SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF
ELECTRONICS AND INSTRUMENTATION ENGINEERING

QUESTION BANK

V SEMESTER

1905502 –MICROPROCESSORS AND MICROCONTROLLERS

Regulation – 2019

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SUBJECT : 1905502–MICROPROCESSORS AND MICROCONTROLLERS
SEM / YEAR: V / III

UNIT I -8085 PROCESSOR				
Hardware Architecture, pinouts – Functional Building Blocks of Processor – Memory organization – I/O ports and data transfer concepts– Timing Diagram – Interrupts.8086 processor (Architecture only).				
PART –A				
Q.No	**Questions**	**BT Level**	**CO**	**Competence**
1.	What are the flags available in 8085 processor?	**BLT 1**	**CO1**	Remember
2.	Explain the function of program counter in 8085 microprocessor.	**BLT 4**	**CO1**	Analyze
3.	State any four pins of 8085 processor which are used to generate control and status signals.	**BLT 2**	**CO1**	Understand
4.	Explain the following signals of 8085: RST 7.5, READY	**BLT 4**	**CO1**	Analyze
5.	Show the schematic to generate separate read/write control signals for memory and I/O related signals in 8085.	**BLT 3**	**CO1**	Apply
6.	Illustrate the functions of the two status signals S0 and S1 in 8085.	**BLT 3**	**CO1**	Apply
7.	List the registers of 8085 processor.	**BLT 1**	**CO1**	Remember
8.	What is stack and what is the function of stack pointer?	**BLT 1**	**CO1**	Remember
9.	Give two applications of 8085	**BLT 2**	**CO1**	Understand
10.	Calculate the execution time of an instruction MVI A,82H in 8085 runs at 2 MHz.	**BLT 3**	**CO1**	Apply
11.	Give the various machine cycles of 8085.	**BLT 2**	**CO1**	Understand
12.	If the memory address of the last location of a 1Kbyte memory chip is FBFFH, What is the starting address?	**BLT 6**	**CO1**	Create
13.	Differentiate I/O mapped I/O and Memory mapped I/O.	**BLT 4**	**CO1**	Analyze
14.	Draw the schematic of latching low-order address bus in 8085 microprocessor.	**BLT 2**	**CO1**	Understand
15.	What are the interrupts available in 8085?	**BLT 1**	**CO1**	Remember
16.	Compare software and hardware interrupts.	**BLT 5**	**CO1**	Evaluate
17.	Mention the use of ALE in 8085 microprocessor.	**BLT 2**	**CO1**	Understand

18.		Define polling.	**BLT 1**	**CO1**	Remember
19.		What is meant by level triggered input? Which of the interrupts in 8085 are level triggered?	**BLT 1**	**CO1**	Remember
20.		What is the function of HOLD and HLDA in 8085 microprocessor?	**BLT 5**	**CO1**	Evaluate
21.		Analyze about instruction cycle.	**BLT 4**	**CO1**	Analyze
22.		Differentiate between the microprocessor and microcontroller	**BLT 4**	**CO1**	Analyze
23.		How many data lines and address lines are available in 8085?	**BLT 5**	**CO1**	Evaluate
24.		Appraise the functions of accumulator	**BLT 6**	**CO1**	create
		PART –B			
1.		Draw the pin configuration of 8085 and explain the purpose of each signal.**(13)**	**BLT 1**	**CO4**	Remember
2.		Deduce the functional description of 8085 Microprocessor with neat diagram.**(13)**	**BLT 5**	**CO4**	Evaluate
3.		Describe the features in the hardware architecture of 8086 microprocessor with a neat diagram. Explain the function of the various registers available in it.**(13)**	**BLT 1**	**CO4**	Remember
4.	**(i)**	Explain the function of the various interrupts available with 8085 microprocessor.**(7)**	**BLT 4**	**CO1**	Analyze
	(ii)	Explain with timing diagrams, the Opcode fetch machine cycle of 8085 microprocessor.**(6)**			
5.	**(i)**	Describe in detail about memory interfacing using 8085.**(7)**	**BLT 1**	**CO1**	Remember
	(ii)	Draw and explain the flag register of 8085 in brief.**(6)**			
6.	**(i)**	Draw the timing diagram for memory read cycle and explain.**(7)**	**BLT 4**	**CO1**	Analyze
	(ii)	Draw and explain the timing diagram for MVI A,32H.**(6)**			
7.	**(i)**	Illustrate the execution of instruction CALL 4322H with timing diagram. Assume the relevant details.**(7)**	**BLT 3**	**CO1**	Apply
	(ii)	Illustrate about the bus structure of 8085 processor.**(6)**			
8.		Explain with suitable example that how an input and output device is interfaced with 8085 Microprocessor using 3 to 8 decoder.**(13)**	**BLT 6**	**CO1**	Create
9.		Discuss with flow diagram how an instruction is fetched and executed in an 8085 processor.**(13)**	**BLT 2**	**CO1**	Understand
10.	**(i)**	Discuss in detail about the I/O read and write operation of 8085 processor with timing diagram.**(7)**	**BLT 2**	**CO1**	Understand
	(ii)	Discuss briefly the input and output interfacing techniques used in 8085 microprocessor.**(6)**			
11.		Explain an 8085 interrupt process and mention the difference between a maskable and a non maskable interrupts.**(13)**	**BLT 2**	**CO1**	Understand
12.	**(i)**	Draw and explain the timing diagram for SHLD 16-bit address.**(6)**	**BLT 4**	**CO1**	Analyze

