53 (IE 501) MPMC

2017

MICROPROCESSOR AND MICROCONTROLLERS

Paper : IE 501

Full Marks : 100

Time : Three hours

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

Answer Question No. **1** *and* ***any four*** *from the rest.*

1. Answer briefly : 10×2=20

   (a) Define Machine Language and Assembly Language.

   (b) Differentiate between Compiler and Interpreter.

   (c) State the function of ALU and control unit in any Microprocessor based system.

   (d) What is the function of Instruction Decoder in 8085 μp ?

(e) Specify the Byte size of the following instructions —

L×1 *H*, 2050*H*, *ADI* 05*H*, *MOV A, M*, *LDAX D*

(f) Specify the meaning of the instructions —

ADC B and *LHLD D*001 *H*

(g) The starting address of two memory chips *M*1 (512×8) and *M*2 (1024×4) is *E*000*H*, find the final addresses.

(h) How does 8085*μp* differentiate between OP code and Data ?

(i) Can an input port and output port have the same port address ? Justify.

(j) State the content of Address and Data Bus during 1st T-state of 2nd Machine cycle while executing CALL instruction.

2. (a) What is the function of flag register of 8085*μp* ? Give details. 1+2=3

(b) For the program given below, answer the questions that follow — 1+2+1=4

```
    MVI A, FOH
    ADD A
    JNC LABEL
    ADI 01H
LABEL : OUT 03H
    ORA A
    HLT
```

(i) What will be displayed at port 03*H*?

(ii) Status of flags

(iii) Value of *LABEL* if the program is assembled starting at location *CFFE H*

(c) Write an Assembly language program to compare the data present in locations *D000H* and *D001 H* respectively and display the larger data at port *01H*. 3

(d) If the size of a memory chip is (4096×8) bits, find out the number of such chips that will be required to build a 16 *kByte* memory system and design a configuration to achieve the same with the help of a 3×8 decoder. Also, mention the address range of each chip based on your design. 2+6+2=10

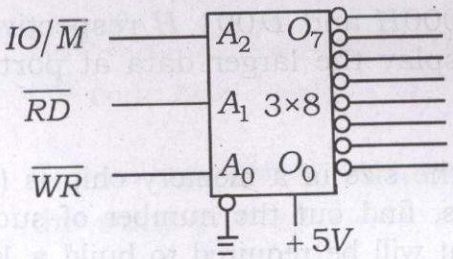
3. (a) Specify the functions of following signals — 4

ALE, IO/$\overline{M}$, CLK (OUT), TRAP

(b) Identify and name the Machine cycles for the following instructions. Also, calculate the time required to execute the instructions if the clock frequency is 2*MHz*.

(i) MOV B, C (ii) STAX D (iii) OUT 05H 3×2=6

(c) In the diagram shown below, identify and name the valid O/P signals. Also, explain why some of the O/P signals are unnecessary. 2+2=4



(d) What do you mean by Absolute and Partial Decoding Techniques for interfacing I/O Devices? 2

(e) Differentiate between Peripheral I/O and Memory mapped I/O Techniques for interfacing I/O Device. 4

4. *(a)* Specify the number of times the following loops are executed — 3×2=6

(i)

```
        MVI A, 20H
LOOP:   DCR A
        JNZ LOOP
```

(ii)

```
        MVI A, 5A H
LOOP :  RLC
        JC LOOP
```

(iii)

```
        MVI A, 05 H
LOOP :  DCR A
        DCR A
        JNZ LOOP
```

(b) Explain the meaning of following instructions with necessary examples — 3×3=9

(i) RAR (ii) CALL D050H (ii) POP PSW

(c) Write a program to display the Hexadecimal numbers from 00*H* through *FFH* repeatedly at port 02*H* with a delay of 100μs (approx.) between successive displays. 5

5. *(a)* What is the significance of various interrupts present in 8085 μp? List these interrupts in terms of their priority order. 1+1=2

(b) Design a circuit to implement the instruction RST 2 with necessary hardware requirements. 5

(c) Explain the functions of SIM and RIM instructions. 3+3=6

(d) List the basic requirements for any programmable device and name the function of each. 7

6. (a) Draw the block diagram of 8155 programmable I/O device and explain each of the blocks. 10

(b) Write an Assembly language program to generate a continuous square wave with a period of 200μs. Assume the system clock frequency is 2MHz and use bit D_0 to output the square wave. 10

7. (a) Explain with suitable diagram —

Interfacing of 8-bit D/A converter with 8085μp. 10

Or

Interfacing of 8-bit A/D converter with 8085 μp

(b) Draw the block diagram of 8254 Programmable Interval Times and explain *any three* modes of operation. 10
