Subject: Microprocessor and Computer Organization **Semester: 4**

Subject Code: CE258 **AcademicYear:2021-22**

Course Outcome (COs):

At the end of the course, the students will be able to

1 Recognize elements of digital logic circuit. Moving from design of single bit function to multibit function. (Flip flop, Logic Gates, Combinational Circuit). Design circuit for fixed function arithmetic function. Understand the notation of writing register transfer language.

2 Design and examine the different Arithmetic, Logic and Shift circuit & Design control unit of Arithmetic, Logic and Shift Circuit.

3 Conceptualize and evaluate various parallelism employed in microprocessor.

4 Demonstrate and evaluate computer arithmetic operations on integer and real numbers using hardwired algorithm.

5 Understand and differentiate n-way set associative memory

6 Understand segment and page translation currently employed in microprocessor. Understand basics of architecture of current era of microprocessors.

Sr. No.	AIM	Hrs	COs
1	Introduction to 8086 Microprocessor & Assembly Language Programming.	1	6
2	Store the data byte 32H into memory location 4000H.	1	6
3	Exchange the contents of memory locations 2000H and 4000H	1	6

4	Convert the below given C Program into Assembly Language.
	`main()`
	`{`
	`int l,m,n,o,p;`
	`l=m+n-o+p;`
	`}`
		1	6

5	Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H.	1	6
6	Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.	1	6
7	Subtract the 16-bit number in memory locations 4002H and 4003H from the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in Memory location 4005H.	1	6
8	Add Two 32-bit numbers stored in consecutive memory locations and store the result in memory locations starting from 7000H	1	6
9	Subtract Two 32-bit numbers stored in consecutive memory locations and store the result in memory locations starting from 7000H	1	6
10	Write an assembly language program to convert temperature in F to C. C=(F-32) * 5/9	1	6
11	Write a program to perform selective set operation on data stored at 4000H with the data stored at 4001H and store the result at 4002H. Verify the result and write bite wise operation of this program. (OR)	1	6
12	Write a program to perform selective compliment operation on data stored at 4000H corresponding to the data stored at 4001H and store the result at 4002H. Verify the result and write bite wise operation of this program. (XOR)	1	6
13	Write a program to perform selective clear operation on data stored at 4000H corresponding to the data stored at 4001H and store the result at 4002H.Verify the result and write bite wise operation of this program. (A AND B')	1	6
14	Write an assembly language program the data at memory locations 2000H & 2001H. (Use XOR)	1	6
15	Write a program to multiply & divide the number stored at 4000H by 2 and store the result at 4001H & 4002H. (Use Shift instructions).	1	6
16	Write a Program to subtract the contents of memory location 4001H from the memory location 4002H and place the result in memory location 4003H without SUB instruction.	1	6
17	Implement a program to mask the lower four bits of content of the memory location	1	6
18	Implement a program to set higher four bits of content of the memory location to 1.	1	6
19	Calculate the sum of series of numbers (Data set-1) from the memory location listed below & store the result at 400AH location.	1	6
20	Modify above the program such a way that it halts the execution if carry generated & stores the intermediate result at 400AH location. (Data set-2) (Note: Student need to implement FOR loop in this program: initialization, Compare, Decrement/Increment; also need to use JMP, JMx instructions.)	1	6
21	Multiply two 8-bit numbers stored in memory locations 4001H and 4006H by repetitive addition and store the result at 400AH location.(Use Data Set -3) (Note: Student need to implement FOR loop in this program: initialization, Compare, Decrement/Increment; also need to use JMP, JMx instructions.)	1	6
22	Program to find average of n numbers	1	6
23	Write an assembly language program to find the no. of odd numbers and even numbers, given an array of n numbers.	1	6
24	Divide 8-bit number stored in memory locations 4009H by data stored at memory location 4001H & store result of	1	6

	division at memory location 400AH. (Use Data Set -4).		
25	Divide 8-bit number stored in memory locations 4009H by data stored at memory location 4001H & store result of module operation at memory location 400AH. (Use Data Set - 2,4).	1	6
26	Write an assembly language program to find the largest number in an array.	1	6
27	Write an assembly language program to count the numbers in an array (negative & positive)	1	6
28	Write an assembly language program to multiply two 16-bit numbers in memory and store the result in memory. 8	1	6
29	Write a program with nested loop which will display the decimal down counter. on Port 1 with a one second delay between each count.	1	6
30	Write an assembly language program to Display Digits 0 1 2 3 4 5 6 7 8 9 A B C D E F on port 01H with 500ms of delay	1	6
31	Design an 8086 microprocessor based system with input device getting input from memory address starting from 2000 h to 2009 h. Three LEDs (common cathode): LED-1(Green) at D0 bit, LED-2 (Yellow) at D3 bit and LED-3 (Red) at D6 bit of the output device connected at I/O mapped address 01h. Write an assembly program to take data from input device, Glow LED-1 ; if data <=50H LED-2 ; if 50H >data<=A0H LED-3; if data>A0H. Take data from input device at every 10 ms time.	1	6
32	Write a program which sets the parity bit.	1	6
33	Write a program which transfers content of Flags to Register	1	6
34	Write a program to add the two Hex Numbers 7AH and 46H and to store the sum at memory location 2098 and flags status at 2097 location	1	6
35	Write a 20 ms time delay subroutine using register pair BC. At the end of subroutine, clear the flag Z without affecting other flags and return to main program.	1	6
36	Using a Subroutine, write a program which adds two hex number 10H and F0H and store result at 2040H location in memory. At the end of subroutine, clear the flag Z without affecting other flags and return to main program.	1	6
37	Write a program which set and resets zero flag at next iteration. (Take number of iteration equal to 5)	1	6
38	Write a program to provide the given on/off time of three traffic lights. (Green, Yellow, Red). The signal sings are turned on/off by the data bits of an output port 1 as shown below: Green will be ON for 15 ms otherwise OFF (On port 1 Value 1 will stay for 15 ms) Yellow will be ON for 5 ms otherwise OFF (On port 1 Value 1 will stay for 5 ms) Red will be ON 20 ms otherwise OFF (On port 1 Value 1 will stay for 20 ms)	1	6
39	Implement a program to reverse a string using stack operations and stored in same memory area.	1	6
40	Calculate the sum of series of even numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 8 bit number so you can ignore carries and store the sum at memory location 2210H.	1	6
41	Write an assembly language program to arrange an array of 10 data in ascending order. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H	1	6
42	Write an assembly language program to fill the memory locations starting from 3000h, with n Fibonacci numbers.	1	6