	(ii)	Explain the interpretation of the accumulator bit pattern for SIM and RIM instruction.**(7)**			
13.	**(i)**	What are the data transfer mechanisms supported by 8085 processor?**(7)**	**BLT 1**	**CO1**	Remember
	(ii)	Write short notes on RST (RESTART) instructions. (6)			
14.	**(i)**	How many flags are there in flag Register? Examine the significance of each.**(5)**	**BLT 3**	**CO1**	Apply
	(ii)	Two machine codes 3EH and 32H are stored in memory locations 2000H and 2001H respectively. The first machine code 3EH represents the opcode to load a data byte in the accumulator and the second code 32H represents the data byte to be loaded in the accumulator. Illustrate and explain the bus timings of 8085 as these machine codes are executed.**(8)**			
15.	Describe the features in the hardware architecture of 8085 microprocessor with a neat diagram. Explain the function of the various registers available in it.**(13)**		**BLT 1**	**CO4**	Remember
16.	Show the memory organization and interfacing with 8085 microprocessor. Explain how the memory is accessed. .**(13)**		**BLT 1**	**CO4**	Remember
17.	Design an 8085 based system containing 64kb of EPROM and 64kb of RAM. .**(13)**		**BLT 6**	**CO4**	Create
	PART-C				
1.	The instruction code 0100 1111(4FH) is stored in memory location 2005H. Illustrate the data flow and explain the sequence of events when the instruction code is fetched by the MPU.**(15)**		**BLT 5**	**CO5**	Evaluate
2.	Design a memory interfacing circuit to interconnect 1Kb (1024*8) RAM to 8085 Microprocessor with the address range of 0000H to 03FFH.**(15)**		**BLT 6**	**CO5**	Create
3.	Differentiate between the following instructions clearly (i)Push and POP **(5×2=10)** (ii)CALL and Jump (iii)ADD and ADC (iv)INC and INX (v)MOVB,B and MOVB,A (vi)What is the general format of an 8085 instruction set? **(5)**		**BLT 6**	**CO5**	Create
4.	Explain the timing diagram of STA 526AH.**(15)**		**BLT 5**	**CO5**	Evaluate
5.	Design an interface circuit for microprocessor-controlled system to meet the following specifications. (a) 74LS138: 3to 8 decoder (b) 2732 (4K x 8): EPROM- address range should begin at 0000h and additional 4K memory space should be available for future expansion. (c) 6116 (2K x 8): CMOS R/W memory .**(15)**		**BLT 6**	**CO6**	Create
UNIT II-PROGRAMMING OF 8085 PROCESSOR					

Instruction -format and addressing modes – Assembly language format – Data transfer, data manipulation& control instructions – Programming: Loop structure with counting & Indexing Look up tability - Subroutine instructions - stack.

Q.No	Questions	BT Level	CO	Competence
1.	State the addressing mode of the SHLD instruction and how it works.	BLT 1	CO1	Remember
2.	If the clock frequency is 5 MHz, Evaluate the time required to execute an instruction having 18 T-states	BLT 5	CO5	Evaluate
3.	List the different machine control instructions used in 8085 microprocessor.	BLT 1	CO5	Remember
4.	What is wait state? When the 8085 processor will enter the wait state?	BLT 1	CO5	Remember
5.	If the 8085 adds 87H and 79H, specify the contents of the accumulator and the status of S, Z and CY flag?	BLT 3	CO5	Apply
6.	Point out the similarity and difference between compare and subtract instructions.	BLT 4	CO5	Analyze
7.	State the purpose and importance of NOP instruction.	BLT 1	CO5	Remember
8.	Illustrate the function of 8085 instruction: CPI and RRC.	BLT 3	CO5	Apply
9.	Differentiate CALL and JUMP instruction.	BLT 4	CO2	Analyze
10.	Develop an ALP to add 5 data bytes stored in memory locations starting at 4500H and display the sum in next memory location.	BLT 6	CO5	Create
11.	Develop an assembly level program in 8085 to check whether the content of accumulator is even or odd	BLT 6	CO5	Create
12.	What is meant by look up table?	BLT 1	CO2	Remember
13.	Discuss how time delay is generated using subroutines?	BLT 2	CO5	Understand
14.	State any four data transfer instructions and their function.	BLT 1	CO5	Remember
15.	What is subroutine? Mention the instructions related to subroutine in 8085 microprocessor.	BLT 2	CO2	Understand
16.	Explain the function of stack.	BLT 4	CO2	Analyze
17.	Differentiate cascade stack and memory stack.	BLT 2	CO2	Understand
18.	Explain any two stack related instructions in 8085 microprocessor.	BLT 5	CO2	Evaluate
19.	Examine the purpose of the I/O instructions IN and OUT.	BLT 3	CO5	Apply
20.	Describe the function of IO/M signal in the 8085	BLT 2	CO5	Understand
21.	Express the different types of instructions in 8085 microprocessor	BLT 2	CO3	Understand
22.	Estimate the function of given 8085 instructions: JP, JPE, JPO, and JNZ	BLT 3	CO4	Apply

