EXPERIMENT : 1
SLIP NO 1

Q1)a) Program is stored from memory location C000H to C002H.
Copy the contents of these memory locations on paper and disassemble the program using op-code sheet.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remarks
F000	21,00,C0		LXI	H,C000H	Initialize HL as ML C000H
F003	11,03,C0		LXI	D, C003H	Initialize DE as ML D000H
F006	0E,03		MVI	C,03H	Get data in regi C i.e. set counter
F008	7E	UP	MOV	A,M	Get content in A from HL i.e. M regi
F009	EB		XCHG		Exchange as HL ←--→ DE
F00A	77		MOV	M,A	Get contet in M from A
F00B	EB		XCHG		Exchange as HL ←--→ DE
F00C	23		INX	H	Increment HL by one location
F00D	13		INX	D	Increment DE by one location
F00E	0D		DCR	C	Decrement counter
F00F	C2,08,F0		JNZ	UP	If if count # 0 then goto label UP and execute instruction MOV A,M
F012	CF		RST	1	Stop processing

DATA (Before Execution)

Address	**DATA**
C000H	**06H**
C001H	**12H**
C002	**18H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	18	01	00	C0	06	54	0F	C0	03	FFEB	F013

Result Data After Execution

Address	**Result**
C003H	**06H**
C004H	**12H**
C005H	**18H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But there are number of 1's are = 3=odd ∴ P= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 1
SLIP NO 1

Q1)a) Program is stored from memory location C000H to C002H.
Copy the contents of these memory locations on paper and disassemble the program using op-code sheet.

Memory Address	Opcodes	Label	Opecodes	Operand	Comment
F000	01,00,C0		LXI	B, C000H	Initialize BC address to location
F003	21,03,C0		LXI	H,C003H	Initialize HL address to location
F006	16,03		MVI	D,03H	Set counter
F008	0A	LOOP	LDAX	B	Loads contents from BC to ACC
F009	77		MOV	M,A	Moves from ACC TO Memory
F00A	03		INX	B	Increments BC address
F00B	23		INX	H	Increments HL address
F00C	15		DCR	D	Decrements counter
F00D	C2,08,F0		JNZ	LOOP	If cout#0 then jumps to label LOOP and executes
F010	CF		RST	1	Stop processing

DATA (Before Execution)

Address	**DATA**
C000H	**22H**
C001H	**24H**
C002H	**26H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	26	C0	03	00	00	54	0F	C0	06	FFEB	F011

Result Data After Execution

Address	**Result**
C003H	**22H**
C004H	**24H**
C005H	**26H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But there are number of 1's are = 3=odd ∴ P= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 2

SLIP NO 2

Q1)a) Write a program that adds the contents of a block of memory using the DAD instructions. The block length is stored at C000H and starting address of block is C001H. Stores the 2-byte result below the end of the block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	01 , 00, C0		LXI	B, C000H	Initialize BC pair
D003	0A		LDAX	B	Loads content of BC rp into A
D004	5F		MOV	E ,A	Gets content into C from A
D005	3E , 00		MVI	A , 00H	LSB sum = 00
D007	16, 00		MVI	D , 00H	MSB sum = 00
D009	03	LOOP	INX	B	Next address in BC rp
D00A	21,00,00		LXI	H,0000H	Initialize HL to 0000H
D00D	09		DAD	B	HL = HL + BC
D00E	86		ADD	M	A = A + M
D00F	D2,13,D0		JNC	NEXT	If cy =0 then goto label NEXT & execute instruction DCR C
D012	14		INR	D	Increment content of D i.e. get MSB sum
D013	1D	NEXT	DCR	E	Decrement counter
D014	C2, 09, D0		JNZ	LOOP	If counter # 0 then goto label LOOP and execute instruction INX B
D017	03		INX	B	
D018	02		STAX	B	Store to BC rp
D019	03		INX	B	Increment BC rp
D01A	7A		MOV	A, D	Gets the content into A to D i.e. MSB sum
D01B	02		STAX	B	Stores to BC rp
D01C	CF		RST	1	Stop processing

DATA (Before Execution)

Address	DATA
C000H	**03H**
C001H	**11H**
C002H	**12H**
C003H	**13H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	C0	05	00	00	54	0F	C0	03	FFEB	D01D

Result Data After Execution

Address	RESULT
C004H	**36H**
C005H	**00H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But there are number of 1's are = 3=odd ∴ P= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 2 **SLIP NO 2**

