DHANALAKSMI SRINIVASAN COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

V SEMESTER

EE6502- MICROPROCESSORS AND MICROCONTROLLERS

Regulation – 2013

Academic Year 2018-2019

	UNIT I - 8085 PROCESSOR		
	Hardware Architecture, pinouts – Functional Building Blocks of Processor – Memory organization – I/O ports and data transfer concepts– Timing Diagram – Interrupts.		
	PART – A		
Q.No	Questions	BT	Competence
1.	Describe the function of program counter in 8085 microprocessor?	BTL1	Remember
2.	Discuss the use of stack pointer.	BTL 2	Understand
3.	Classify the types 8085 flags.	BTL 4	Analyze
4.	Discover why data bus is bi-directional?	BTL 3	Apply
5.	Explain the level triggered interrupt. Which of the interrupts in 8085 are level triggered?	BTL 5	Evaluate
6.	Give the uses of ALE.	BTL2	Understand
7.	List out the machine cycles of 8085 microprocessor.	BTL 1	Remember
8.	Define Address Bus and Data Bus.	BTL 1	Remember
9.	Point out the steps involved in interfacing a memory to the 8085 microprocessor.	BTL 4	Analyze
10.	Discuss about the interrupts in 8085 microprocessor.	BTL2	Understand
11.	Explain the tri-state logic.	BTL 5	Evaluate
12.	Compare the purpose of SID and SOD lines.	BTL 6	Create
13.	Tabulate the functions of the two status signals S0 and S1 in 8085 Microprocessor.	BTL 1	Remember
14.	List out the machine cycle for executing the instruction MVI A,34H	BTL 1	Remember
15.	Classify the purpose of timing diagram in 8085 Microprocessor.	BTL 3	Apply
16.	Summarize the function of trap interrupt and its significance.	BTL 2	Understand
17.	Examine the memory mapping in 8085 Microprocessor.	BTL 1	Remember
18.	Demonstrate the significance of tri-state logic.	BTL 3	Apply
19.	Compose the function of parity flag and zero flag in 8085.	BTL 6	Create
20.	Analyze the function of keyboard interrupts.	BTL 4	Analyze

SUBJECT   : EE6502- MICROPROCESSORS AND MICROCONTROLLERS

SEM / YEAR: V/III

	PART – B		
1.	Explain with a neat block diagram the architecture of 8085 microprocessor. (13)	BTL4	**Analyze**
2.	(i) Examine the interrupt structure of 8085 microprocessor. (7) (ii)Describe in detail about the memory interfacing. Explain with an example. (6)	**BTL 1**	**Remember**
3.	(i) Label the timing diagram for memory read and write operations and explain. (7) (ii) Label the interfacing diagram to interface 8085 with 2KB RAM and 4KB EPROM. (6)	**BTL 1**	**Remember**
4.	(i) Analyze the input and output interfacing techniques used in 8085 microprocessor. (7) (ii)Explain the Timing diagram of STA 526A$_H$. (6)	**BTL 4**	**Analyze**
5.	Describe the pin configuration of 8085 processor and explain them in detail. (13)	**BTL 1**	**Remember**
6.	(i) Demonstrate the Timing diagram of LDA 526A$_H$. (7) (ii) Illustrate the timing diagram for LXI H, 4200H. (6)	**BTL 3**	**Apply**
7.	(i) Explain the functions of 8085 signals. (7) (ii) Evaluate the timing diagram for LHLD 16-bit address. (6)	**BTL 5**	**Evaluate**
8.	(i) Examine the bus structure of 8085 processor. (7) (ii) Classify the types of interrupts in 8085. Explain in detail about the hardware interrupts in 8085. (6)	**BTL 3**	**Apply**
9.	(i) Express the timing diagram of Opcode Fetch machine cycle. (7) (ii) Summarize how an instruction is fetched with flow diagram and executed in an 8085 processor. (6)	**BTL 2**	**Understand**
10.	Explain the I/O read and write operation of 8085 processor with timing diagram. (13)	BTL4	**Analyze**
11.	(i) What do you mean by polling in 8085? (5) (ii) List out the Maskable and Non-Maskable interrupts available in an 8085 processor. (4) (iii) Label and explain the flag register of 8085 in brief. (4)	**BTL 1**	**Remember**
12.	(i)Discuss in detail about the timing diagram for MVI A, 32H. (7) (ii) Interpret the timing diagram for MOV A, M. (6)	**BTL 2**	**Understand**
13.	Design an interface circuit for microprocessor controlled system to meet the following specifications. (13) (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	**BTL 6**	**Create**
14.	Summarize the signal configuration of 8085 and summarize them. (13	**BTL 2**	**Understand**
	PART – C		

