by Harvard architecture?	BTL 2	Understanding
22	Point out the difference between ARM and PIC?	BTL 2	Understanding
23	How many ports are there for PIC and ARM?	BTL 3	Applying
24	Write the program and data memory size of PIC microcontroller?	BTL 2	Understanding
PART – B			
1	What are the instructions to access external data memory? Discuss in detail. (13)	BTL 1	Remembering
2	Write a program to scan a small keyboard consisting of 8 keys and identify a key pressed? (13)	BTL 3	Applying
3	(i) Illustrate how to interface an LCD display with µC. (7) (ii) Demonstrate a program to display a character using an LCD display. (6)	BTL 2	Understanding
4	Assuming XTAL= 11.0592 MHz, write an 8051 ALP to generate a square wave of 50 Hz frequency on pin P2.3.(13)	BTL 3	Applying
5	Describe the address decoding techniques to access external memory in 8051 microcontroller. (13)	BTL 4	Analyzing
6	Write a Program using 8051 to display “Engineer” on LCD on size 8 x 1 Line. (13)	BTL 4	Analyzing
7	Develop a program to convert the analog signal in channel 0 of ADC 0809 and store it in location 30H onwards. The routine should store the value whenever it is called (13)	BTL 4	Analyzing
8	A 8051 based system requires external memory of four 4 Kbytes of SRAM each and two chips of EPROM of size 2 Kbytes. The EPROM starts at address 2000H. The SRAM address map follows EPROM map. Give the complete interface. (13)	BTL 4	Analyzing
9	Explain the interfacing of external program memory with its timing diagram. (13)	BTL 1	Remembering
10	With a neat circuit diagram, explain how 4x4 Keypad is in interfaced with 8051 microcontroller and write 8051 ALP for keypad scanning. (13)	BTL 3	Applying
11	Compare Microprocessor, Microcontroller, PIC and ARM Processors. (13)	BTL 2	Understanding
12	Describe the procedures required to interface an 8 bit ADC with 8051 microcontroller. (13)	BTL 2	Understanding
13	Write assembly language program to generate a triangular waveform at the output of DAC by interfacing it with 8051 microcontroller. (13)	BTL 3	Applying
14	Write an 8051 ALP to create a square wave of 66% duty cycle on bit 3 of port 1. (13)	BTL 4	Analyzing
15	Draw the circuit diagram showing the interface of a DAC with microcontroller and explain. (13)	BTL 1	Remembering
16	Draw and Explain the general block diagram of ARM	BTL 1	Remembering

	processor. (13)		
17	Write an assembly language program to generate a sine waveform at the output of DAC by interfacing it with 8051 microcontroller. (13)	BTL 2	Understanding
PART – C			
1	Write the interfacing of a 8051 based traffic light control system with necessary diagram. (15)	BTL 1	Remembering
2	Interface 8 bit, 8 channel ADC to 8051, Write an ALP to convert Sensor data from various input devices through CH0, CH3 and CH7 channel to digital data and store them in external memory location starting from C000H, Repeat procedure for every 1 sec. (15)	BTL 4	Analyzing
3	Draw the diagram to interface a stepper motor with 8051 microcontroller and explain. Write its ALP to run the stepper motor in both forward and reverse direction with delay. (15)	BTL 3	Applying
4	Sixteen keys are to be interfaced with 8051 arranged in a 4 x 4 matrix. Give a schematic of the hardware interfacing. Develop a software to generate unique key code for any key pressed. The key code must be fully de bounced. (15)	BTL 4	Analyzing
5	Write short notes on following: (i) PIC Controller. (7) (ii) Sensor interfacing. (8)	BTL 2	Understanding