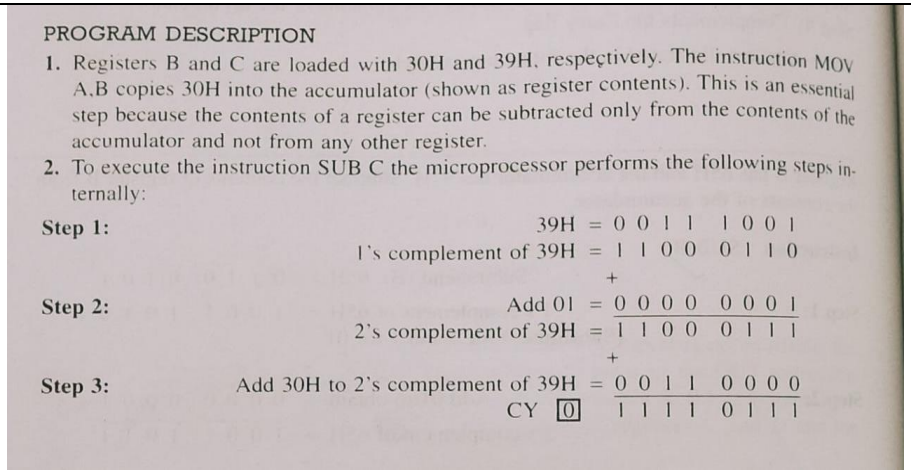
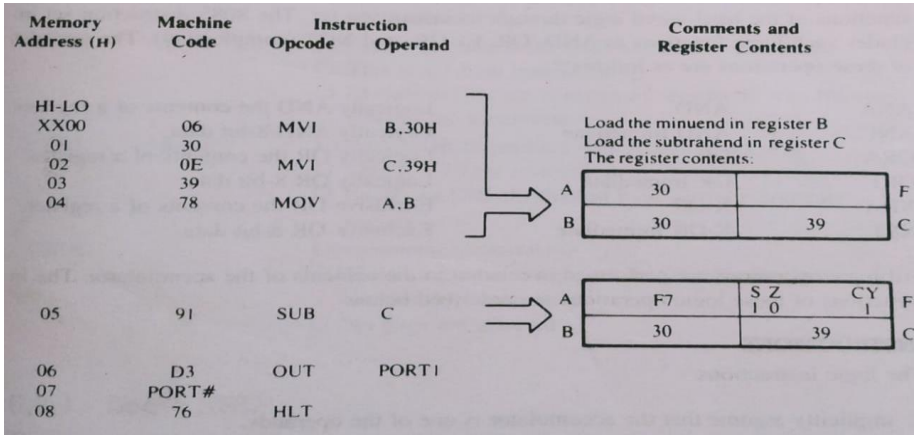
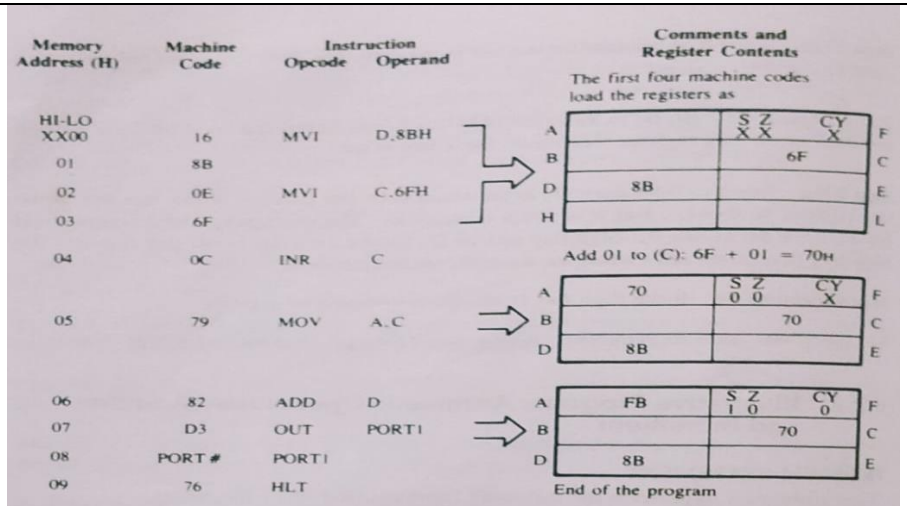
Day 6 / Analytical Questions		
AQ No	**Question**	**Text Book Page No**
1	**Problem Statement:** a) Load the number 30H in register B and 39H in register C. b) Subtract 39H from 30H c) Display the answer and write an Assembly language program using 8085 Microprocessor.	