1.	(i) Evaluate the timing diagram of OUT instruction. (8) (ii) Explain the registers of 8085 microprocessor. (7)	BTL 5	Evaluate

2.	(i) Formulate the timing diagram for LHLD 16-bit address. (8) (ii) Compose the operation of memory mapped I/O and I/O mapped I/O. (7)	BTL 6	Create
3.	Generalize the data transfer concepts of 8085 processor. (15)	BTL 6	Create
4.	Assess the operation of stock with suitable example. (15)	BTL 5	Evaluate

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 table - Subroutine instructions – stack

PART – A

Q.No	Questions	BT	Competence
1.	Demonstrate an 8085 program to swap lower and higher nibble of the contents of accumulator.	BTL 3	Apply
2.	Classify the addressing modes of 8085 processor.	BTL 3	Apply
3.	Discuss the function of CALL instruction.	BTL 2	Understand
4.	List different instruction formats.	BTL 1	Remember
5.	Tabulate the functions of Rotate instructions. Give example.	BTL 1	Remember
6.	Compose the similarity and difference between compare and subtract instructions.	BTL 6	Create
7.	Choose any two instructions in data transfer.	BTL 6	Create
8.	Differentiate CALL instruction from JUMP instruction.	BTL 4	Analyze
9.	Differentiate MVI and MOV instructions.	BTL 2	Understand
10.	Explain any two data manipulation instructions.	BTL 4	Analyze
11.	Summarize the function of SIM Instruction in 8085.	BTL 5	Evaluate
12.	Assess the time delay generated using subroutines.	BTL 5	Evaluate
13.	Discuss significance of 'XCHG' and 'SPHL' instructions.	BTL 2	Understand
14.	Examine the functioning of CMP instruction.	BTL 1	Remember
15.	Explain the function of given 8085 instructions: CPI and RRC.	BTL 4	Analyze
16.	List the purpose of SID and SOD lines.	BTL 1	Remember
17.	Examine the size of data, address, memory word and memory capacity of 8085 microprocessor.	BTL 3	Apply
18.	Define stack and stack related instructions.	BTL 1	Remember
19.	Explain about the lookup table.	BTL 5	Evaluate
20.	Describe the purpose of NOP instruction.	BTL 1	Remember

PART – B

1.	(i) Describe the types of addressing modes in 8085 processor. (7) (ii) Quote an 8085 assembly language program to sort numbers in descending orders. (6)	**BTL 1**	**Remember**
2.	(i) Apply an assembly language program to find two's complement of a 16 bit data. (7) (ii) Illustrate an assembly language program to shift a 16 bit number left of two bits. (6)	**BTL 3**	**Apply**
3.	(i) Compare memory mapping and I/O mapping techniques in 8085. (7) (ii) Explain an 8085 assembly language program to sort numbers in ascending orders. (6)	**BTL 4**	**Analyze**
4.	Identify a suitable assembly language program for (i) Adding a set of n numbers. (6) (ii) Finding the biggest number in a block of data stored in the memory locations from 4270H – 427FH. (7)	**BTL 1**	**Remember**
5.	(i) Describe the data manipulation instructions of 8085. (6) (ii) Summarize the 8085 instructions which change the normal sequence of the program. (7)	**BTL 2**	**Understand**
6.	(i) Quote an assembly language program for adding a set of n numbers. (7) (ii) Describe with suitable examples the data transfer, loading and storing instructions. (6)	**BTL 1**	**Remember**
7	(i) Describe in detail classification of 8085 instruction set. (7) (ii) Evaluate an assembly language program to find the largest number in an array. (6)	**BTL 5**	**Evaluate**
8	(i) Develop an assembly language program for the loop structure with counting of 10 numbers. (7) (ii) Write a 8085 assembly language program to divide a 8 bit number by another 8 bit number and store the remainder and quotient in memory locations 4252 and 4253 respectively. (6)	**BTL 6**	**Create**
9	(i) Apply a program to output square wave of 1khz frequency on the SOD pin of 8085 for 5 seconds. (7) (ii) Demonstrate an assembly language program to generate the square wave form using DAC. Assume the T_{ON}=70% (6)	**BTL 3**	**Apply**
10	(i) Describe the interrupt structure of 8085 microprocessor and compare the same with 8085 microprocessor. (7) (ii) Identify a suitable assembly language program to generate a time delay of 1ms. Show the calculations (6)	**BTL 1**	**Remember**
11	(i) Describe with suitable example the operation of stack. (7) (ii) Estimate the similarities and differences of CALL and RET instructions with PUSH and POP instructions. (6)	**BTL 2**	**Understand**