Q1)a) Write a program that adds the contents of a block of memory using the DAD instructions. The block length is stored at C000H and starting address of block is C001H. Stores the 2-byte result below the end of the block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	11, 00, 00		LXI	D,0000H	; Initialize DE register pair.
F003	21, 00, 00		LXI	H, 0000H	; Initialize HL register pair.
F006	01, 00, CO		LXI	B, C000H	; Initialize BC register pair.
F009	0A		LDAX	B	; Load A with BC register pair content.
F00A	4F		MOV	C, A	; copy A content to register C
F00B	0A	UP	LDAX	B	; Load A with BC register pair content.
F00C	5F		MOV	E, A	; copy content of A to E register.
F00D	19		DAD	D	; HL = HL + DE.
F00E	0B		DCX	B	; Decrement BC register pair address by one.
F00F	79		MOV	A, C	; Copy C content in register A.
F010	FE, 00		CPI	00H	; Compare A data 00H
F012	C2, 0B, F0		JNZ	UP	; if Z# 0 then goto label UP.
F015	01, 00, C0		LXI	B,C000H	; Initialize BC register pair.
F018	0A		LDAX	B	; Load A with BC register pair content.
F019	4F		MOV	C, A	; Copy A content to register C.
F01A	03		INX	B	; Increment BC address by one.
F01B	7D		MOV	A, L	; Copy L content to register A.
F01C	02		STAX	B	; Store A content to BC register pair address.
F01D	7C		MOV	A, H	; Copy H content to register A.
F01E	03		INX	B	; Increment BC register pair address.
F01F	02		STAX	B	; Store A content to BC register pair address.
F020	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	**05H**
C001H	**01H**
C002H	**02H**
C003H	**03H**
C004H	**04H**
C005H	**05H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	C0	07	00	01	54	0F	00	0F	FFEB	F021

Result Data After Execution

Address	Result
C006H	**0FH**
C007H	**00H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But there are number of 1's are = 3=odd ∴ P= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book Q3) Term Work Q4) Oral (Viva Vice)

EXPERIMENT : 2

SLIP NO 3

Q1)a) Write program that subtract the number stored in ML C001H from the number stored in C000H. Stores the absolute difference in ML C002H as result.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H, C000H	Initialize HL
F003	7E		MOV	A , M	; Copy HL content to A.
F004	23		INX	H	; Increment HL address by 1.
F005	96		SUB	M	; A= A – HL
F006	D2, 0B,F0		JNC	NEXT	; Jump to Label NEXT if CY=0
F009	2F		CMA		;1's compliment is calculates.
F00A	3C		INR	A	; Increment A by one.
F00B	23	NEXT	INX	H	; Increment HL address by 1.
F00C	77		MOV	M ,A	; Copy content of A to HL
F00D	CF		RST	1	; Stop processing

DATA (Before Execution)

Address	**DATA**
C000H	**45H**
C001H	**23H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	22	01	00	00	00	14	0F	C0	02	FFEB	F00E

Result Data After Execution

Address	**Result**
C002H	**22H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 14 = 00010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But there are number of 1's are = 2=even
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 2

SLIP NO 3

Q1)a) Write program that subtract the number stored in ML C001H from the number stored in C000H. Stores the absolute difference in ML C002H as result.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H, C000H	Initialize HL
F003	7E		MOV	A , M	; Copy HL content to A.
F004	23		INX	H	; Increment HL address by 1.
F005	96		SUB	M	; A= A – HL
F006	D2,0C,F0		JNC	NEXT	; Jump to Label NEXT if CY=0
F009	7E		MOV	A, M	; Copy HL to A.
F00A	2B		DCX	H	; Decrement HL address by 1.
F00B	96		SUB	M	; A = A – HL .
F00C	32,02,C0	NEXT	STA	C002H	; Store A to ML C002H.
F00F	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	**DATA**
C000H	**23H**
C001H	**ABH**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	88	01	00	00	00	B4	0F	C0	00	FFEB	F010

Result Data After Execution

Address	**Result**
C002H	**88H**

Flags After Execution & Interpret's its meaning is

After Execution = F = B4 = 10110100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ Result is Even & 1's=4=even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 1 ∴ Result is Negative.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 2

SLIP NO 4

Q1)a) Write a program that adds a 4-byte integer stored in consecutive memory locations starting from C000H beginning with lower order byte to another 4-byte integer stored in the consecutive M.L. starting from MLC004H beginning with lower order byte stores the result in consecutive M.L. starting from MLC000H

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	AF		XRA	A	Reset CY flag
D001	06,04		MVI	B , 04H	Set counter in B register
D003	21, 00 , C0		LXI	H , C000H	Set memory pointer in HL
D006	11, 04 , C0		LXI	D , C004H	Set memory pointer in DE
D009	1A	UP	LDAX	D	Load ACC with databyte from DE rp
D00A	8E		ADC	M	[A] = [A] + [M] + CY
D00B	77		MOV	M , A	Moves A to M
D00C	13		INX	D	Increments memory of DE rp
D00D	23		INX	H	Increments memory of HL rp
D00E	05		DCR	B	Decrements counter by one
D00F	C2 , 09, D0		JNZ	UP	If counter # 0 then goto label UP and executes the instruction LDAX D
D012	CF		RST	1	Stop processing