PROGRAM DESCRIPTION

1. Registers B and C are loaded with 30H and 39H, respectively. The instruction MOV A,B copies 30H into the accumulator (shown as register contents). This is an essential step because the contents of a register can be subtracted only from the contents of the accumulator and not from any other register.
2. To execute the instruction SUB C the microprocessor performs the following steps internally:

Step 1:	39H =	0 0 1 1 1 0 0 1
	1's complement of 39H =	1 1 0 0 0 1 1 0
	+	
Step 2:	Add 01 =	0 0 0 0 0 0 0 1
	2's complement of 39H =	1 1 0 0 0 1 1 1
	+	
Step 3:	Add 30H to 2's complement of 39H =	0 0 1 1 0 0 0 0
	CY [0]	1 1 1 1 0 1 1 1



2	**Problem Statement:** Load the number 8BH in Register D, Load the number 6F in Register C, Increment the contents of Register C by One, Add the content of registers C and D and display the sum. Write the Assembly language program using 8085 Microprocessor.	 FIGURE 6.5 Illustrative Program for Arithmetic Operations—Using Addition and Increment 4. Instruction ADD D adds (D) to (A), stores the sum in A, and sets the Sign flag as shown below: (A) : 70H = 0 1 1 1 0 0 0 0 + (D) : 8BH = 1 0 0 0 1 0 1 1 (A) : FBH = 0 1 1 1 1 0 1 1 (see Figure 6.5) CY Flag Status: S = 1, Z = 0, CY = 0

3	**Problem Statement** Assume register B holds 93H and the accumulator holds 15H. Illustrate the results of the instruction ORA B. Write the Assembly language program using 8085 Microprocessor for Setting of bits.	OR (B) = 1 0 0 1 0 0 1 1 (93H) (A) = 0 0 0 1 0 1 0 1 (15H) (A) = 1 0 0 1 0 1 1 1 (97H) Flag Status: S = 1, Z = 0, CY = 0 The result 97H will be placed in the accumulator, the CY flag will be reset, and the other flags will be modified to reflect the data conditions in the accumulator.
4	**Problem Statement:** Assume register B holds 93H and the accumulator holds 15H. Illustrate the results of the instruction XRA B. Write the Assembly language program using 8085 Microprocessor for the logical operation Exclusive OR.	The instruction XRA B will perform the following operation. X-OR (B) = 1 0 0 1 0 0 1 1 (93H) (A) = 0 0 0 1 0 1 0 1 (15H) (A) = 1 0 0 0 0 1 1 0 (86H) Flag Status: S = 1, Z = 0, CY = 0 The result 86H will be placed in the accumulator, and the flags will be modified as shown.
5	**Problem Statement:** Assume register B holds 93H and the accumulator holds 15H. Illustrate the results of the Instruction CMA. Write the Assembly language program using 8085 Microprocessor for the logical operation NOT.	The instruction CMA will result in CMA (A) = 0 0 0 1 0 1 0 1 (15H) (A) = 1 1 1 0 1 0 1 0 (EAH) The result EAH will be placed in the accumulator and no flags will be modified.
6	Let us assume that two numbers Xand Y, 8-bit each, are stored in memory locations 2400H and 2401H. Calculate Z1 and Z2 by the following equations and store the result in memory locations 2402H and	

