53 (IE 501) MCPR

2021

MICROPROCESSOR

Paper : IE 501

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Define the following key terms — 4
Machine Language, Assembly Language, Word, Instruction.

(b) State the functions of a Compiler and an Interpreter for any microprocessor based system. 4

(c) Name the flags available in 8085 microprocessor and explain how these flags are affected. 5

Contd.

(d) Write a program to add the data in memory locations D050H and D051H and display the carry and sum through output ports 02H and 03H respectively. 4

(e) For the program given below, specify the final contents of the registers involved and the flags — 3

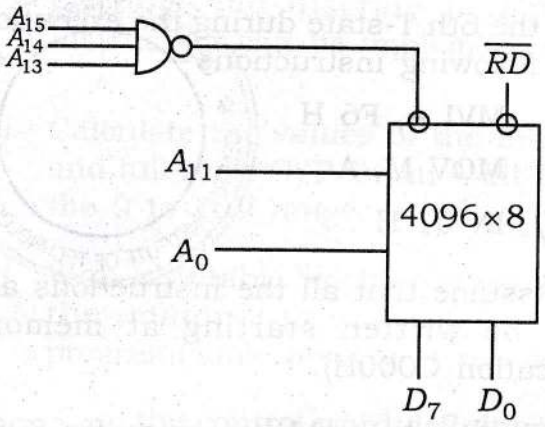
```
MVI A, FF H
MVI B, 00 H
ANI 0F H
DCR B
ADD B
MOV C, A
HLT
```


2. (a) Specify the Byte size and Addressing modes of the following instructions —

MVI B, 05 H, MOV A, M, STAX B, LDA 2050 H. 8

(b) How many memory chips will be required to build a memory system of size 8 KBytes if the size of each memory chip is 2048×4 bits? Also, find out the final address of the memory system if the initial address is C000H. 4

(c) Find out the address range(s) of the memory arrangement given below: 4



(d) With the help of a suitable logic diagram, show how the control signals $\overline{MEMR}$, $\overline{MEMW}$, $\overline{IOR}$ and $\overline{IOW}$ can be generated from the pins $IO/\overline{M}$, $\overline{WR}$ and $\overline{RD}$. 4

3. (a) Specify the number of machine cycles and name of the machine cycles involved in executing the following instructions — 8

(i) MOV A, B,

(ii) M, 20H,

(iii) OUT 03H,

(iv) ADD M

(b) Specify the contents of Address Bus $(A_{15} - A_8)$ and Data Bus $(AD_7 - AD_0)$ in the 6th T-state during the execution of following instructions—

(i) MVI A, F6 H

(ii) MOV M, A

(iii) IN 01 H

(*Assume that all the instructions are to be written starting at memory location C000H). 6

(c) Write an Assembly program for 8085 microprocessor to count the odd numbers stored in memory locations (D000–D009) H and display the total count through port 03 H. 6

4. (a) Explain the meaning of the instruction STA C050H and draw its bus timing diagram. 6

(b) Write *four* differences between Peripheral I/O and memory-mapped I/O techniques. 4

(c) Write an Assembly program to display the values from 00H to FFH continuously with a delay of 450 μs between successive displays. 4

(d) Name the Hardware Interrupt pins available in 8085. Explain with an example and diagram how an RST instruction can be implemented. 6

5. (a) Calculate the values of the LSB, MSB and full scale O/P for an 4-bit DAC for the 0 to 10*V* range. 6

(b) With a suitable block diagram, discuss the major sections of the 8279 programmable display interface. 10

(c) State the control word definition in the 8155 multipurpose programmable device. 4

6. Write short notes on : 20

(a) Binary weighted DAC

(b) The control logic of 8155

(c) Nesting

(d) Time Delay using loop inside loop technique

7. (a) Compare the similarities and differences between PUSH/POP and CALL/RET instructions. 8

(b) Specify the number of times the following loops are executed — 12

(i)
```
    MVI A, 18H
Loop: ORA A
      RAL
      JNC LOOP
```


(ii)
```
    LXI B, 1000H
Loop: DCX B
      NOP
      JNZ LOOP
```

(iii)
```
Loop: MVI C, 99H
      NOP
      DCR C
      JNZ LOOP
```

(iv)
```
    MVI A, 10H
Loop: DCR A
      JNZ LOOP
```

(v)

```
        XRA A
        MVI A, FF
Loop :  INR A
        JNC LOOP
```

(vi)

```
        LXI H, 0005H
        MOV A, L
Loop :  ORA L
        JNZ LOOP
```


8. *(a)* Write a program to exchange the contents of memory locations ranging from D000H – D100H with the contents of memory locations ranging from E000H – E100H. 5

(b) What do you mean by foldback memory ? Explain by taking an example of a memory chip of size 2048 × 8 bits and specify the default address range and the mirror memory or the foldback memory range as per your design. 10

(c) For the program given below, answer the questions that follow — 1+2+2=5

```
        LDA D020 H
        ORA A
        JP NEXT
        CMA
        ADI 01 H
NEXT →  STA D020 H
        HLT
```


(i) Value of NEXT if the program is assembled starting at C007 H.

(ii) If the content of D020 H is FF H initially, what will be its content after execution of program ?

(iii) Specify the function of the program.