23.	Compare the significance of 'XCHG' and 'SPHL' instructions		**BLT 4**	**CO3**	Analyze
24.	Analyze the operation carried out when 8085 executes RST0 instruction		**BLT 4**	**CO4**	Analyze
	PART-B				
1.	**(i)**	Explain the various addressing modes of 8085 microprocessor with example.**(8)**	**BLT 1**	**CO1**	Remember
	(ii)	Explain the Compare instructions of 8085 microprocessor.**(5)**			
2.	Explain the operations carried out when 8085 executes the instruction.**(13)** (i) MOV A, M (ii) XCHG (iii) DAD B (iv) DAA.		**BLT 4**	**CO5**	Analyze
3.	**(i)**	Describe with suitable examples the data transfer and control instructions in 8085 microprocessor.**(7)**	**BLT 2**	**CO1**	Understand
	(ii)	Describe the categories of instructions used for data manipulation in 8085 Microprocessor.**(6)**			
4.	**(i)**	Write short notes on branching operations available in 8085.**(7)**	**BLT 4**	**CO2**	Analyze
	(ii)	Compare the similarities and differences of CALL and RET instructions with PUSH and POP instructions.**(6)**			
5.	Define addressing mode .Identify the addressing mode of the following instructions and explain them.**(13)** (i)STA 6350H (ii)CMA (iii)MOV A,M (iv)MOV D,E (v)MVI A,A7H		**BLT 4**	**CO5**	Analyze
6.	**(i)**	Illustrate a program with a flowchart to multiply two 8-bit numbers.**(7)**	**BLT 3**	**CO5**	Apply
	(ii)	Illustrate an 8085 ALP to count continuously in hexadecimal from FFH to 00H in a system with a 0.5 µs clock period. Use register C to set up 1ms delay between each count and display the numbers.**(6)**		**CO5**	
7.	**(i)**	Develop a program to obtain 1's complement of 16-bit number stored at location FC15(H) and FC16(H).Store the result at location FC17 (H) and FC18 (H).MSB should be in location FC16(H) and FC18(H). **(7)**	**BLT 6**	**CO5**	Create
	(ii)	Develop an ALP to load the hexadecimal numbers 9BH and A7H in registers D and E respectively and add the numbers. If the sum is greater than FFH display 01H at output port 00H; Otherwise display the sum.**(6)**			
8.	**(i)**	Explain the various arithmetic instructions of 8085 with illustrative examples?.**(6)**	**BLT 2**	**CO5**	Understand
	(ii)	Write an ALP for 8085 microprocessor to add data stored in memory from 4200H.The first element in the location 4200H gives the number of elements in the array. Store the result of the addition in 4300H and 4301H.Assume the sum does not exceed 16 bits. **(7)**	**BLT 5**	**CO5**	Evaluate