DATA (Before Execution)

Address	**DATA**
C000H	**F3H**
C001H	**B2H**
C002H	**C6H**
C003H	**89H**
C004H	**72H**
C005H	**90H**
C006H	**35H**
C007H	**67H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	F0	00	00	C0	08	54	0F	C0	04	FFEB	D013

Result Data After Execution

Address	**Result**
C000H	**65H**
C001H	**43H**
C002H	**FCH**
C003H	**F0H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But number of 1's=3=odd ∴ Result is odd . So P=0 modify.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Negative.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 2 SLIP NO 4

Q1)a) Write a program that adds a 4-byte integer stored in consecutive memory locations starting from C000H beginning with lower order byte to another 4-byte integer stored in the consecutive M.L. starting from MLC004H beginning with lower order byte stores the result in consecutive M.L. starting from MLC000H

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	0E,04		MVI	C,04H	; Load Immediate data 04H to regi. C
F002	21,00,C0		LXI	H,C000H	; Initialize HL
F005	11,04,C0		LXI	D, C004H	; Initialize DE
F008	37		STC		; Set carry
F009	3F		CMC		; Complement carry
F00A	1A	LOOP	LDAX	D	; Load A with content of DE regi. pair
F00B	8E		ADC	M	; A = A + HL + CY
F00C	77		MOV	M,A	; Copy content of A into HL.
F00D	23		INX	H	; Increment HL by 1.
F00E	13		INX	D	; Increment address of DE regi. pair by 1.
F00F	0D		DCR	C	; Decrement C register content by 1.
F010	C2,0A,F0		JNZ	LOOP	; Jump on Z#0 to label LOOP.
F013	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	**03H**
C001H	**B2H**
C002H	**B6H**
C003H	**8FH**
C004H	**73H**
C005H	**9DH**
C006H	**37H**
C007H	**EDH**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	7C	01	00	C0	08	55	0F	C0	04	FFEB	F014

Result Data After Execution

Address	Result
C000H	**76H**
C001H	**4FH**
C002H	**EEH**
C003H	**7CH**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 3
SLIP NO 5

Q1)a) Write a program that multiplies two 1-byte hex numbers stored in consecutive MLs starting from C000H. Stores the 2-byte result in consecutive MLs starting from C002H beginning with lower order byte.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	3A ,00 ,C0		LDA	C000H	; Load A with ML content C000H.
D003	5F		MOV	E ,A	; Copy content of A into E.
D004	16 , 00		MVI	D , 00H	; Move immediate data to regi D.
D006	3A ,01 ,C0		LDA	C001H	; Load A with ML content C001H
D009	4F		MOV	C , A	; Copy content of A into C.
D00A	21, 00, 00		LXI	H , 0000H	; Initialize HL and clears.
D00D	19	LOOP	DAD	D	; HL = HL + DE
D00E	0D		DCR	C	; Decrement C by 1.
D00F	C2 ,0D,D0		JNZ	LOOP	; Jump if Z#0 to label LOOP.
D012	22 , 02, C0		SHLD	C002H	; Store HL to C002H and C003H.
D015	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	FFH
C001H	02H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	02	01	00	00	FF	54	0F	01	FE	FFEB	D016

Result Data After Execution

Address	Result
C002H	FEH
C003H	01H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ Result is Even. But 1's = 3=odd. So p=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 3 SLIP NO 5

Q1)a) Write a program that multiplies two 1-byte hex numbers stored in consecutive MLs starting from C000H. Stores the 2-byte result in consecutive MLs starting from C002H beginning with lower order byte.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	0E , 00		MVI	C ,00H	Initialize C =00 to store CY and MSB sum
D002	3E , 00		MVI	A , 00H	Initialize A = 00 to LSB sum
D004	21 , 00 , C0		LXI	H, C000H	Initialize HL and memory address becomes C000H
D007	46		MOV	B, M	Gets content of memory in B regi
D008	23		INX	H	Increment memory address
D009	86	NEXT	ADD	M	[A] = [A] + [M]
D00A	D2 , 0E , D0		JNC	LOOP	If CY = 0 then goto label LOOP and executes instruction DCR B
D00D	0C		INR	C	I f CY = 1 then Increments CY i.e. MSB sum
D00E	05	LOOP	DCR	B	Decrements counter
D00F	C2 , 09 , D0		JNZ	NEXT	If Z=0 then goto label NEXT and executes instruction ADD M
D012	23		INX	H	Increments memory address
D013	77		MOV	M , A	Gets contents into memory from A
D014	23		INX	H	Increments memory address by one
D015	71		MOV	M , C	Gets contents into memory from C
D016	CF		RST	1	Stop processing

