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53 (IE 501) MPMC

2015

**MICROPROCESSOR &
MICROCONTROLLERS**

Paper : IE 501

Full Marks : 100

Time : Three hours

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

Answer **any five** questions.

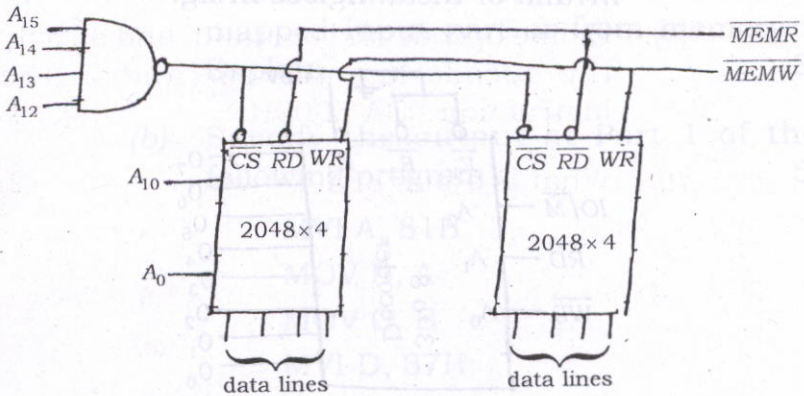
1. (a) Explain the difference between a microprocessor and a microcomputer. 4
- (b) Define bit, byte, word and instruction. 4
- (c) Explain the difference between the machine language and assembly language of 8085 microprocessor. 4

Contd.

- (d) What is an ASCII code ? 2
- (e) Define opcode and operand, and specify the opcode and the operand in the instruction LDA 5000H. 4
- (f) What is a bus ? 2
2. (a) Assemble the following program, starting with memory address D000H. 4
- ```
MVI A, 55H
MVI B, 44H
SUB B
ANI 05H
STA D050H
HLT
```
- (b) Write the logical steps to add two 8-bit Hex numbers. Both the numbers should be saved for future use and save the sum in accumulator. 5
- (c) Why is the data bus bidirectional ? 2
- (d) What is the function of the  $\overline{WR}$  signal on memory chip ? 2

(e)

7



List the high-order, low-order and don't care address lines. How many pages of memory does the chip include ?

3. (a) Specify the four control signals commonly used by the 8085 MPU. 4
- (b) What are tri-state devices and why are they essential in a bus oriented system ? 3
- (c) Why are the program counter and stack pointer 16-bit registers ? 3
- (d) Explain the functions of the ALE and  $IO/\overline{M}$  signals of 8085 MPU. 3

- (e) Explain why four output signals are invalid or meaningless in fig. 7

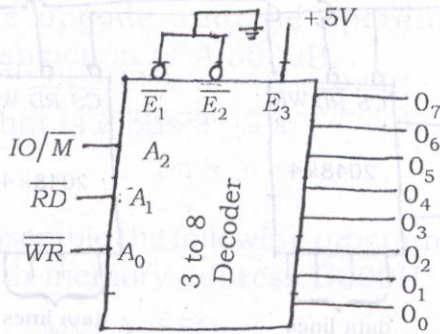


fig.

4. (a) Identify the machine cycles in the following instructions 6  
 SUB B : 1 byte ; 4 T-states  
 ADI 47H : 2 byte ; 7 T-states  
 STA 3000H : 3 byte ; 13 T-states
- (b) Draw and explain the timing diagram of IN-instruction. 10
- (c) Make a comparison between Memory-Mapped I/O and Peripheral I/O interfacing schemes. 4

5. (a) Can the microprocessor differentiate whether it is reading from a memory-mapped input part or from memory ? Explain. 3
- (b) Specify the output at Port 1 of the following program : 5
- ```
MVI A, 81H
MOV B, A
MOV C, B
MVI D, 37H
OUT PORT 1
HLT.
```
- (c) What operation can be performed by using the instruction SUB A ? Specify the status of Z and *cr*-flags. 3
- (d) Write instructions to
- * load 00H in the accumulator
 - * decrement the accumulator
 - * display the answer.
- Also write the answer you would get at the output port. 5

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

4

MVI B, 00H

LXI H, XX75H

MOV M, B

INX H

MOV M, B

HLT.

6. (a) Explain how many times the following loop will be executed

5

LXIB, 0007H

LOOP : DCX B

MOV A, B

ORA C

JNZ LOOP.

(b) The following block of data is stored in the memory locations D055H to D05AH.

[01, 02, 03, 04, 05, 06]

Now transfer the data to location D080H to D085H in the reverse order.

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- (c) Write a program to turn a light ON and OFF every 5-seconds. Use data bit D_5 to operate the light. 7
7. (a) Explain how data bytes are stored and revived in stack by the instructions PUSH and POP. 5
- (b) List the different 8085 interrupts and their vector locations. 5
- (c) Draw the block diagram of 8155 programmable device and list the internal components. 10
8. (a) Draw the functional block diagram of 8085 MPU. 8
- (b) How does a microprocessor differentiate between a data and instruction? 2
- (c) What are the different flags found in 8085 MPU? 5
- (d) Explain the need to demultiplex the bus $AD_0 - AD_7$. 3
- (e) Why 8085 is called a 8-bit microprocessor? 2
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