9.	Write a program to transfer 50 bytes of data from memory location starting from 2000H to 3000H using the memory pointer concept in 8085 Microprocessor.**(13)**		**BLT 1**	**CO5**	Remember
10.	**(i)**	Assume the SP register contains 2099H, register B contains 32Hand register C contains 57H. Write the instructions to save the contents of the BC register pair on the stack and specify the register contents (SP, B and C) after execution.**(7)**	**BLT 2**	**CO5**	Remember
	(ii)	Find the two's complement of a 16 bit data with example.**(6)**			
11.	**(i)**	Write an ALP using 8085 instructions to implement a hexadecimal to 7-segment decoder using look-up table method.**(7)**	**BLT 1**	**CO5**	Understand
	(ii)	Write the 8085 ALP for modulo 10 counter with flowchart.**(6)**			
12.	Develop an algorithm and 8085 assembly language program to sort 100 byte type data. Explain the instructions used in the program. **(13)**		**BLT 3**	**CO5**	Apply
13.	Describe what is meant by counting, looping and indexing.**(13)**		**BLT 1**	**CO2**	Remember
14.	**(i)**	Explain briefly about subroutine with example.**(7)**	**BLT 5**	**CO2**	Evaluate
	(ii)	Summarize the operation of stack with suitable example. **(6)**		**CO2**	
15.	Describe the instruction format and addressing modes of 8085 microprocessor. .**(13)**		**BLT 5**	**CO2**	Evaluate
16.	With the help of neat diagrams, Describe the differences between microprocessors and microcontrollers. .**(13)**		**BLT 3**	**CO2**	Apply
17.	With suitable examples explain how I/O devices are connected using memory mapped I/O and peripheral I/O. .**(13)**		**BLT 2**	**CO2**	Remember
	PART C				
1.	Develop an assembly language program based on 8085 microprocessor instruction set to search the smallest data in a set.**(15)**		**BLT 6**	**CO5**	Create
2.	**(i)**	Develop an 8085 assembly language program to sort numbers in ascending order.**(8)**	**BLT 6**	**CO5**	Create

	(ii)	Evaluate the contents of registers A,B, C and D and the flag status ie (S,Z and CY) as the following instructions are executed.
		MVI A,00H
		MVI B, F8H
		MOV C,A
		MOV D,B
		HLT **(7)**
			BLT 5	**CO1**	Evaluate

3.	Justify and explain in detail, If the program counter is always one count ahead of the memory location from which the machine code is being fetched, how does the microprocessor change the sequence of program execution with a Jump instruction?**(15)**		**BLT 5**	**CO5**	Evaluate
4.	Develop a program using the ADI instruction to add two hexadecimal numbers 3AH and 48H and to display the answer at an output port.**(15)**		**BLT 6**	**CO5**	Create

5.	**(i)**	Write a program to calculate the factorial of a number between 0 to 8 **(8)**	**BLT 5**	**CO5**	Evaluate
	(ii)	Write a program to find the number of negative, zero and positive numbers. **(7)**			

UNIT III -8051 MICRO CONTROLLER

Hardware Architecture, pinouts – Functional Building Blocks of Processor – Memory organization – I/O ports and data transfer concepts– Timing Diagram – Interrupts- Data Transfer, Manipulation, Control Algorithms& I/O instructions, Comparison to Programming concepts with 8085.

PART – A

Q. No	Questions	BT Level	CO	Competence
1.	What are the addressing modes of 8051 microcontroller?	**BLT 1**	**CO1**	Remember
2.	Write the purpose of PSEN and EA pin in 8051.	**BLT 6**	**CO4**	Create
3.	Explain how multiplication is performed in 8085 and 8051?	**BLT 4**	**CO5**	Analyze
4.	Draw the program memory organization in 8051.	**BLT 2**	**CO4**	Understand
5.	What are the main features of 8051 microcontroller?	**BLT 1**	**CO4**	Remember
6.	How does 8051 differentiate between the external and internal program memory.	**BLT 4**	**CO4**	Analyze
7.	Compare microprocessor and microcontroller.	**BLT 4**	**CO4**	Analyze
8.	List the interrupts of 8051 microcontroller.	**BLT 1**	**CO2**	Remember
9.	Write the vector address and priority sequence of 8051 interrupts.	**BLT 6**	**CO2**	Create
10.	Examine, how the microcontrollers respond to any interrupt request?	**BLT 3**	**CO2**	Apply
11.	Illustrate the function of Program Status Word in microcontrollers.	**BLT 3**	**CO4**	Apply
12.	What is meant by SFR in 8051? List any four special function register.	**BLT 1**	**CO4**	Remember
13.	List the on-chip peripherals of 8051 microcontroller.	**BLT 1**	**CO4**	Remember
14.	Summarize the functions of TMOD register in 8051 microcontroller.	**BLT 5**	**CO4**	Evaluate
15.	Distinguish between MOV and MOVX instructions.	**BLT 2**	**CO5**	Understand
16.	What do you understand by bit oriented instructions?	**BLT 2**	**CO5**	Understand
17.	What are I/O instructions in 8051 microcontroller?	**BLT 1**	**CO5**	Remember
18.	Explain the function of DJNZ instruction.	**BLT 5**	**CO5**	Evaluate
19.	Mention any four data transfer instructions of 8051 microcontroller.	**BLT 3**	**CO5**	Apply
20.	Distinguish between the functions of the instructions XCHG and SWAP of 8051.	**BLT 2**	**CO5**	Understand
21.	List out the flags available in 8051 Microcontroller.	**BLT 2**	**CO5**	Understand

