53 (IE 501) MPMC

2013

(December)

MICROPROCESSORS AND MICROCONTROLLERS

Paper : IE 501

Full Marks : 100

Pass Marks : 30

Time : Three hours

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

*Answer **any five** questions.*

1. *(a)* Explain the significance of carry flag and auxillary carry flag in 8085 microprocessor. 2

(b) Define stack and subroutine in 8085 microprocessor. 2

(c) What do you mean by vectored and non vectored interrupts ? Name the vectored and non vectored interrupts in 8085. 3

(d) What is the function of Program Counter and Stack Pointer in 8085 ? 2

(e) What do you mean by tri-state devices ? Mention any use. 2

(f) Calculate the address lines required for an 8*K-byte* memory chip. 1

(g) Distinguish between a high level language and a low level language. 2

(h) Why 8085 is called an 8-bit microprocessor ? 1

(i) Explain the addressing modes of 8085. Give examples of each. 5

2. (a) Draw the timing diagram for the following instructions 6×2=12

(I) IN

(II) STA

(b) Give the meaning of following 8085 instructions 1×8=8

(I) LXI

(II) STAX

(III) RAL

(IV) PUSH

(V) CALL

(VI) JC

(VII) CMP

(VIII) XRI

3. (a) Calculate the delay in the following loop, assuming the system clock frequency is 2*MHz* 5

Label	Mnemonics		T-States
	MVI B,	16H	7
DELAY :		NOP	4
		NOP	4
	DCR	B	4
	JNZ	DELAY	10/7

(b) Design an interfacing circuit to interface 8085 with the following chips 10

(I) 4K ROM

(II) 2K RAM

(III) 8255

Determine the address range for the memory chip and port addresses for the 8255 chip.

(c) Write a program to find the largest of two 8 bit hexadecimal number in assembly language. Specify memory locations, opcode and operand in the program. 5

4. (a) Draw the block diagram of 8253 programmable interval timer. 10

Write a program to initialize 8253 as a counter, in which the counter is operated by counter 2 in mode 0.

Describe *any two* modes of operation of 8253 timer.

(b) Write an assembly language program to multiply two numbers stored in memory location C050 and C051. Display the result in location C055. 6

(c) Explain the function of the following routine 4

```
LXI SP, STACK
PUSH B
PUSH D
PUSH H
POP B
POP D
POP H
RET
```

5. (a) What is 8237 DMA Controller ? With the help of a block diagram, explain the interfacing of 8237 DMA Controller with 8085 microprocessor. 10

Describe in brief the DMA channels and signals.

(b) Write a program to read the DIP switches in Figure 1 and display the reading at port A. 5

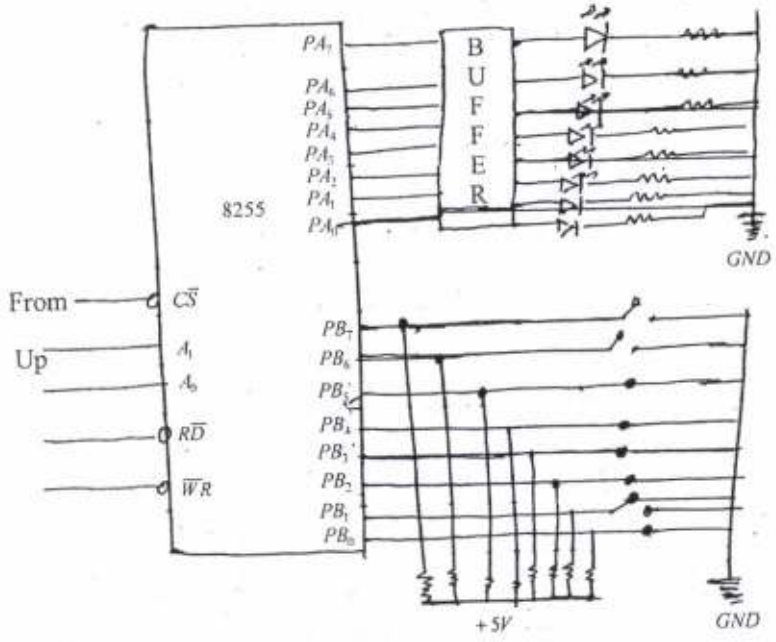

Figure 1

(c) Elaborate the 8085 interrupt process in steps. 5

6. (a) Design a circuit to interface an RS 232 terminal using 8251 programmable communication interface. 10

Determine the data in the following which is appropriate for the above application

(I) Control Register

(II) Status Register

(III) Mode Word.

(b) Draw the block diagram for 8255 programmable peripheral interface configuration in Input or Output handshake mode. Describe the control signals associated in either case. 8

(c) In *Figure 2*, recognize the type of I/O interfacing. 2

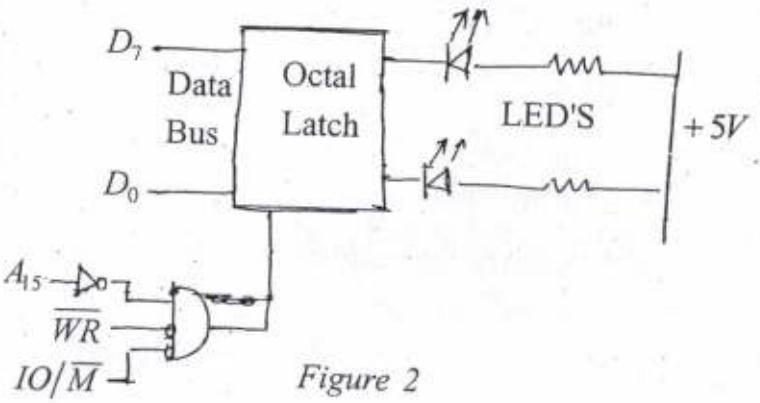

Figure 2

What is the difference between memory-mapped I/O interfacing and peripheral mapped I/O interfacing ?

7. *(a)* Describe briefly with block diagram *any one* of the following 10

(I) Interfacing a keyboard and displaying the value of each key in seven segment LED using 8255.

(II) Interfacing ADC 0801 with 8255.

(b) For the following assembly language program 7

Instruction	Bytes	T States
START : LDA FFF9H	3	13 (4, 3, 3, 3)
STA FFF8H	3	13(4, 3, 3, 3)
MOV B, A	1	4
JMP START	3	10 (4, 3, 3)

(I) Identify the machine cycle for each instruction.

(II) Specify the number of $\overline{RD}$ and $\overline{WR}$ signals in one loop.

(c) Write the word format for SIM instruction. 3

Among all the 8085 interrupts, which interrupt is having the highest priority ?