12	(i) Describe with a suitable 8085 assembly language program the use of subroutine instructions. (7) (ii) Distinguish an assembly language program to generate Fibonacci series using subroutines. (6)	**BTL 2**	**Understand**
13	Explain the operations carried out when 8085 executes the instructions: (13) (i)MOV A,M (ii)XCHG (iii)DAD B (iv)LDA 6000 (v)SHLD 4000	**BTL 4**	**Analyze**
14	(i) Analyze a program to output square wave of 1KHz frequency on the SOD pin of 8085 for 5 seconds. (7) (ii) Explain an assembly language program to generate the square wave form using DAC. Assume the T_{ON}=70% (6)	**BTL 4**	**Analyze**
	PART-C		
1.	Explain an 8085 assembly language program to solve the following equation: Z=2X+Y where X and Y are stored in memory location 4200 and 4201 respectively. The value of Z should be stored in 4202 (Lower byte) and 4203(Lower byte). (15)	**BTL 5**	**Evaluate**
2.	(i)Develop a program to calculate and store in the results as mentioned. Five memory locations 2401H, 2402H, 2403H, 2404H and 2405H have data called X_1, X_2, X_3, X_4 and X_5. (2405H) = $X_1+X_2+X_3+X_4$ (2403H) = $X_5-X_3-X_2-X_4$ (15)	**BTL 6**	**Create**
3.	(i) Develop a suitable program for the below: Sixteen bytes are stored in memory locations at XX50H to XX5FH. Transfer the entire block of data to new memory locations starting at XX70H. (8) (ii) Compose an assembly language program based on 8085 microprocessor instruction set to search the smallest data in a set. (7)	**BTL 6**	**Create**
4.	(i) Explain the loop structure with counting and indexing in 8085 programming. (8) (ii) Write an 8085 program to count the number of even and odd numbers in a given set of numbers. (7)	**BTL 5**	**Evaluate**

UNIT III- 8051 MICRO CONTROLLER

Hardware Architecture, pintouts – Functional Building Blocks of Processor – Memory organization – I/O ports and data transfer concepts– Timing Diagram – Interrupts-Comparison to Programming concepts with 8085.

PART - A

Q.No	Questions	BT	Competence
1.	Explain the operating mode 0 of 8051 ports	BTL-4	Analyze
2.	Discuss the function of TMOD register in 8051 microcontroller	BTL-2	Understand