22.	How are the status of the carry, auxiliary carry and parity flag affected if the following instructions are executed?
	MOV A,#9C
	ADD A,#64H
		BLT 5	**CO5**	Evaluate

23.	Identify the functions of the pins TXD, RXD in 8051 microcontroller.	**BLT 3**	**CO5**	Apply
24.	What is the function of PSEN and EA in the 8051 microcontroller?	**BLT 2**	**CO5**	Understand

PART B

1.	Describe with a neat block diagram the architecture of 8051 microcontroller.**(13)**		**BLT 1**	**CO4**	Remember
2.	**(i)**	What are the functional blocks available in 8051? Explain with a block diagram.**(7)**	**BLT 1**	**CO4**	Remember
	(ii)	Describe the operation of stack in 8051.**(6)**		**CO4**	
3.	Draw and explain the pinouts of 8051 microcontroller. **(13)**		**BLT 3**	**CO4**	Apply
4.	Discuss in detail about the memory organization of 8051 microcontroller and explain.**(13)**		**BLT 2**	**CO4**	Remember
5.	Design an 8051 based system with 16 K bytes of program ROM and 16 K bytes of data ROM.**(13)**		**BLT 6**	**CO4**	Create
6.	Explain the I/O ports and their functions of 8051 microcontroller.**(13)**		**BLT 4**	**CO4**	Analyze
7.	Describe about the RAM structure of 8051 microcontroller. **(13)**		**BLT 1**	**CO4**	Understand
8.	Explain different timer/counter modes of 8051microcontroller. **(13)**		**BLT 4**	**CO4**	Analyze
9.	Discuss in detail, the hardware and software support provided by 8051 for serial communication. **(13)**		**BLT 2**	**CO4**	Understand
10.	Discuss the addressing modes of 8051 microcontroller with suitable examples. **(13)**		**BLT 2**	**CO1**	Understand
11.	**(i)**	Illustrate about vectored interrupts in 8051 microcontroller. **(7)**	**BLT 3**	**CO2**	Apply
	(ii)	Illustrate with block diagram how to access external memory devices in an 8051 based system.**(6)**		**CO4**	
12.	**(i)**	Explain the various bit manipulation instructions in 8051 with examples. **(7)**	**BLT 1**	**CO5**	Remember
	(ii)	Explain the following instructions of 8051 micro-controller : **(3*2=6)** **1.** DJNZ Ro, HERE **2.** CJNZ @ R_i, #data, rel **3.** SWAP A			
13.	**(i)**	Explain the various program branching instructions available with 8051 microcontroller. **(7)**	**BLT 1**	**CO5**	Remember
	(ii)	Draw the data memory structure of 8051 microcontroller and explain. **(6)**			
14.	Explain the programming concepts of 8051 in comparison with 8085. **(13)**		**BLT 5**	**CO5**	Evaluate
15.	Explain about various serial communication modes provided by 8051 microcontroller. **(13)**		**BLT 2**	**CO1**	Understand
16.	Write short note on (i) program status word and (ii) DPTR of 8051 microcontroller. **(13)**		**BLT 2**	**CO1**	Understand
17.	Evaluate the operation of interrupts by giving the interrupt structure of 8051 microcontroller. **(13)**		**BLT 5**	**CO5**	Evaluate
PART C					
1.	Describe the timing diagram of external data memory read cycle of 8051. **(15)**		**BLT 4**	**CO5**	Analyze

2.	Explain the different types of instructions set used in 8051 microcontroller. **(15)**	**BLT 4**	**CO1**	Analyze
3.	Explain about the importance of the Program Counter, data pointer, Program Status word, Special Function Registers in 8051. **(15)**	**BLT 5**	**CO2**	Evaluate
4.	(i)What is the value of register A after each of the following instructions? MOV A,#26H RR A RR A RR A RR A SWAP A **(8)** (ii)Write a delay program using 8051 instructions**. (7)**	**BLT 5**	**CO5**	Evaluate
5.	Compare different jump instructions of 8051 microcontroller. .**(15)**	**BLT 4**	**CO1**	Analyze

UNIT IV -PERIPHERAL INTERFACING

Study on need, Architecture, configuration and interfacing, with ICs: 8255 , 8259 , 8254, 8279 ,- A/D and D/A converters &Interfacing with 8085& 8051

