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**Question Paper Code : 40493**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fifth Semester

Electrical and Electronics Engineering

EE 8551 — MICROPROCESSORS AND MICROCONTROLLERS

(Common to Electronics and Instrumentation Engineering/  
Instrumentation and Control Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the functions of an accumulator?
2. List the 16-bit registers of 8085 microprocessor.
3. What is an operand?
4. Write an assembly language program to add two 8 bit numbers stored at address 2020 and address 2021 in 8085 microprocessor. The starting address of the program is taken as 2000.
5. Show how the flag register is affected by the following instruction  
MOV A,#0F5H  
ADD A,#0AH
6. List the alternate functions of port 3 in the 8051 microcontroller.
7. Specify the bit of a control word for 8255, which differentiates between the I/O mode and the BSR mode.
8. List the various modes of 8254 Timer.

9. Identify the row and column of the pressed key for each of the following :
- (a)  $D3 - D0 = 1110$  for row,  $D3 - D0 = 1011$  for the column
  - (b)  $D3 - D0 = 1101$  for the row,  $D3 - D0 = 0111$  for the column.
10. Assume that a stepper motor is running in full-step mode with step angle = 1.8 deg. How many steps are required to make 2 full rotations?

PART B — (5 × 13 = 65 marks)

11. (a) With the help of neat diagram explain the architecture of 8085 microprocessor in detail. (13)

Or

- (b) Draw the microprocessor bus timing for the instruction STA 2022 H and explain it. (13)

12. (a) With suitable examples, explain the addressing modes of 8085. (13)

Or

- (b) Explain the function of the following instructions with one example. (13)

- (i) LXI
- (ii) HLT
- (iii) LDAX
- (iv) CMP
- (v) STA
- (vi) SHLD.

13. (a) Discuss in detail about memory organization and the expansion of memory in 8051 with a neat diagram. (13)

Or

- (b) Explain the interrupt structure of 8051 microcontroller and also explain how interrupts are prioritized. (13)

14. (a) Draw and explain block diagram of 8259A programmable interrupt controller in detail. Explain control word definition of the same. (13)

Or

- (b) With neat block diagram, explain the description and function of 8254. (13)

15. (a) Write in detail about the interfacing of LCD with 8051 microcontroller. (13)

Or

- (b) Describe the basic operation of stepper motor and also discuss how to interface a stepper motor with 8085 microprocessor. (13)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Write a program to arrange first 10 numbers from memory address 3000H in an ascending order in 8085. (8)
- (ii) Interface an 8-bit ADC with 8051 and write ALP to get 1000 samples of input data each taken at a time interval of 50 micro seconds and store the result in external data memory from the address 2000H. Crystal frequency = 12 MHz. (7)

Or

- (b) Draw the interfacing diagram and write 8051 program for interfacing 4 × 4 matrix keyboard and display the key number in Port 0. (15)

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**Question Paper Code : X 10400**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020  
Fifth Semester

Electrical and Electronics Engineering

EE 8551 – MICROPROCESSORS AND MICROCONTROLLERS

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(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Calculate the number of memory chips needed to design 8K-byte memory if the memory chip size is  $1024 \times 1$ .
2. Why crystal is a preferred clock source ?
3. Define a subroutine.
4. 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 ?
5. Show the internal data memory organization of 8051 microcontroller.
6. How does the CPU know where to return to after executing the RET instruction ?
7. Show the control word format for 8255 I/O mode.
8. Compare automatic rotation and specific rotation priority modes of 8259.
9. Examine the following code and analyze the result :  
MOV A, #60H  
MOV R1, #46H  
ADD A, R1
10. If CY =1, A = 95H and B = 4FH prior to the execution of "SUBB A, B", what will be the contents of A after the subtraction ?

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PART – B

(5×13=65 Marks)

11. a) i) List the steps to be performed by the Micro Processing Unit (MPU) during the communication process with peripheral devices. Also, explain the functions of address bus, data bus and control bus in the communication process between the MPU and peripheral devices. (9)
- ii) Show how the MPU read an instruction from a memory location. (4)

(OR)

- b) Show the internal architecture of the 8085 microprocessor with neat functional block diagram and explain the functions of each internal unit in decoding and executing an instruction.
12. a) Write an assembly language program to calculate the sum of series of even numbers from the given list of numbers. The length of the list is in memory location 2200H and the series begins from memory location 2201H. Result will store at memory location 2210H.

**Sample Input :**

**Sample Output :**

2200H = 4H

Result 2210H = 46H

2201H = 20H

2202H = 15H

2203H = 13H

2204H = 22H

(OR)

- b) i) Write an assembly language program to swap two 8-bit numbers using direct addressing mode where the first 8-bit number is stored at 3000H and the second 8-bit number is stored at 3001H memory address. (7)

**Example :**

	D	H
Input Data →	31	12
Memory Address →	3001	3000

	D	H
Swapped Data →	12	31
Memory Address →	3001	3000

- ii) Explain the operation of instructions related to rotation of accumulator bits with example. Also state any two applications of rotate instruction. (6)
13. a) Describe the various operating modes of the timers / counters and associated control registers of 8051 microcontroller.

