X10400 Reg. No. :

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
(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. Calculate the number of memory chips needed to design 8K-byte memory if the memory chip size is 1024 × 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 ?

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 :

2200H = 4H
2201H = 20H
2202H = 15H
2203H = 13H
2204H = 22H

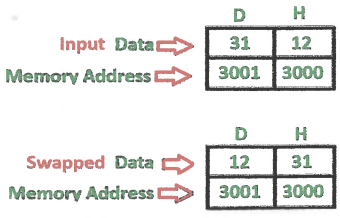
Sample Output :

Result 2210H = 46H

(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 :



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)

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)**

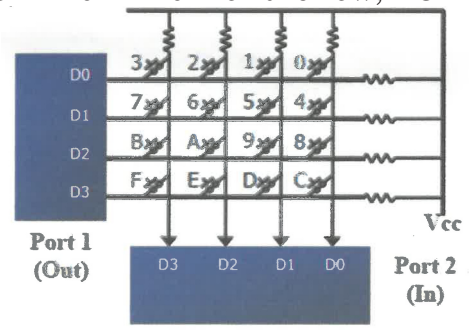
16. a) Show a schematic of interfacing a typical 8 bit A/D converter with the 8085 using status check. Also illustrate how to interface an 8-bit A/D converter (ADC0801) with the 8085 MPU using the interrupt RST 6.5 and show the timing diagram for reading data from A/D Converter.

(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.

———————