PART – A

Q. No	Questions	BT Level	CO	Competence
1.	What are different peripheral interfacing used with 8085 microprocessor?	**BLT 1**	**CO3**	Remember
2.	What is meant by A/D converter?	**BLT 1**	**CO3**	Remember
3.	Find the control word of 8255 if port A is configured as input and port B is configured as output in mode 0.	**BLT 3**	**CO3**	Apply
4.	Give the ports placed in group a and group b of 8255	**BLT 2**	**CO3**	Understand
5.	Explain how data is transmitted in asynchronous serial communication.	**BLT 5**	**CO3**	Evaluate
6.	What are the steps in interfacing peripherals with the microprocessor?	**BLT 1**	**CO3**	Remember
7.	What is the need for 8259 PIC?	**BLT 1**	**CO3**	Remember
8.	Illustrate the salient features of Intel 8259 PIC.	**BLT 3**	**CO3**	Apply
9.	Mention the use of ISR and PR registers in 8259 PIC.	**BLT 3**	**CO3**	Apply
10.	Point out the operating modes in 8254 timer/Counter.	**BLT 4**	**CO3**	Analyze
11.	Define the Strobed I/O mode of 8255 Programmable peripheral interface.	**BLT 1**	**CO3**	Remember
12.	Give the operation modes of 8255.	**BLT 2**	**CO3**	Understand
13.	Explain what is meant by key debouncing?	**BLT 5**	**CO3**	Evaluate
14.	Differentiate between two key lockout and N-key rollover modes in 8279.	**BLT 4**	**CO3**	Analyze
15.	Define peripherals.	**BLT 2**	**CO3**	Understand
16.	Draw the 3-bit digital to analog converter block and plot its analog output.	**BLT 2**	**CO3**	Understand

17.	Mention the categories of Digital to Analog converters.		**BLT 4**	**CO3**	Analyze
18.	What is handshaking? And what are handshake signals?		**BLT 1**	**CO3**	Remember
19.	How a keyboard matrix is formed in keyboard interface using 8279?		**BLT 6**	**CO3**	Create
20.	Explain how wait states can be introduced in the machine cycle using READY signal to interface slow memory devices?		**BLT 5**	**CO3**	Evaluate
21.	Draw the flow chart of Analog to digital conversion process.		**BLT 1**	**CO4**	Remember
22.	List out the priority modes of 8259.		**BLT 2**	**CO3**	Understand
23.	Analyze the function of read back command in 8254.		**BLT 4**	**CO3**	Analyze
24.	Distinguish 2 key lock out and N-key rollover		**BLT 4**	**CO3**	Analyze
	PART B				
1.	Explain how the 8255A programmable peripheral interface chip can be used with the 8085 and 8051 for reading and writing parallel data from and to I/O devices.**(13)**		**BLT 5**	**CO3**	Evaluate
2.	Explain the architecture, functions and registers of the 8255 PPI.**(13)**		**BLT 4**	**CO3**	Analyze
3.	Explain the internal architecture and programming of 8259 Programmable Interrupt Controller.**(13)**		**BLT 5**	**CO3**	Evaluate
4.	**(i)**	Discuss how a PIC, 8259 is interfaced to an 8085 and 8051 based system. **(7)**	**BLT 2**	**CO3**	Understand
	(ii)	How does 8259 service an interrupt? **(6)**			
5.	Discuss the various modes of operation of the programmable interval timer, 8254.**(13)**		**BLT 2**	**CO3**	Understand
6.	**(i)**	Illustrate briefly the block diagram of 8254 timer.**(7)**	**BLT 3**	**CO3**	Apply
	(ii)	Describe the working of successive approximation type A/D converter.**(6)**	**BLT 1**	**CO3**	Remember
7.	Explain an application of 8255 in the handshake mode with the assembly program.**(13)**		**BLT 1**	**CO3**	Remember
8.	With a neat diagram Discuss briefly about the internal architecture and registers of 8279 keyboard/ display controller. **(13)**		**BLT 2**	**CO3**	Understand
9.	Explain about the interfacing of an 8 bit A/D converter using (i)Status check method (ii)Interrupt method with neat diagram. **(13)**		**BLT 1**	**CO3**	Remember
10.	**(i)**	Explain with neat sketch, the A/D converter interfacing with 8085 microprocessor.**(7)**	**BLT 4**	**CO3**	Analyze
	(ii)	With sample program explain the interfacing of D/A converter with 8085 microprocessor. **(6)**		**CO3**	
11.	**(i)**	Write the program and Illustrate the operation of 8255 PPI Port A programmed as input and output in mode 1 with necessary handshaking signals .**(7)**	**BLT 6**	**CO3**	Create
	(ii)	Illustrate in detail about parallel communication interface with microprocessor and microcontroller.**(6)**		**CO3**	
12.	Explain the interfacing of D/A converter with 8051 microcontroller with neat diagram. **(13)**		**BLT 1**	**CO3**	Remember

