53 (IE 501) MPMC

2014

MICROPROCESSOR AND MICROCONTROLLERS

Paper : IE 501

Full Marks : 100

Time : Three hours

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

Answer any five (5) questions.

1. *(a)* Define Bit, Byte, Word and instruction. 4

   (b) Name the *five* flags present in 8085 and with a suitable example state how they are affected by instructions. 5

   (c) Classify the 8085 instruction set in terms of its functional categories with an example of each. 5

   *(d)* What is the size of Program Counter and what is its function ? 2

(e) How does 8085 differentiate between data and opcode ? 2

(f) Specify the number of bytes in the following instructions : 2

    (i) STACO5OH

    (ii) ADDB.

2. (a) Draw the bus architecture of 8085 and explain each of the main components. 5

(b) Construct a 4-*bit* register using latches and explain how it works. 5

(c) Specify the *four* control signals commonly used by 8085. 4

(d) How many address lines are required to specify 4*K bytes* of memory ? If the last location of this memory is FFFFH ; find its starting address. 4

(e) State the *two* types of R/W Memory and differentiate between the two. 2

3. (a) Explain how 8085 demultiplexes the bus AD_0-AD_7 with diagram. 5

(b) Using a logic diagram, show how 8085 generates the control signals. 5

(c) Draw the bus timing diagram of the instruction STA 3050H. Also find the execution time needed for the instruction if the clock frequency is $2MHz$. **10**

4. (a) Draw an interfacing circuit using a $3 : 8$ decoder to interface an EPROM (4096×8) memory chip and decode the address OFFFH. **10**

(b) In an opcode fetch cycle, what are the control and status signals asserted by 8085 ? **2**

(c) What is a tri-state buffer ? Explain its importance related to 8085. **4**

(d) State the peripheral or externally initiated operations and each of its functions. **4**

5. (a) Calculate the count to obtain $50\mu sec$ loop delay and express the count value in Hex. [Assume clock period as $0.5\mu sec$] **5**

		T-States
	MVI B, COUNT	
LOOP :	NOP	4
	DCR B	4
	JNZ LOOP	10/7

(b) Explain the functional diagram of 8155 and explain its control word. 10

(c) List the interrupts of 8085 in details. 5

6. *(a)* Make a comparison between Memory mapped I/O and I/O-mapped I/O. 5

(b) Describe the execution of PUSH and POP operation. 5

(c) Write a program using ADI instruction to add the numbers 5AH and 52H and display the answer at output port 02H. 5

(d) Identify the port address of the output LED in the following figure. 5
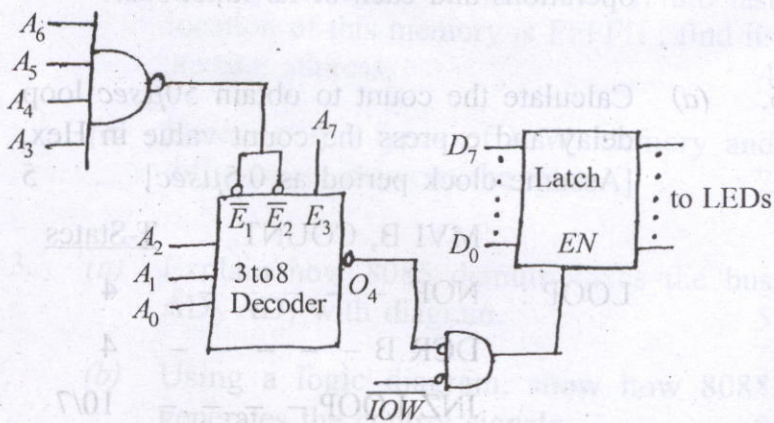
7. *(a)* Explain why the no of ports in I/O-mapped I/O is limited to 256. 2

(b) What operation can be performed by using the instruction SUBA ? Specify the status of Z and *CY* flags. 3

(c) Write a program to — 5

* Clear the accumulator
* Add 75H using ADI instruction
* Subtract 25H
* Add 21H
* Display the answer after subtracting 25H and after adding 21H.

(d) Design an interfacing circuit to connect the following — 10

* 8-DIP Switch as input device at port address 77H
* 8-LED array as output device at port address 70H.

8. *(a)* List the operating modes of 8155 programmable device. 5

(b) Write a program to generate a square wave with period of $200 \mu sec$ [system clock period is $0 \cdot 5 \mu sec$]. 7

(c) Identify the memory locations that are cleared by the following instructions : 4

MVI B, OOH

LXI H, XXFEH

MOV M, B

INXH

MOV M, B

HLT.

(d) Explain how many times the following loop will be executed : 2

LXI B, 0009H

LOOP : DCX B

MOV A, B

JNZ LOOP

HLT.

(e) Specify the contents of Registers and flags after the following instructions are executed :

Reg *C*	Reg *D*	Flag *Z*	Flag *CY*
XX	*XX*	*XX*	*XX*

MVI A, 52H

MVIB, 27H

MOV C, A

MOV D, B

HLT.   2