Total No. of printed pages = 8

CAI-505/M&A/5th Sem/2018/M

MICROPROCESSORS AND APPLICATIONS

Full Marks – 70

Time – Three hours

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

The Question Paper consists of two parts : PART-A and PART-B. Both are compulsory.

PART – A

(Marks – 25)

All questions are compulsory.

1. Answer the following questions within one sentence : 1×10=10

   (i) What is a machine language ?

   (ii) Define the term "Word".

   (iii) What is the function of Stack pointer in 8085 microprocessor ?

   (iv) How many address lines are required to address 2KB memory ?

[Turn over

(v) What is the need of the $\overline{WR}$ signal on memory chip ?

(vi) Why 8085 is called 8-bit processor ?

(vii) Specify the numbers of registers and memory cells in a 128×4 memory chip.

(viii) State the function of IO/$\overline{M}$ signal of 8085 microprocessor.

(ix) Why the bus AD_7–AD_0 has to be demultiplexed ?

(x) What is the maximum number of input-output devices that can be connected in 8085 using Memory mapped I/O technique ?

2. Fill in the blanks : $1 \times 5 = 5$

(i) The OUT is a ____ byte instruction.

(ii) A tristate buffer is commonly used to interface _____ devices.

(iii) A group of 4 bits is called _____.

(iv) The number of flags in ALU are _____.

(v) The largest positive integer that can be processed by 8085 at one time is _____.

3. Choose the correct answer : 1×5=5

(i) The microprocessor interprets the first byte it fetches as an

(a) Opcode (b) Operand

(c) Port address (d) Register

ii) Example of data transfer (copy) instruction is

(a) ADD R (b) STA 16 - bit

(c) ANA R (d) CALL 16 - bit

iii) The size of the instruction "RLC" is

(a) 1-byte (b) 2-byte

(c) 3-byte (d) 4-byte

iv) Which of the following is used for temporary storage of binary information ?

(a) Hard Disk (b) RAM

(c) ROM (d) Stack

(v) The instruction SUB A will clear the

(a) Program counter

(b) Stack pointer

(c) Accumulator

(d) None of the above.

4. Match the following in column A with the correct answer from column B : $1 \times 5 = 5$

Column A	Column B
Read/Write Memory	Keyboard
Output device	Windows 10
Address bus	7 segment LEDs
Operating system	Unidirectional
Input device	RAM

PART – B

Marks – 45

Answer any *five* (5) questions.

5. (a) Draw a block diagram of a computer with the microprocessor as CPU. 3

(b) Define opcode and operand, and specify the opcode and operand of the following instructions- 4

(i) MOV A, B (ii) STA 3000H

(c) How does a microprocessor differentiate between an Opcode and data ? 2

6. Draw a neat and clean functional block diagram of 8085 microprocessor. List the various internal units that make up 8085 architecture, and explain their functions in decoding and executing an instruction. 9

7. (a) What will be the output of the following program ? Also assemble the program starting with memory address C000H :

```
SUB A
MOV B, A
DCR B
INR B
SUI 01H
HLT
```

5

(b) If the 8085 adds 87H and 79H, specify the contents of the accumulator and the status of theS, Z, and CY flags. 4

8. (a) Write an assembly language program to exchange the content of reg B with content of reg C. Load EAH in register B and CDH in register C. Also draw the flow chart. 5

(b) Identify the machine cycles in the following instructions :

(i) ADD B (ii) XRI 8-bit data

(iii) STA 16-bit (iv) CMA 4

9. (a) In Fig.1 design the chip select logic Hardware with NAND gates so that the memory address range will be as indicated. 5

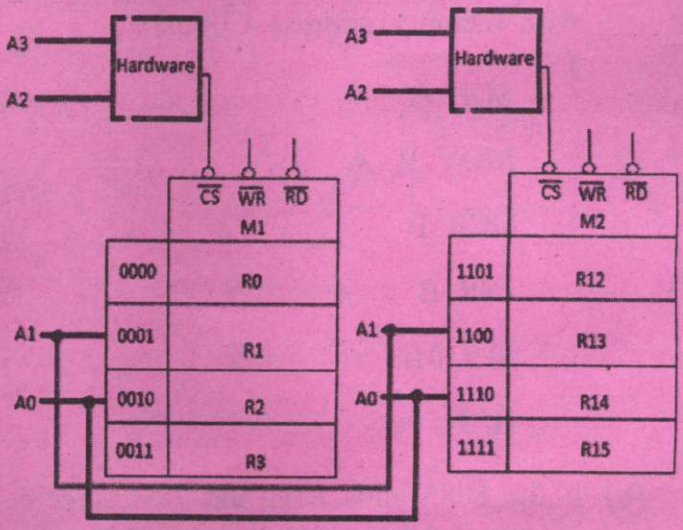

Fig. 1

(b) Assemble the following program starting with memory address C050H and specify the total number of bytes consumed : 4

```
MVI A, FFH
MVI B, 01H
SUB B
XRA A
STA 3050H
RST1
```

10. (a) Design a memory interfacing circuit with the following components : 5

- 3 to 8 decoder (with enable inputs $\overline{E_1}$, $\overline{E_2}$ and E_3)
- 2Kbyte EPROM
- The address range should begin with 3000H.

(b)

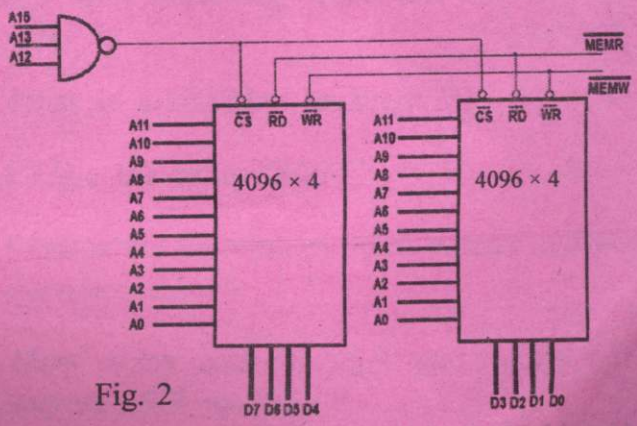

Fig. 2

Identify the don't care address line and specify the entire memory map of the schematic shown in fig. 2. 4

11. (a) Make a comparison between Memory mapped I/O and I/O mapped I/O interfacing schemes. 5

(b) List the different 8085 interrupts and their vector locations. 4

12. (a) Differentiate the following : 4

- High level language and low level language.
- Instruction cycle, Machine cycle and T-states.

(b) Draw the timing diagram of MVI instruction. 5