13.	**(i)**	Vin=2.25 V, Vref=5V, Number of data lines are 5. Convert the given analog quantity into its equivalent output digital quantity.**(7)**	**BLT 1**	**CO3**	Remember
	(ii)	Write a program to generate the square, triangular and trapezoidal waveforms using 8051 microcontroller.**(6)**		**CO3**	
14.		Demonstrate how a matrix key board is interfaced with microprocessor using programmable peripheral interface. **(13)**	**BLT 3**	**CO3**	Apply
15.		Describe with neat sketch, the A/D converter interfacing with 8051. **(13)**	**BLT 1**	**CO3**	Remember
16.		Distinguish BSR mode and I/O mode of 8255..**(13)**	**BLT 4**	**CO3**	Analyze
17.		Develop a 8085 program to illustrate square wave generator mode of 8254..**(13)**	**BLT 6**	**CO3**	Create
		PART C			
1.		Interface an 8 bit ADC with 8085 microprocessor and write the algorithm and assembly language program to get 500 digital equivalent data of analog samples taken at every one millisecond and store them in memory. Make suitable assumptions. **(15)**	**BLT 5**	**CO3**	Evaluate
2.		Design a system using 8085 or 8051 to blink four LEDs**(15)**	**BLT 6**	**CO3**	Create
3.		Design an interface circuit and explain how programmable timer is interfaced with 8085. **(15)**	**BLT 6**	**CO3**	Create
4.		Write 8085 program to configure Port A as input port, Port B and Port C as output port of 8255 PPI. .**(15)**	**BLT 6**	**CO3**	Create
5.		Interface an 8x8 keyboard using 8255 ports and write a program to read the code of a pressed key. **(15)**	**BLT 5**	**CO3**	Evaluate

UNIT – V MICRO CONTROLLER PROGRAMMING & APPLICATIONS				
Simple programming exercises- key board and display interface –Control of servo motor stepper motor control- Application to automation systems.				
PART – A				
Q. No	**Questions**	**BT Level**	**CO**	**Competence**
1.	How is pulse generated from microcontroller for stepper motor control?	**BLT 5**	**CO6**	Evaluate
2.	State any four applications of microcontroller.	**BLT 1**	**CO6**	Remember
3.	Write an ALP to receive input from port P1.5 and if it is high then an output 35H is sent to port 0.	**BLT 6**	**CO6**	Create
4.	List the instructions that always clear the carry flag.	**BLT 1**	**CO6**	Remember
5.	LED is connected to pin P0.7, Write an assembly program to toggle the LED forever.	**BLT 6**	**CO6**	Create

6.	How would you explain the different operand types used in 8051?		**BLT 1**	**CO6**	Remember
7.	Mention the sequence of operation performed by 8051 upon execution of CJNE instruction.		**BLT 3**	**CO6**	Apply
8.	Deduce the control signals from 8051 microcontroller required for washing machine control.		**BLT 5**	**CO6**	Evaluate
9.	What is the advantage of data pointer register?		**BLT 1**	**CO6**	Remember
10.	State how to save the status of P2.7 in RAM bit location 31?		**BLT 4**	**CO6**	Analyze
11.	What is baud rate?		**BLT 1**	**CO6**	Remember
12.	Show a block diagram of a closed loop system for the speed control of a servo motor.		**BLT 3**	**CO6**	Apply
13.	What is multiplexed display? Point out its advantage?		**BLT 4**	**CO6**	Analyze
14.	Discuss about read-modify-write.		**BLT 2**	**CO6**	Understand
15.	Point out the need for driver in between the microcontroller and the stepper motor?		**BLT 4**	**CO6**	Analyze
16.	Show how to drive a solenoid or a motor winding from the output port pin of a microcontroller?		**BLT 3**	**CO6**	Apply
17.	In a microcontroller based system on-chip ROM, why does the size of the ROM matter?		**BLT 2**	**CO6**	Understand
18.	Discuss what happens in power down mode of a microcontroller?		**BLT 2**	**CO6**	Understand
19.	Give the advantage of closed loop control system for interfacing?		**BLT 2**	**CO6**	Understand
20.	What is duty cycle in PWM?		**BLT 1**	**CO6**	Remember
21.	Write a 8051 ALP to multiply two numbers.		**BLT 3**	**CO6**	Apply
22.	Write a 8051 ALP to divide two numbers.		**BLT 3**	**CO6**	Apply
23.	Develop a program to generate delay in 8051		**BLT 6**	**CO6**	Create
24.	Write a program to output the status a switch connected in P1.2		**BLT 3**	**CO6**	Apply
PART –B					
1.	**(i)**	Write an ALP in 8051 to convert a 16 bit binary number to ASCII. **(6)**	**BLT 5**	**CO6**	Evaluate
	(ii)	Develop an 8051 program to monitor P1 continuously the value 63H. It should get out of the monitoring only if P1=63H. **(7)**	**BLT 6**	**CO6**	Create
2.	Explain with neat diagram the closed loop control of servo motor using microcontroller.**(13)**		**BLT 4**	**CO6**	Analyze
3.	Design the microcontroller based system to control the water level in the tank. **(13)**		**BLT 6**	**CO6**	Create
4.	**(i)**	Write an assembly language program Using 8051 instructions to add an array of unsigned binary numbers available in RAM location 50 to 5F and store the result at locations 70 and 71. **(7)**	**BLT 5**	**CO6**	Evaluate
	(ii)	Write an assembly language program for 8051 microcontroller to divide the 8- bit number stored in memory location 2400H by the the 8- bit number stored in memory location 2401H. Store the quotient in 2402H and the remainder in 2403H. **(6)**	**BLT 5**	**CO6**	Evaluate