DATA (Before Execution)

Address	DATA
C000H	F5H
C001H	08H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	A8	00	07	00	00	54	0F	C0	03	FFEB	D017

Result Data After Execution

Address	Result
C002H	A8H
C003H	07H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 3

SLIP NO 6

Q1)a) Write an ALP that divides two one-byte hex numbers, where dividend is stored at ML D000H and divisor is stored in ML D001H. Stores the quotient and remainder in MLs D002H and D003H. **Note : dividend is 8 bit result is 16bit**

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
C000	06, 00		MVI	B ,00H	Set B = 00H
C002	21, 00, D0		LXI	H , D000H	Initialize HL address to C000H
C005	7E		MOV	A , M	Gets content into A from memory
C006	23		INX	H	Increments the HL address by one
C007	BE	BACK	CMP	M	If A<M
C008	DA, 10 , C0		JC	LOOP	If A< M then CY =1 then goto label LOOP executes instruction INX H
C00B	96		SUB	M	[A] = [A] – [M]
C00C	04		INR	B	Increments the contents of B
C00D	C3, 07, C0		JMP	BACK	Jumps unconditionally label BACK
C010	23	LOOP	INX	H	Increments HL by one
C011	70		MOV	M , B	Gets contents in memory from B
C012	23		INX	H	Increments HL by one
C013	77		MOV	M , A	Gets contents in memory from A
C014	CF		RST	1	Stop processing

DATA (Before Execution)

Address	**DATA**
D000H	**09H**
D001H	**02H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	01	04	00	00	82	85	0F	D0	03	FFEB	C015

Result Data After Execution

Address	**Result**
D002H	**04H**
D003H	**01H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 85 = 10000101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 0 ∴ Carry is not given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 1 ∴ Result is Negative.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 3

SLIP NO 6

Q1)a) Write an ALP that divides two one-byte hex numbers, where dividend is stored at ML D000H and divisor is stored in ML D001H. Stores the quotient and remainder in MLs D002H and D003H. **Note : dividend is 8 bit result is 16bit**

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
C000	21, 00, D0		LXI	H, D000H	; Initialize HL
C003	7E		MOV	A, M	; Copy HL content into A.
C004	23		INX	H	; Increment HL address by 1.
C005	46		MOV	B, M	; Copy HL content into regi. B.
C006	0E, 00		MVI	C, 00H	; Load Immediate data into regi C
C008	90	LOOP	SUB	B	; A = A – B.
C009	0C		INR	C	; Increment C register content by 1.
C00A	B8		CMP	B	; Compare A with B.
C00B	D2, 08, C0		JNC	LOOP	; Jump to label LOOP if CY=0
C00E	23		INX	H	; Increment HL address by 1.
C00F	71		MOV	M, C	; Copy content of C register into HL.
C010	23		INX	H	; Increment HL address by 1.
C011	77		MOV	M, A	; Copy content of A into HL.
C012	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
D000H	09H
D001H	02H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	01	02	04	00	00	85	0F	D0	03	FFEB	C013

RESULT Data After Execution

Address	Result
D002H	04H
D003H	01H

Flags After Execution & Interpret's its meaning is

After Execution = F = 85 = 10000101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 0 ∴ Carry is not given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 1 ∴ Result is Negative.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 4

SLIP NO 7

Q1)a) Write a program that adds the BCD contents of a block of memory. Block length is hex not exceeding $63_{16} = 99_{10}$ is stored at MLC000H and starting address of block is at ML C001H. Stores the BCD sum as result starting from ML D000H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	06,00		MVI	B,00H	; Load Immediate data in register B.
F002	21,00,CO		LXI	H,C000H	; Initialize HL.
F005	4E		MOV	C,M	; copy HL content into register C.
F006	7E		MOV	A,M	; Copy HL content into register A.
F007	FE,63		CPI	63H	; Compare A with data 63H.
F009	D2,20,F0		JNC	STOP	; Jump to label STOP if cy =0
F00C	3E,00		MVI	A,00H	; Load immediate data in regi. A and clear
F00E	23	LOOP	INX	H	; Increment HL address by 1.
F00F	86		ADD	M	; A = A + HL
F010	27		DAA		; Decimal adjust accumulator.
F011	D2,15,F0		JNC	NEXT	; Jump to label NEXT if cy=0.
F014	04		INR	B	; Increment B content by 1.
F015	0D	NEXT	DCR	C	; Decrement C content by 1.
F016	C2,0E,F0		JNZ	LOOP	; Jump to label LOOP if z=0
F019	32,00,D0		STA	DOOOH	; Store A into ML D000H.
F01C	78		MOV	A,B	; Copy B into A.
F01D	32,01,D0		STA	D001H	; Store A into ML D001H.
F020	CF	STOP	RST	1	; Stop processing.

