Total No. of printed pages = 10

END SEMESTER EXAMINATION – 2019

Semester : 5th

Subject Code : CAI-505

MICROPROCESSORS AND APPLICATIONS

Full Marks –70

Time – Three hours

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

Instructions :

1. *All* questions of PART – A are compulsory.

2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. State whether the following statements are true
   or false :   10

   (i) The stack is a data storage area in RAM used
       by certain microprocessor operations.

   (ii) A microprocessor with the necessary support
        circuits will include at least two memory ICs :
        ROM or EPROM, and a RAM.

(iii) I/O mapped systems identify their input and output devices by giving them an 8-bit port number.

(iv) The software used to drive a microprocessor-based system is called FORTRAN.

(v) 8085 has 6 flags in flag register.

(vi) The numbers of registers in a 512×8 memory chip is 1024.

(vii) Nibble is a group of 4 bits.

(viii) The address lines required to address 1 KB memory is 11 numbers.

(ix) For memory read m/c cycle the S_1 and S_0 signal becomes 1 and 0 respectively.

(x) Zero flag is set if ALU operation results in zero.

2. Fill in the blanks : 10

(i) The IN 01H is a ___ byte instruction.

(ii) The number of instructions available in 8085 is ___.

(iii) The instruction ADD A will make the contents of accumulator ___.

(iv) The number of 16 bit general purpose registers in 8085 are ___.

(v) The maximum numbers of input devices that can be interfaced with 8085 with I/O mapped I/O scheme is ___.

(vi) The largest positive integer that can be processed by 8085 is ___.

(vii) ___ program interprets the hex/ASCII input from the keyboard and converts into its equivalent binary.

(viii) Initial clock frequency of 8085 microprocessor is ___.

(ix) A ___ is a group of instructions written separately from the main program to perform a task that occurs repeatedly in the main program.

(x) A copying machine is a typical example of ___.

3. Choose the correct answer : 5

(i) What is meant by ALU ?

    (a) Arithmetic logic upgrade

    (b) Arithmetic logic unsigned

    (c) Arithmetic local unsigned

    (d) Arithmetic logic unit

(ii) 8085 microprocessor has how many pins ?

    (a) 20   (b) 28

    (c) 36   (d) 40

(iii) HLT opcode means

    (a) load data to accumulator

    (b) end of program

    (c) store result in memory

    (d) load accumulator with contents of memory

(iv) Which of the following statements for Intel 8085 is correct ?

    (a) Program Counter (PC) specifies the address of the instruction last executed.

    (b) PC specifies the address of the instruction being executed.

    (c) PC specifies the address of the instruction to be executed.

    (d) PC specifies the number of instructions executed so far.

(v) In an Intel 8085A, which is the first machine cycle of an instruction ?

    (a) An op-code fetch cycle

    (b) A memory read cycle

    (c) A memory write cycle

    (d) An I/O read cycle.

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PART—B

Marks — 45

4. (a) Design a 4-bit register (4 input lines and 4 output lines) to store 4 bits using flip flops. 4

   (b) Write an ALP to add two bytes already stored in memory locations E051H and E052H. Location E051H holds A9H and location E052H holds the byte 20H. Store the answer in memory location F000H. 4

   (c) The starting memory address of a 2K byte memory chip is given as F000H. Specify the last memory address of the chip. 1

5. (a) Explain the function of SP and PC of 8085. 2

   (b) If the 8085 has fetched the m/c code located at the memory location 2000H, specify the contents of program counter. 2

   (c) Identify the word sizes in the following instructions : 3

   * CMA

   * MVI 55H

   * JMP E123H

   (d) Name the machine control instructions of 8085. 2

6. (a) 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 ? 1

   (b) Specify the status of Carry and Zero flags when following instructions are executed. Assume that the content of the Accumulator is FFH. 8

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

   (iii) XRA A   (iv) INR A

7. (a) Why is 8085 called an 8-bit microprocessor ? 1

   (b) How does a microprocessor differentiate between an opcode and data ? 2

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

   (i) ADI FFH

   (ii) LDA B123H

(d) Assemble the following program starting with memory address 20F6H and specify the total number of bytes consumed: 3

MVI A, FFH
MVI B, 01H
SUB B
XRA A
STA 3050H
HLT

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: 4

(i) ADD B

(ii) XRI 8-bit data

(iii) STA 16-bit

(iv) CMA

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

(i)

LXI B, 0007H
LOOP : DCX B
JNZ LOOP

(ii)

LXI B, 0007H
LOOP : DCX B
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

10. (a) Make a comparison between memory mapped I/O and I/O mapped I/O interfacing schemes. 4

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

11. Calculate the COUNT to obtain a 120µ Sec loop delay and express the value in Hex. 9

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