	2403H.
	Z1 = X+Y-2
	Z2 = X-Y+10
		LXI H, 2400H ; Load registers H–L with 2400H
		MOV C, M ; Move X to register C
		INX H ; Increment register pair H–L. H–L will now have 2401H
		MOV D, M ; Move Y to register D
		MOV A, D ; Move Y to ACC
		ADD C ; Add Y to X, result in ACC
		SUI 02 ; Subtract 2 from X + Y
		INX H ; Increment H–L. H–L will have 2402H
		MOV M, A ; Store (X + Y – 2) in 2402H
		MOV A, C ; Move X to ACC
		SUB D ; Calculate (X – Y) result in ACC
		ADI 0AH ; Add 10
		INX H ; Increment H–L. H–L has 2403H
		MOV M, A ; Store (X – Y + 10) in 2403H

7	Four bytes of data are stored consecutively from location 2400H onwards. Write a program to transfer this data to start from 2500H onwards using (a) direct addressing (LDA) and (b) direct addressing (LHLD).	(a) LDA 2400H ; Load the contents of 2400H in ACC STA 2500H ; Store the contents of ACC in 2500H LDA 2401H STA 2501H LDA 2402H STA 2502H LDA 2403H STA 2403H (b) LHLD 2400H ; Load in L and H the contents of 2400H and 2401H SHLD 2500H ; Store in 2500H and 2501H the contents of the L and H registers LHLD 2402H SHLD 2502H

8	An 8-bit number X is stored in memory location 2400H. Write the Assembly language program using 8085 Microprocessor to compute Z by the following relation and store it in memory location 2401H.
	Z=[{(X+5) AND (X-5)} OR (X x 2)]
		$Z = [\{(X + 5) \text{ AND } (X - 5)\} \text{ OR } (X \times 2)]$
		The program to compute Z by the above relation is as follows:
		LXI H, 2400H
		MOV A, M ; (A) ← X
		ADI 05H
		MOV B, A ; (B) ← X + 5
		MOV A, M
		SUI 05 ; (A) ← X – 5
		ANA B
		MOV E, A ; (E) ← (A) AND (B)
		MOV A, M
		ADD A ; (A) ← X × 2
		ORA E ; (A) ← (E) OR (A)
		INX H
		MOV M, A ; (2401H) ← (A)

9	Perform setting of bits and masking of bits using suitable 8086 microprocessor's logical operation for the data FEFEh with F0F0h and save the results in memory location 1400 using assembly language program.	
10	Take a 16-bit number (2222H) and set the array with counter register (CX) to count 5 Times. Write an ALP using 8086 Microprocessor to perform array operation. Get the Sum of N numbers in a word array and store the result in 1200. Start the data array from 1100.	
11	Set the dividend (AX) with 2C5BH and Divisor in (BL) with 56H. Divide the given 16-bit number by 8-bit number. Write an Assembly language program	

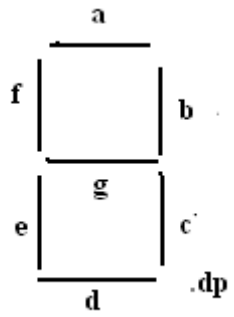
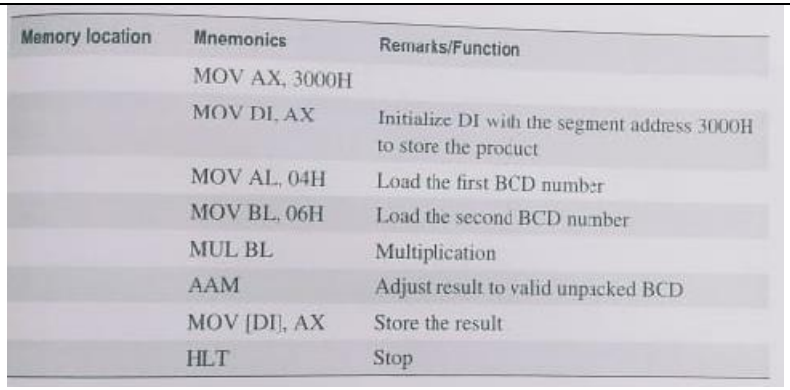
<table>
<tr><td></td><td>using 8086 Microprocessor to Divide two 16-bit data from locations 1200 to 1203 and store the LSB in 1300H and MSB in 1301H</td><td></td></tr>
<tr><td>12</td><td>Segment definition of the seven-segment display are shown below:
 