DATA (Before Execution)

Address	**DATA**
C000H	**04H**
C001H	**22H**
C002H	**45H**
C003H	**56H**
C004H	**89H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	02	02	00	00	00	55	0F	C0	04	FFEB	F021

Result Data After Execution

Address	**Result**
D000H	**12H**
D001H	**02H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 4 SLIP NO 7

Q1)a) Write a program that adds the BCD contents of a block of memory. Block length is hex not exceeding $63_{16} = 99_{10}$ is stored at MLC000H and starting address of block is at ML C001H. Stores the BCD sum as result starting from ML D000H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	06,00		MVI	B,00H	; Load B with immediate data and clear.
F002	21,00,CO		LXI	H,C000H	; Initialize HL
F005	4E		MOV	C,M	; Copy HL content into register C
F006	7E		MOV	A,M	; Copy HL content into register A.
F007	FE,63		CPI	63H	; Compare A with data 63H.
F009	D2,20,F0		JNC	STOP	; Jump to label STOP if cy=0.
F00C	AF		XRA	A	; Clear A and CY i.e A XORed with A.
F00D	23	LOOP	INX	H	; Increment HL address by 1.
F00E	8E		ADC	M	; A = A + HL + CY
F00F	27		DAA		; Decimal adjust accumulator.
F010	D2,14,F0		JNC	NEXT	; Jump to label NEXT if cy=0
F013	04		INR	B	; Increment B register content by 1.
F014	0D	NEXT	DCR	C	; Decrement content of regi C by 1.
F015	C2,0D,F0		JNZ	LOOP	; Jump to label LOOP if z=0
F018	32,00,D0		STA	DOOOH	; Store A content into ML D000H.
F01B	78		MOV	A,B	; Copy B content into A.
F01C	32,01,D0		STA	D001H	; Store content of A into ML D001H.
F01F	CF	STOP	RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	**04H**
C001H	**11H**
C002H	**34H**
C003H	**14H**
C004H	**15H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	00	00	00	00	54	0F	C0	04	FFEB	F020

Result Data After Execution

Address	Result
D000H	**74H**
D001H	**00H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8

SLIP NO 11

Q1)a) A block of data is stored in MLs from C000H to C002H. Write a program to transfers the data in the reverse order to MLs starting from M.L. C003H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	01,02,C0		LXI	B,C002H	Initialize source block to BC rp
F003	21,03,C0		LXI	H,C003H	Initialize to destination block to HL
F006	16,03		MVI	D,03H	Set counter as register D
F008	0A	LOOP	LDAX	B	Gets contents from source block in ACC
F009	77		MOV	M,A	Moves content to from memory
F00A	0B		DCX	B	Decrement block counter
F00B	23		INX	H	Increment HL
F00C	15		DCR D	H	Decrement counter
F00D	C2,08,F0		JNZ	LOOP	If counter # 0 then goto to LOOP execute instruction LDAX B
F010	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	**DATA**
C000H	**03H**
C001H	**02H**
C002H	**05H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	03	BF	FF	00	00	54	0F	C0	06	FFEB	F011

Result Data After Execution

Address	**Result**
C003H	**05H**
C004H	**02H**
C005H	**03H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Negative.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 11

Q1)a) A block of data is stored in MLs from C000H to C002H. Write a program to transfers the data in the reverse order to MLs starting from M.L. C003H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,02,C0		LXI	H,C002H	; Initialize HL.
F003	11,03,C0		LXI	D,C003H	; Initialize DE.
F006	0E,03		MVI	C,03H	; Move immediate data 03H to register C.
F008	7E	BACK	MOV	A,M	; Copy HL content into register A.
F009	EB		XCHG		; Exchanges HL and DE addresses.
F00A	77		MOV	M,A	; Copy content of register A into HL.
F00B	EB		XCHG		; Exchanges HL and DE addresses.
F00C	2B		DCX	H	; Decrement address of HL by 1.
F00D	13		INX	D	; Increment address of DE by 1.
F00E	OD		DCR	C	; Decrement content of register C by 1.
F00F	C2,08,F0		JNZ	BACK	; if z=0 then jump to label BACK
F012	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	11H
C001H	22H
C002H	33H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	11	01	00	C0	06	54	0F	BF	FF	FFEB	F013