5.	Develop a 8051 ALP to evaluate an arithmetic expression (A-B) x C where A, B, C are 8-bit data in internal memory. Assume A>B and store the result in external memory. Explain the program developed. **(13)**	**BLT 6**	**CO6**	Create
6.	Analyze the operations carried out when the following instructions are executed by 8051**.** **(i)** MOVX @ R 0 , A **(ii)** MOVC A, @A+PC **(iii)**RLC A **(iv)**CJNE A,50 H,L2 **(v)** JBC 20H, L3 **(vi)**XCH A,30H where,L2 and L3 are labels. **(13)**	**BLT 4**	**CO6**	Analyze
7.	**(i)** Demonstrate with a neat diagram, a 4x4 keyboard interfacing with 8051 microcontroller. **(8)**	**BLT 3**	**CO6**	Apply
	(ii) Explain the various bit manipulation instructions in 8051 microcontroller. **(5)**			
8.	**(i)** Write a program to add two 16 bit numbers. The numbers are 8C8D and 8D8C.Place the sum in R7 and R6. R6 should have the lower byte. **(8)**	**BLT 5**	**CO6**	Evaluate
	(ii) Explain the various program branching instructions available with 8051 microcontroller**(5)**			
9.	**(i)** Develop an ALP to generate a square wave of 50% duty cycle on bit 0 of port 1 of 8051 microcontroller and explain. **(7)**	**BLT 1**	**CO6**	Remember
	(ii) Explain the various arithmetic instructions of 8051.**(6)**			
10.	Draw the diagram to interface a servo motor with 8051 microcontroller and explain. Also write an 8051 ALP to run the servo motor in forward direction with delay. **(13)**	**BLT 1**	**CO6**	Remember
11.	Explain the stepper motor control using 8051 and write an assembly language program for running the stepper motor in clockwise direction. **(13)**	**BLT 5**	**CO6**	Evaluate
12.	Describe the control system design of washing machine using 8051 microcontroller programming. **(13)**	**BLT 2**	**CO6**	Understand
13.	Discuss how to program and interface LCD to an 8051**.(13)**	**BLT 2**	**CO6**	Understand
14.	Explain, with necessary diagrams, how a 4-Winding stepper motor can be interfaced and rotated in steps. Assume normal 4-step sequence data as 09H, OCH, 06H and 03H, respectively. **(13)**	**BLT 3**	**CO6**	Apply
15.	Develop a 8051 ALP to transfer a block of data. .**(13)**	**BLT 6**	**CO6**	Create
16.	Explain the role of microcontrollers in automation with examples. .**(13)**	**BLT 3**	**CO6**	Apply
17.	Illustrate the timer counter operation of 8051 with a suitable program. .**(13)**	**BLT 3**	**CO6**	Apply
	PART – C			
1.	Illustrate the keyboard and display interface with 8051 and write the program to get the input 45H from the external keyboard and display it on the external display device. **(15)**	**BLT 6**	**CO6**	Create

2.	With a neat diagram and explain how stepper motor can be interfaced with 8051 microcontroller. Give both program and the interfacing circuit. **(15)**	**BLT 4**	**CO6**	Analyze
3.	A switch (SW) is connected to pin P2.7. Write a ALP to monitor the status of SW and perform the following. **(15)** If SW = 0, the stepper motor moves clockwise If SW = 1, the stepper motor moves counter clockwise.	**BLT 5**	**CO6**	Evaluate
4.	Assume that P1 is an input port connected to a temperature sensor. Write a program to read the temperature and test it for the value 75.According to the test results, place the temperature value into the registers indicated by the following: **(15)** If T=75 then A=75 If T<75 then R1=T If T>75 then R2=T	**BLT 5**	**CO6**	Evaluate
5.	Design an 8-digit seven segment display system using 8051 microcontroller. .**(15)**	**BLT 6**	**CO6**	Create