3.	Classify the addressing modes of 8051 microcontroller.	BTL-4	Analyze
4.	Define Program status word.	BTL-1	Remember
5.	Explain the application of bit wise instruction.	BTL-4	Analyze
6.	Discuss PCON register.	BTL-2	Understand
7.	Discover in which ports of 8051 are bit addressable.	BTL-3	Apply
8.	Define microcontroller and List the features of 8051 microcontroller.	BTL-1	Remember
9.	List the significance of PSEN and EA pin in 8051 microcontroller.	BTL-1	Remember
10.	List the on-chip peripherals of 8051 microcontroller.	BTL-1	Remember
11.	List the alternative functions assigned to Port 3 pins of 8051 microcontroller.	BTL-1	Remember
12.	Explain the applications of 8051 microcontroller.	BTL-5	Evaluate
13.	Illustrate what is meant by SFR in 8051.Give an example.	BTL-3	Apply
14.	Compose the flags available in 8051?	BTL-6	Create
15.	List the interrupts of 8051 microcontroller.	BTL-1	Remember
16.	Show the purpose of timing diagram in 8051 microcontroller.	BTL-3	Apply
17.	Distinguish between microprocessor and microcontroller.	BTL-2	Understand
18.	Explain the function of SM2 bit in the SCON register of 8051.	BTL-5	Evaluate
19.	Give the vector address and priority sequence of 8051 interrupts.	BTL-2	Understand
20.	Compose the number of register banks in 8051 and say how the CPU knows which bank is currently in use.	BTL-6	Create
PART - B			
1.	(i) Define the vectored interrupts in 8051 microcontroller. (7) (ii) Define the different addressing modes of 8051 microcontroller. (6)	BTL-1 BTL-1	Remember Remember
2.	Discuss with a neat block diagram the architecture of 8051 microcontroller. (13)	BTL-2	Understand
3.	Define the I/O ports and their functions of 8051 microcontroller. (13)	BTL-1	Remember
4.	(i) Draw and discuss the TMOD register format and explain the different operating modes of timer in 8051 microcontroller. (7) (ii)Discuss how serial communication is performed in 8051 microcontroller. (6)	BTL-2 BTL-2	Understand Understand
5.	(i) Explain how the internal timers are used to generate time delay by using 8051 microcontroller. (7) (ii) Explain program memory interfacing in 8051 microcontroller. (6)	BTL-4 BTL-4	Analyze Analyze
6.	(i) Briefly discuss about interrupts used in 8051 microcontroller. (7) (ii) Discuss about the organization of internal RAM and special function registers of 8051 microcontroller in detail. (6)	BTL-2 BTL-2	Understand Understand

7.	(i) Show the data memory structure of 8051 microcontroller and explain. (7)	BTL-3	Apply
	(ii) Illustrate with block diagram how to access external memory devices in an 8051 based system. (6)	BTL-3	Apply
8.	Explain in detail pin diagram of 8051 microcontroller. (13)	BTL-5	Evaluate
9.	(i) Explain Timing diagram interrupt structure of 8051 in detail. (7)	BTL-4	Analyze
	(ii) Explain the program and data memory structure of 8051 microcontroller. (6)	BTL-4	Analyze
10.	Compose the signal configuration of 8051 and explain the purpose of each signal. (13)	BTL-6	Create
11.	(i) Describe in detail the different methods of memory address decoding in 8051. (7)	BTL-1	Remember
	(ii) Describe the operation of stack in 8051. (6)	BTL-1	Remember
12.	Define the Timers of 8051 microcontroller with relevant diagrams. (13)	BTL-1	Remember
13.	Explain in detail, the hardware and software support provided by 8051 for serial communication. (13)	BTL-4	Analyze
14.	Briefly illustrate the internal port structure of 8051 microcontroller. (13)	BTL-3	Apply
PART - C		
1.	(i) Explain the interrupt structure of 8051 microcontroller. (8)	BTL-4	Analyze
	(ii) Explain the RAM structure of 8051 microcontroller (7)	BTL-4	Analyze
2.	Explain the different modes of operation by serial port in 8051 in detail with its associated registers. (15)	BTL-4	Analyze
3.	With suitable block diagram, explain the architecture of 8051 microcontroller. Also explain the function of each block. (15)	BTL-4	Analyze
4.	(i) Prepare an 8051 assembly language program to multiply the given number 48H and 30H. (8)	BTL-6	Create
	(ii) Compose the types of addressing mode with suitable example in 8051. (7)		

UNIT IV- PERIPHERAL INTERFACING		
Study on need, Architecture, configuration and interfacing, with ICs: 8255, 8259, 8254, 8237, 8251, 8279, - A/D and D/A converters &Interfacing with 8085& 8051.		
PART - A		
Q.No	**Questions**	**BT**	**Competenc**
1.	Compose the control word value for 8255 PPI when PORT A and PORT B are inputs in simple I/O mode.	BTL-6	Create