Table below shows the correspondence between the data bus and output port bits of 8279
<table>
<tr><td>Data bus</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
<tr><td>8279 O/P</td><td>A3</td><td>A2</td><td>A1</td><td>A0</td><td>B3</td><td>B2</td><td>B1</td><td>B0</td></tr>
<tr><td>Segment</td><td>d</td><td>c</td><td>b</td><td>a</td><td>.dp</td><td>g</td><td>f</td><td>e</td></tr>
</table>
In order to light up a segment the corresponding bit of data written in to the display RAM should be “0”. Using 8086 Microprocessor to roll a display “HELP ALL” by interfacing keyboard display controller 8279. Draw the segment definition for the rolling message.</td><td></td></tr>
<tr><td>13</td><td>Choose a Suitable String operation for moving a byte</td><td></td></tr>
</table>

<table>
<tr><td></td><td>string from source to destination. Set the OFFSET S_ARRAY to 200C and OFFSET D_ARRAY to 300C.Write an assembly language program in 8086 Microprocessor to move a block of data from source to destination.</td><td></td></tr>
<tr><td>14</td><td>Take two single digit BCD numbers each having a maximum value of 09. Write an assembly language program in 8086 Microprocessor to multiply two 8-bit BCD numbers. Store the result in AX Register with AH having 04 and AL having 02.</td><td> 
<table>
<tr><th>Memory location</th><th>Mnemonics</th><th>Remarks/Function</th></tr>
<tr><td></td><td>MOV AX, 3000H</td><td></td></tr>
<tr><td></td><td>MOV DI, AX</td><td>Initialize DI with the segment address 3000H to store the procuct</td></tr>
<tr><td></td><td>MOV AL, 04H</td><td>Load the first BCD number</td></tr>
<tr><td></td><td>MOV BL, 06H</td><td>Load the second BCD number</td></tr>
<tr><td></td><td>MUL BL</td><td>Multiplication</td></tr>
<tr><td></td><td>AAM</td><td>Adjust result to valid unpacked BCD</td></tr>
<tr><td></td><td>MOV [DI], AX</td><td>Store the result</td></tr>
<tr><td></td><td>HLT</td><td>Stop</td></tr>
</table></td></tr>
<tr><td>15</td><td>Write a program for multiplying two unsigned 16-bit data (WORD), With the help of assembly language program in 8086 Microprocessor multiply the unsigned data 1530H and FFBBH and store the 32-bit result in DX-AX Registers.</td><td></td></tr>
<tr><td>16</td><td>Write a program for multiplying two unsigned 8-bit data (BYTE), With the help of assembly language program in 8086 Microprocessor multiply the unsigned data 20H and EFH and store the 32-bit result in AX.</td><td></td></tr>
<tr><td>17</td><td>Write an ALP using 8051 Microcontroller to perform 8-bit Multiplication and store the result in memory.</td><td></td></tr>
<tr><td>18</td><td>Write an ALP using 8051 Microcontroller to perform</td><td></td></tr>
</table>

	8-bit division and store the quotient and remainder in memory.	
19	Write and assembly language to add two 16-bit numbers using microcontroller 8051. Take two numbers 1234h and 5678h, after adding store the result in 4150.	
20	Write an assembly language to subtract two 8-bit numbers using 8051 Microcontroller. Take two number 2AH and 2BH, after subtracting store the result in 4500.	