Result Data After Execution

Address	Result
C003H	33H
C004H	22H
C005H	11H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 12

Q1)a) A block of data is stored in MLs from C000H TO C002H. Another block of data having the same length is stored in MLs starting from ML C003H. Writes a program to exchanges the contents of these two blocks.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	06,03		MVI	B, 03	Set counter in register B
F002	21,00,C0		LXI	H,C000H	Initialize address in HL
F005	11,03,C0		LXI	D,C003H	Initialize address DE rp
F008	4E	BACK	MOV	C, M	Gets content in register C from memory i.e. HL
F009	1A		LDAX	D	Loads content in ACC from DE rp
F00A	77		MOV	M,A	Gets contents in memory from Acc
F00B	79		MOV	A,C	Gets content in ACC from C
F00C	12		STAX	D	Stores contents from ACC to DE rp
F00D	23		INX	H	Increment HL
F00E	13		INX	D	Increment DE
F00F	05		DCR	B	Decrement counter
F010	C2,08,F0		JNZ	BACK	If counter # 0 then goto label BACK then execute MOV C,M
F013	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	**55H**
C001H	**66H**
C002H	**77H**
C003H	**99H**
C004H	**98H**
C005H	**97H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	77	00	77	C0	06	54	0F	C0	03	FFEB	F014

RESULT: Data After Execution

Address	Result
C000H	**99H**
C001H	**98H**
C002H	**97H**
C003H	**55H**
C004H	**66H**
C005H	**77H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 12

Q1)a) A block of data is stored in MLs from C000H TO C002H. Another block of data having the same length is stored in MLs starting from ML C003H. Writes a program to exchanges the contents of these two blocks.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	06, 03		MVI	B,03H	; Move immediate data 03H into regi B.
D002	21, 00, C0		LXI	H,C000H	; Initialize HL register pair.
D005	11, 03, C0		LXI	D,C003H	; Initialize DE register pair.
D008	EB	LOOP	XCHG		; Exchanges address of HL and DE regi. pair
D009	4E		MOV	C,M	; Copy content of HL into register C.
D00A	1A		LDAX	D	; Load A with DE regi. pair content.
D00B	EB		XCHG		; Exchanges addresses of HL with DE and DE with HL.
D00C	71		MOV	M,C	; Copy content of register C into HL.
D00D	12		STAX	D	; Stores content of A into DE register pair.
D00E	23		INX	H	; Increment HL address by 1.
D00F	13		INX	D	; Increment DE address by 1.
D010	05		DCR	B	; Decrement content of register B by 1.
D011	C2,08, D0		JNZ	LOOP	; Jump to label LOOP if z=0
D0014	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	**A1H**
C001H	**A2H**
C002H	**A3H**
C003H	**FFH**
C004H	**FEH**
C005H	**FDH**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	A3	00	FD	C0	06	54	0F	C0	03	FFEB	D015

Result Data After Execution

Address	Result
C000H	**FFH**
C001H	**FEH**
C002H	**FDH**
C003H	**A1H**
C004H	**A2H**
C005H	**A3H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 13

Q1)a) A block of data is stored in MLs from C000 TO C003H.Write a program to finds the smallest as well as greatest number from this block using Linear-Search. Stores the results immediately after the end of block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H, C000H	Loads HL pair immediate with C000H
F003	06,04		MVI	B, 04H	Moves counter into regi B
F005	05		DCR	B	Decrements counter
F006	7E		MOV	A , M	Move memory to ACC
F007	57		MOV	D , A	Moves acc to D
F008	5F		MOV	E , A	Moves acc to E
F009	23	BACK	INX	H	Increments HL pair by one location
F00A	BE		CMP	M	Compare memory with acc if CY=1
F00B	DA,19,F0		JC	LARGE	If CY = 1 then goto label LARGE & executes instruction MOV A,M
F00E	57		MOV	D , A	Moves content A to D
F00F	7E		MOV	A , M	Moves content of M to A
F010	BB		CMP	E	Compare with E register if CY=0
F011	D2,15,F0		JNC	SMALL	If CY = 0 then goto label SMALL and executes instruction MOV A,D
F014	5F		MOV	E , A	Moves content of A to E
F015	7A	SMALL	MOV	A , D	Moves content of D to A
F016	C3,1A,F0		JMP	NEXT	Jumps unconditionally label NEXT & executes instruction DCR B
F019	7E	LARGE	MOV	A , M	Moves content of M to A
F01A	05	NEXT	DCR	B	Decrements counter
F01B	C2,09,F0		JNZ	BACK	If counter # 0 then goto label BACK & executes instruction INX H
F01E	23		INX	H	Increment HL by 1
F01F	77		MOV	M , A	Moves content of A to M
FO20	7B		MOV	A, E	Moves content of E to A
F021	23		INX	H	Increments HL address
F022	77		MOV	M , A	Moves content of A to M
F023	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	08H
C001H	09H
C002H	01H
C003H	07H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	01	00	00	09	01	54	0F	C0	05	FFEB	F024

