Total No. of printed pages = 8

**CAI-505/M&A/5th Sem/2017/N**

# MICROPROCESSORS AND APPLICATIONS

Full Marks – 70

Pass Marks – 28

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 each : 1·0

   (i) How many pins 8085 microprocessor has ?

   (ii) Name the two 16-bit registers in 8085 microprocessor.

   (iii) What is the function of ALE signal in 8085 microprocessor ?

[Turn over

(iv) Which interrupt has the highest priority ?

(v) Which stack is used in 8085 microprocessor ?

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

(vii) What is meant by maskable interrupts ?

(viii) State the function of Program Counter.

(ix) Write the status of S0 and S1 pins for memory write operation.

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

2. Fill in the blanks : 5

(i) A 16-bit address bus can generate _____ addresses.

(ii) The external device is connected to a pin called the _____ pin on the processor chip.

(iii) The first machine cycle of an instruction is always _____.

(iv) The microprocessor 8085 has _____ basic instructions and _____ opcodes.



3. Choose the correct answer : 5

(i) The number of status flags in 8085 are

(a) 5 (b) 6

(c) 8 (d) 9

(ii) Microprocessor speed depends on

(a) Clock

(b) Data bus width

(c) Address bus width

(d) Size of register

(iii) The width of address bus and data bus in 8085 are respectively

(a) 16, 8 (b) 8, 16

(c) 8, 8 (d) 16, 16

(iv) Which of the following is a two-byte instruction ?

(a) MVI B, 05 (b) LDA 2500H

(c) IN 01 (d) both (a) and (c)

(v) The difference between memory and storage is that the memory is _____ and storage is _____.

(a) Temporary, permanent

(b) Permanent, temporary

(c) Slow, fast

(d) None of the above.

4. Match the following statements in column A with the correct answer from column B. 5

| Column A | Column B |
|---|---|
| A nibble can be represented in the form of | Data bus |
| Direct memory access | Address bus |
| CPU can read and write data by using | Von Neumann |
| The external system bus architecture | DMA |
| Unidirectional bus | Hexadecimal |



PART – B

Marks – 45

Answer any *five* questions.

5. (a) What is the function of accumulator ? 2

(b) Specify the opcode, operand and meaning of the following instructions : 3

(i) ADI FFH (ii) LDAX B

(c) Assemble the following program starting with memory address D050H and specify the total number of bytes consumed : 4

MVI A, FFH

MVI B, 01H

SUB B

XRA A

STA 3050H

RST1

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

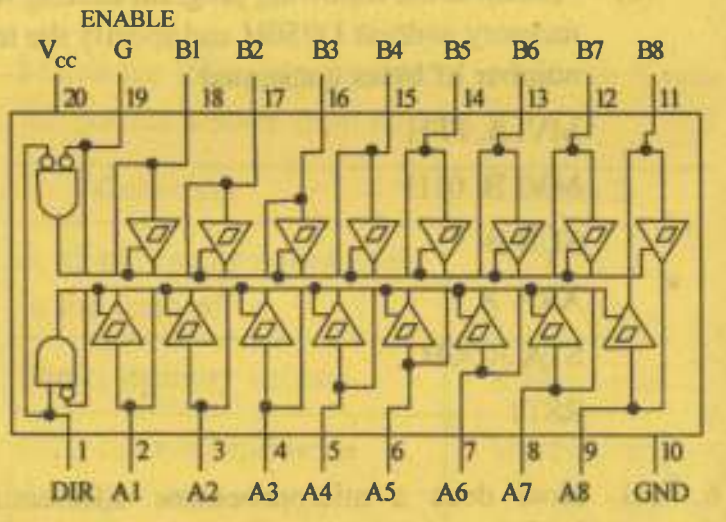
(b) Explain the importance of tristate buffer in a bus oriented system. 2

(c) If the size of a memory chip is 1024 × 4 bits, how many such chips will be required to make up 16 Kbytes of memory ? 2

(d) Specify the status of Carry and Zero flags when following instructions are executed. Assume that the content of the Accumulator is FFH. 3

(i) SUB A (ii) MVI A, 00H (iii) INR A

7. (a) Draw the bus timing diagram of the instruction LDA D050H. Also, find the time required by the microprocessor to execute this instruction, if the clock frequency is 5 MHz. 5




Functional Table

| ENABLE (Pin 19) | DIR (Pin 1) |
|---|---|
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |
| 1 | 1 |

Fig.1



(b) What will be the data flow direction in the bidirectional buffer (Fig.1) if the above inputs are given ? 4

8. (a) What do you mean by fold back or mirror memory ? Illustrate with an example. 4

(b) Draw an interfacing circuit for a 4 Kbyte EPROM using a 3 to 8 decoder such that the memory address range will be F000H-FFFFH. 5

9. (a) Make a comparison between Memory-Mapped I/O and Peripheral I/O technique. 6

(b) Write an ALP to load hexadecimal number 65H in register C, and 90H in the accumulator. Display the summation of these two numbers at PORT 0 and store it in memory location for future reference. 3

10. (a) Explain how many times the following two loops will be executed : 4

| (i) | (ii) |
|---|---|
| LXI B, 0007H | LXI B, 0007H |
| LOOP: DCX B | LOOP: DCX B |
| JNZ LOOP | MOV A,B |
| | ORA C |
| | JNZ LOOP |

(b) Write an ALP to move a block of 10 data from one memory location to another. 5

11. Calculate the COUNT to obtain a 100μ Sec loop delay and express the value in Hex. 9

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

12. 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