2.	Discuss the working modes of 8254 timer.	BTL-2	Understand
3.	Explain the features used mode 2 in 8255.	BTL-4	Analyze
4.	Define the internal registers available in 8259 PIC.	BTL-1	Remember
5.	Illustrate the salient features of INTEL 8259 programmable interrupt controller.	BTL-3	Apply
6.	Draw the command word format of 8255 in I/O mode.	BTL-1	Remember
7.	List the output terminals in USART 8251.	BTL-1	Remember
8.	Give the difference between maskable and non-maskable interrupts.	BTL-3	Apply
9.	Illustrate the 'Mode Word' format of 8251 USART.	BTL-3	Apply
10.	Describe the applications of D/A converter interfacing with 8255.	BTL-2	Understand
11.	How is keyboard interfaced with microprocessor?	BTL-2	Understand
12.	Label the use of ISR and PR registers in 8259 PIC	BTL-1	Remember
13.	Assess the different ways to end the interrupt execution in 8259 programmable interrupt controller.	BTL-5	Evaluate
14.	Compose the function of scan section in 8279 programmable keyboard/display controller.	BTL-6	Create
15.	List the operation modes of 8255.	BTL-1	Remember
16.	Explain handshaking and what are the handshake signals?	BTL-4	Analyze
17.	Give the operating modes of 8259A.	BTL-2	Understand
18.	Explain the cascade mode of 8259 programmable interrupt controller.	BTL-4	Analyze
19.	Define USART.	BTL-1	Remember
20.	Explain the working of receiver part of USART.	BTL-5	Evaluate
PART - B			
1.	Describe with the Block diagram of 8255(PPI) and explain its various operating modes. (13)	BTL-1	Remember
2.	Discuss the internal architecture of 8253 programmable interval timer. (13)	BTL-2	Understand
3.	Define With a suitable interfacing circuit, explain D/A converter interfacing (13)	BTL-1	Remember
4.	Explain with a neat diagram, the closed loop control of servomotor using microcontroller. (13)	BTL-4	Analyze
5.	Discuss the various modes of operation of the programmable interval timer 8254. (13)	BTL-2	Understand

6.	i) Illustrate the control word of 8253 timer/counter and explain the operation modes of 8253 timer/counter. (6)	BTL-3	Apply
	ii) Examine why do we need A/D converter and D/A Converter? Draw the block diagram to interface 8085 microprocessor with A/D converter and D/A convertor. (7)	BTL-3	Apply
7.	Compose how 8279 keyboard and Display controller is interfaced to 8085 or 8051. (13)	BTL-6	Create
8.	i) Describe the block diagram and modes of the 8254 timer. (7)	BTL-1	Remember
	ii) Describe the architecture, functions and registers of the 8255 PPI. (6)	BTL-1	Remember
9.	Describe with Block diagram of 8259(PIC) and explain the initialization command words. (13)	BTL-2	Understand
10.	Explain how the serial data transfer can be performed using 8251 USART. (13)	BTL-4	Analyze
11.	Illustrate and draw the interfacing of A/D and D/A converter interfacing to 8085 µp. (13)	BTL-3	Apply
12.	(i) Explain the operation of 8255 PPI Port A programmed as input and output in mode 1 with necessary handshaking signals. (7)	BTL-4	Analyze
	(ii) Explain the parallel communication between two processors using mode 2 of 8255. (6)	BTL-4	Analyze
13.	Describe the architecture of DMA controller 8237. (13)	BTL-1	Remember
14.	Explain the seven segment LED interface with microprocessor.(13)	BTL-5	Evaluate

	PART - C		
1.	Explain the working of 8237 as a DMA controller and its command registers and their function. (15)	BTL-4	Analyze
2.	Draw and explain the functional diagram of parallel communication interfacing chip. (15)	BTL-4	Analyze
3.	Explain the working of 8279 as a keyboard/display controller and explain its command registers and their functions. (15)	BTL-4	Analyze
4.	Compose the ADC and DAC interface with 8085 & 8051. (15)	BTL-6	Create

| **UNIT V- MICRO CONTROLLER PROGRAMMING & APPLICATIONS** |
| Data Transfer, Manipulation, Control Algorithms& I/O instructions – Simple programming exercises- key board and display interface – Closed loop control of servo motor- stepper motor control – Washing Machine Control. |

