B. E. (C.S.E.) 2ND YEAR 2ND SEMESTER EXAMINATION 2025

MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Time: Three Hours | Full Marks: 100

Different parts of the same question must be answered ***together***

Answer any one from questions 1 and 2:

1.	CO1	(a)	Explain the purpose of the address, data and control buses. Which are unidirectional and bidirectional?	9+3
	CO3	(b)	How many machine cycle and T states are required to execute INR M? Write the names of these machine cycles. Write the steps and draw the timing diagram of data flow to execute the instruction. Assume that the instruction is stored from 2050_H.	2+2+(2+7)
2.	CO1	(a)	Describe the functions of BIU and EU of the 8086 μP using their schematic diagrams. If the CS register contains 2500_H and IP register contains $B050_H$, what is the physical address of the instruction to be fetched?	10+2
	CO3	(b)	How many machine cycle and T states are required to execute LDA 2550_H? Write the names of these machine cycles. Write the steps and draw the timing diagram of data flow to execute the instruction. Assume that the instruction is stored from 2050_H.	2+2+(2+7)

Answer any two from the following questions 3 – 5:

3.	CO2	(a)	There are N data bytes stored from m/m location 2500_H. The value of N is stored in 2400_H. Write a properly documented 8085 program to find the sum of bytes for which lower and upper nibbles are palindromes, i.e. D_7=D_0, D_6=D_1 and so on. Store the result in 2600_H and 2601_H.	12
		(b)	There are N bytes stored from m/m location 2500_H. The value of N is stored in 2400_H. Write a properly documented 8085 program to find the sum of even bytes if its D_4D_3 = 10 and number of 1's is odd. Store the result in locations 2300_H and 2301_H.	13
4.	CO2	(a)	Load the two binary patterns stored in m/m locations 2500_H and 2600_H. Write a properly documented 8085 program to find the bit positions which are different.	12
		(b)	There are N data bytes stored from m/m location 2200_H. The value of N is stored in 2100_H. Write a properly documented 8085 program to interchange the bits "D_5 D_4" with "D_1D_0" of each byte, irrespective of their values.	13
5.	CO2	(a)	Fibonacci sequence is defined as $f(i) = f(i\text{-}1) + f(i\text{-}2)$, for all $i > 2$ with $f(1) = f(2) = 1$.	12

			Write a properly documented 8085 program to generate the first 10 elements of the sequence and store them in m/m locations starting from 2500_H.	
		(b)	Write a properly documented 8085 program to move the contents of N consecutive locations beginning at S to N consecutive locations beginning at D. The parameter N is available at 2100_H. However, the parameters S and D are available as the contents of the two m/m location pairs (2102_H, 2103_H) and (2104_H, 2105_H), respectively. Assume that the source and the destination blocks overlap.	13

Answer question 6:

6.	CO4	A 8085 based microcomputer is to be designed with the following specifications: (i) 8 kbytes of ROM starting from location 0000_H (ii) 16 kbytes of RAM starting from location 2000_H Draw a neat schematic diagram for the system showing all system buses and also the address decoding technique. Assume/generate appropriate signals and pins.	15

Answer any one from questions 7 and 8:

7.	CO5	(a)	Write the sequence of steps for DMA operation.	3
	CO6	(b)	Describe the different operating modes of the 8255 PPI.	7
8.	CO5	(a)	What does microprocessor do after receiving an interrupt?	3
	CO6	(b)	Describe with a schematic diagram the sequence of steps for asynchronous serial data transfer between μP and peripheral using a UART.	7