Result Data After Execution

Address	Result
C004H	09H
C005H	01H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 14

Q1)a) A block of data is stored in MLs from C001H. The length of block is stored at ML C000H. Writes an ALP that sorts the given data in Ascending orders.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H, C000H	;Initialize HL
F003	4E		MOV	C, M	; Copy HL content to register C.
F004	21,01,C0	UP1	LXI	H, C001H	; Initialize HL
F007	79		MOV	A, C	; Copy content of register C into A.
F008	DE,01		SBI	01H	; A = A – 01H
F00A	47		MOV	B,A	; Copy content of A into register B.
F00B	7E	UP	MOV	A, M	; Copy content of HL into register A.
F00C	23		INX	H	; Increment address of HL by 1.
F00D	BE		CMP	M	; Compare A with HL content.
F00E	DA,16,F0		JC	DN	; Jump if cy=1 to label DN
F011	56		MOV	D, M	; Copy HL content into register D
F012	77		MOV	M, A	; Copy content of A into HL location.
F013	2B		DCX	H	; Decrement address of HL by 1.
F014	72		MOV	M, D	; Copy content of D register into HL location.
F015	23		INX	H	; Increment HL address by 1.
F016	05	DN	DCR	B	; Decrement content of register B by 1.
F017	C2, 0B,F0		JNZ	UP	; Jump to label UP if z=0.
F01A	0D		DCR	C	; Decrement content of register C by 1.
F01B	C2,04,F0		JNZ	UP1	; Jumps to label UP1 if z=0
F01E	CF		RST	1	; Stop processing

DATA (Before Execution)

Address	DATA
C000H	05H
C001H	02H
C002H	08H
C003H	01H
C004H	04H
C005H	03H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	E9	00	00	00	00	55	0F	C1	01	FFEB	F01F

Result Data After Execution

Address	Result
C001H	01H
C002H	02H
C003H	03H
C004H	04H
C005H	08H

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 8 SLIP NO 14

Q1)a) A block of data is stored in MLs from C001H. The length of block is stored at ML C00H. Writes an ALP that sorts the given data in Descending orders.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H, C000H	;Initialize HL
F003	4E		MOV	C, M	; Copy HL content to register C.
F004	21,01,C0	UP1	LXI	H, C001H	; Initialize HL
F007	79		MOV	A, C	; Copy content of register C into A.
F008	DE,01		SBI	01H	; A = A – 01H
F00A	47		MOV	B,A	; Copy content of A into register B.
F00B	7E	UP	MOV	A, M	; Copy content of HL into register A.
F00C	23		INX	H	; Increment address of HL by 1.
F00D	BE		CMP	M	; Compare A with HL content.
F00E	D2,16,F0		JNC	DN	; Jump if cy=0 to label DN
F011	56		MOV	D, M	; Copy HL content into register D
F012	77		MOV	M, A	; Copy content of A into HL location.
F013	2B		DCX	H	; Decrement address of HL by 1.
F014	72		MOV	M, D	; Copy content of D register into HL location.
F015	23		INX	H	; Increment HL address by 1.
F016	05	DN	DCR	B	; Decrement content of register B by 1.
F017	C2, 0B,F0		JNZ	UP	; Jump to label UP if z=0.
F01A	0D		DCR	C	; Decrement content of register C by 1.
F01B	C2,04,F0		JNZ	UP1	; Jumps to label UP1 if z=0
F01E	CF		RST	1	; Stop processing

DATA (Before Execution)

Address	DATA
C000H	**05H**
C001H	**06H**
C002H	**09H**
C003H	**01H**
C004H	**03H**
C005H	**02H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	00	00	F3	00	55	0F	C1	01	FFEB	F01F

Result Data After Execution

Address	Result
C001H	**09H**
C002H	**06H**
C003H	**03H**
C004H	**02H**
C005H	**01H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book Q3) Term Work Q4) Oral (Viva Vice)

EXPERIMENT : 10

SLIP NO 15

Q1)a) A block of data is stored in MLs from C001H. The length of block is stored at M.L C000H. Writes an ALP that counts the occurrences of the number D9H in the given block, Stores the result in M.L.D000H

