Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala
Department of Computer Science and Engineering
MID SEMESTER EXAMINATION

B. E. (Third Year): Semester-VI (2021/22)	Course Code: UCS617
(COE)	Course Name: Microprocessor Based Systems Design
Date: April 1, 2022	Time: 11:00 AM – 1:00 PM
Duration: 2 Hours, M. Marks: 35	Name of Faculty: ANJ, MJU, HRS, SHI

Note: Attempt any five out of seven questions *in a proper sequence with justification*.
Assume missing data, if any, suitably.

Q1	Draw and explain the timing diagram of DCR M using the following values of registers in hexadecimal. PC: 8000, H: 85, L: 00, opcode of DCR M: 35.	(4+3)
Q2(a)	Write a program and show the contents of accumulator for RIM instruction that will mask RST 7.5 and RST 5.5, Pending Interrupt is RST 6.5 and SID is set.	(4)
Q2(b)	3000 : MVI D, 30H 3002 : MVI E, 01H 3004 : LDAX D 3005 : CPI 40H 3007 : HLT When above instructions (program) is executed what will be content of A and status of flag CY and Z.	(3)
Q3	Write a program in 8085 to store the 10 numbers in the first memory block of data and perform the 2's complement of even numbers present in the first block. After that, store the numbers with 2's complement in the second memory block.	(7)

Q4	Compare the following pairs of instructions in 8085 with their operations, instruction size, machine cycle, addressing modes and affected flags :
	   i. JMP 8500H and PCHL
	   ii. LHLD 8000H and LDA 8000H with example
	   iii. SUB B and CMP B
		(2+3+2)

Q5	Write a program for displaying binary up counter. It should count numbers from 00H to FFH and increments every 0.5s. Assume that the operating frequency of the 8085 is equal to 2MHz and the display routine is available.
	   i. Firstly, find the value of count using frequency of 2 MHz.
	   ii. Write the program for displaying binary up counter using time delay subroutine and assuming display subroutine.
		(7)

Q6	The four segment registers contain the upper 16 bits of the starting addresses of the four memory segments of 64 KB each. Let the starting address of each segment in registers DS= 2000, CS=3000, SS=5000 and ES=7000. Find the values of each segment registers. Further each associated offset registers is BX = 1000H, SI = 2000H, DI = 3000H, and BP = 4000H. Find the Physical address/addresses from where the 8086 accesses the data while executing the following instructions.
	   i. MOV AX, [BX]
	   ii. MOV CX, [BP]
	   iii. MOV BX, [BP + DI + 34]
	   iv. MOV AH, [BX + 13H]
	   v. MOV CX, DS: [BP + 7]
	   vi. MOV BX, [SI - 5]
	   vii. LEA CX, [BP+SI]
		(7)

Q7(a)	Write a program to find the seven-segment code of a digit between 0 to 9 or a character between A and F. Assume that the seven segment code of the characters is stored in the memory starting at the address 2000H: 1000H. The result must be stored at the offset address 2000H in the same segment.	(4)

Q7(b)	Consider the following pair of partial program:
	   MOV AX, 4000H
	   ADD AX, AX
	   ADC AX, AX
	What is the data in AX after execution of the third instruction and the value of CY flag?
		For the following program:
		   MOV AL, '9'
		   ADD AL, '5'
		   AAA
		What are the contents after each step execution?
			(3)