(OR)

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- b) i) Distinguish between microprocessor and microcontroller. (3)
- ii) List the categories under which the instructions in the instruction set of the 8051 microcontroller are grouped. Explain the operation of any two instructions in each group. (10)

14. a) Sketch the block diagram of the 8279 Keyboard Display Interface and explain the functions of Keyboard and Display section.

(OR)

b) Sketch the block diagram of the 8254 Programmable Interval Timer and explain the functions of each internal block. Also, list the operating modes of the 8254 timer.

- 15. a) i) Describe the basic operation of stepper motor and discuss how to interface a stepper motor to the 8051. (9)
- ii) Code a program using 8051 instructions to rotate a stepper motor continuously in clockwise direction. (4)

(OR)

- b) i) Show how to interface Liquid Crystal Display (LCD) to 8051 microcontroller. (4)
- ii) Write a program using 8051 instructions to send commands and data to LCDs with a time delay. (9)

PART – C

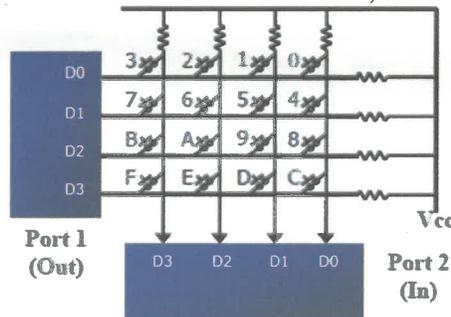
(1×15=15 Marks)

16. a) Show a schematic of interfacing a typical 8 bit A/D converter with the 8085 using status check. Also illustrate how to interface an 8-bit A/D converter (ADC0801) with the 8085 MPU using the interrupt RST 6.5 and show the timing diagram for reading data from A/D Converter.

(OR)

b) From figure below, identify the row and column of the pressed key for each of the following.

- a) D3 – D0 = 1110 for the row, D3 – D0 = 1011 for the column
- b) D3 – D0 = 1101 for the row, D3 – D0 = 0111 for the column



Discuss in detail the major stages involved in the detection and identification of key activation along with a flowchart.



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**Question Paper Code : 90205**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Electrical and Electronics Engineering

EE 8551 – MICROPROCESSORS AND MICROCONTROLLERS

(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. List two major differences between INTR and the other hardware interrupts.
2. Does the 8085 support externally initiated operations. If yes, how ?
3. Illustrate the changes made to the content of registers during the execution of the instruction LXI B, 4000 H.
4. State the advantages of subroutine.
5. Can single bit of a port be accessed in 8051 ? If yes, how ? Give an example.
6. What are the flags supported by 8051 microcontroller ?
7. Differentiate programmed I/O and interrupt driven I/O.
8. Why an interface is needed in between CPU and input-output devices ?
9. Write a program to load the accumulator with the value 82H and complement the accumulator 700 times.
10. List any four applications of 8051 to automation systems.



PART - B

(5×13=65 Marks)

11. a) With a functional block diagram, briefly discuss the architecture of the 8085 microprocessor.

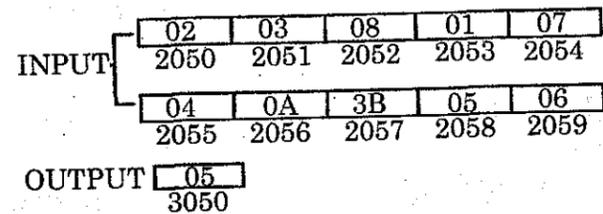
(OR)

b) Draw the timing diagram of the instruction MVI B, 45. Assume the memory address of the opcode and the data is 2000H and 2001 H respectively.

12. a) i) Differentiate RAL and RLC instruction. (3)

ii) Write an assembly language program for 8085 microprocessor to count even numbers in series of 10 numbers. (10)

Example :



(OR)

b) i) Briefly describe stack pointer register. (3)

ii) Briefly discuss the different types of addressing modes supported by the 8085 microprocessor with examples. (10)

13. a) With a functional block diagram, briefly discuss the architecture of the 8051 microcontroller.

(OR)

b) i) Summarize the similarities and differences between 8085 and 8051. (5)

ii) Discuss in detail the internal data memory organization of 8051 microcontroller. (8)

14. a) i) Interface 8255 with 8085 microprocessor and write an assembly language program to display 99 in Port A, 1's complement of 99 in Port B and 2's complement of 99 in Port C Assume the Port addresses are 30H, 32H and 33H for ports A, B and C respectively. (5)

ii) Describe the operating modes and control words of 8255. (8)

(OR)

b) With a functional block diagram, briefly discuss the architecture of the 8259 programmable interrupt controller.

15. a) Show how to interface a stepper motor to 8051 microcontroller. Also, write an assembly language program to demonstrate control of direction and speed of stepper motor rotation.

(OR)

b) Show how to interface a servo motor to 8051 microcontroller. Also, explain the working principle to control a servo motor with angle rotations.

PART - C

(1×15=15 Marks)

16. a) Show how to interface a 8 × 8 matrix keyboard to the 8051 microcontroller and discuss in detail the various stages for detection and identification of key activation by a microcontroller. Also, write an assembly language program to detect and identify the pressed key.

(OR)

b) Show how to interface a Digital to Analog Converter (DAC) with 8085 microprocessor and write an assembly language program to generate a square waveform. Also, discuss in detail the successive approximation technique for the process of conversion of analog signal to digital data.