| | **PART - A** | | |
| Q.No | Questions | BT | Competenc |

1.	Define program status word.	BTL-1	Remember
2.	State and explain the functions performed by JBC and CJNE instructions in 8051 microcontroller	BTL-4	Analyze
3.	What is duty cycle in PWM?	BTL-2	Understand
4.	Discuss about CALL statement in 8051	BTL-2	Understand
5.	Explain what is meant by PSW.	BTL-4	Analyze
6.	List out the difference between MOV and MOVX instructions	BTL-1	Remember
7.	What is baud rate?	BTL-2	Understand
8.	Evaluate the control signals from 8051 microcontroller required for washing machine control?	BTL-5	Evaluate
9.	Discuss how is pulse generated from microcontroller for stepper motor control.	BTL-2	Understand
10.	Show why do we need opto-isolator circuit between microcontroller and the stepper motor?	BTL-3	Apply
11.	Define the operation of the given 8051 microcontroller instructions: XRL A, direct.	BTL-1	Remember
12.	Compose the I/O related instructions in microcontroller 8051.	BTL-6	Create
13.	List the different types of 8051 instructions.	BTL-1	Remember
14.	List the addressing modes supported by 8051.	BTL-1	Remember
15.	Show how can you perform multiplication instructions in microcontroller 8051?	BTL-3	Apply
16.	Illustrate 8051 program to divide two 8-bit numbers.	BTL-3	Apply
17.	Name the addressing mode followed in the following instructions: MOV R1,#02H and MOV R1,2	BTL-1	Remember
18.	Explain the instructions :LJMP and SJMP	BTL-4	Analyze
19.	Assess how 8051 differentiates between the external and internal program memory.	BTL-5	Evaluate
20.	Compose how the DIV AB instruction works in an 8051 microcontroller?	BTL-6	Create
PART - B			
1.	Describe the control system design of washing machine (13)	BTL-1	Remember
2.	Describe with a neat diagram the stepper motor control using microcontroller. (13)	BTL-1	Remember

3.	Explain with a neat diagram the closed loop control of servomotor using microcontroller. (13)	BTL-4	Analyze
4.	Discuss how to interface a 4 x 4 matrix keyboard using 8051 microcontroller and explain how to identify the key press. (13)	BTL-2	Understand
5.	i) Compose the stepper motor control using 8051. (7)	BTL-6	Create
	ii) Compose a program to generate pulse to drive and for continuous operation of a stepper motor. (6)	BTL-6	Create
6.	Explain the various types of instruction set used in 8051 microcontroller. (13)	BTL-4	Analyze
7.	Draw and discuss the circuit diagram to interface an LCD display with 8051 microcontroller and explain how to display a character using LCD display. (13)	BTL-2	Understand
8.	Explain with a neat diagram the application of 8051 microcontroller in washing machine control. (13)	BTL-4	Analyze
9.	Describe with a program to rotate the stepper motor in both clockwise direction using 8051 microcontroller. (13)	BTL-1	Remember
10.	List the different types of instructions set used in 8051 microcontroller. (13)	BTL-1	Remember
11.	Illustrate an assembly language program based on 8051 microcontroller instruction set to perform four arithmetic operations on two 8 bit data. (13)	BTL-3	Apply
12.	Contrast a program to generate pulses to derive and for continuous operation of a stepper motor. (13)	BTL-2	Understand
13.	Explain about various types of jump instructions according to range.(13)	BTL-5	Evaluate
14.	i) Illustrate an 8051 assembly language program to copy 10 bytes of data stored from location 30H to another location starting from 50H. (7)	BTL-3	Apply
	(ii)Show with a neat diagram the stepper motor control using 8051 microcontroller. (6)	BTL-3	Apply
PART - C			
1.	Explain the stepper motor control using 8051 and write an assembly language program for running the stepper motor in clockwise direction. (15)	BTL-4	Analyze
2.	Design the closed loop control of a servo motor using 8051 with a neat diagram. (15)	BTL-6	Create
3.	Explain the washing machine control using 8051 and write a program for the same. (15)	BTL-4	Analyze
4.	Explain the interfacing of four digit 7 segment display to 8051 and its program. (15)	BTL-4	Analyze