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	1E,00		MVI	E, 00H	Set counter for how many times the data 05H is occurred
F002	3E,D9		MVI	A,D9H	Gets data byte D9H in ACC
F004	21,00,C0		LXI	H, C000H	Initialize address in HL
F007	56		MOV	D,M	Sets block counter
F008	23		INX	H	Increments HL address
F009	BE	BACK	CMP	M	If A=M then Z =1
F00A	C2,0E,F0		JNZ	NEXT	If Z =0 then goto label NEXT and executes instruction INX H
F00D	1C		INR E		If A=M then Z=1 then increments the counter of E
F00E	23	NEXT	INX	H	Increments the HL address
F00F	15		DCR	D	Decrements the counter
F010	C2,09,F0		JNZ	BACK	If counter # 0 i.e. D#0 then goto label BACK and executes instruction CMP M
F013	7B		MOV	A, E	Gets counter in ACC
F014	32,00,D0		STA	D000H	Stores counter in M.L.
F017	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	**05H**
C001H	**02H**
C002H	**D9H**
C003H	**D9H**
C004H	**D9H**
C005H	**B4H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	03	01	00	00	03	54	0F	C0	06	FFEB	F018

Result Data After Execution

Address	Result
D000H	**03H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in result 1's=3=odd ∴ Result is odd ∴ P=0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 10

SLIP NO 15

Q1)a) A block of data is stored in MLs from C001H. The length of block is stored at M.L C000H. Writes an ALP that counts the occurrences of the number B5H in the given block, Stores the result in M.L.D000H

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21, 00, C0		LXI	H, C000H	; Initialize HL
F003	4E		MOV	C,M	; Copy HL content to register C.
F004	16, 00		MVI	D,00	; Load Immediate data to regi D & clear.
F006	23	LOOP	INX	H	; Increment HL address by 1.
F007	7E		MOV	A,M	; Copy HL content into Accumulator.
F008	FE, B5		CPI	B5H	; Compare A with data B5H.
F00A	C2, 0E, F0		JNZ	NEXT	; Jump to label NEXT if z=0
F00D	14		INR	D	; Increment content of D by 1.
F00E	0D	NEXT	DCR	C	; Decrement content of C by 1.
F00F	C2, 06, F0		JNZ	LOOP	; Jump to label LOOP if z=0.
F012	7A		MOV	A,D	; Copy content of D register into A.
F013	32, 00, D0		STA	D000H	; Store content of A to ML D000H.
F016	CF		RST	1	; Stop processing

DATA (Before Execution)

Address	DATA
C000H	**05H**
C001H	**02H**
C002H	**B5H**
C003H	**08H**
C004H	**B5H**
C005H	**07H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	02	01	00	02	00	55	0F	C0	05	FFEB	F017

RESULT Data After Execution

Address	Result
D000H	**02H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 10 SLIP NO 16

Q1)a) A block of data is stored in MLs from C001H. The length of the block is stored at M.L.C000H. Writes a program that searches for the first occurrences of data byte ABH in the given block. Stores the address of this occurrences in the HL pair. If number is not found then HL pair must contains FFFFH.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,C0		LXI	H,C000H	Initialize HL address to location
F003	4E		MOV	C, M	Moves from memory to C regi.
F004	23		INX	H	Increment memory address
F005	3E,AB		MVI	A,ABH	Set data byte as FFH in ACC
F007	BE	UP	CMP	M	Compare data byte & content of memory
F008	CA,13,F0		JZ	END	If A=M i.e. FFH databyte occurred in Memory then HL address is becomes as data bytes location
F00B	23		INX	H	Increments HL address
F00C	0D		DCR	C	Decrements counter
F00D	C2,07,F0		JNZ	UP	If counter # 0 then goto label UP
F010	21,FF,FF		LXI	H,FFFFH	HL address is FFFFH if not found
F013	CF	END	RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	**05H**
C001H	**ABH**
C002H	**ABH**
C003H	**ABH**
C004H	**05H**
C005H	**12H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	AB	FF	05	00	8D	54	0F	C0	01	FFEB	F014

Result Data After Execution

Address	Result
H	**C0H**
L	**01H**
HL	**C001H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in Result number of 1's are 3 So that Result is odd. It is modified P=0.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 10

SLIP NO 16

Q1)a) A block of data is stored in MLs from C001H. The length of the block is stored at M.L.C000H. Writes a program that searches for the first occurrences of data byte FFH in the given block. Stores the address of this occurrences in the HL pair. If number is not found then HL pair must contains AABBH.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21, 00, C0		LXI	H,C000H	; Initialize HL.
F003	4E		MOV	C,M	; Copy content HL into register C.
F004	23	UP	INX	H	; Increment address of HL by 1.
F005	7E		MOV	A,M	; Copy HL content to register A.
F006	FE, FF		CPI	FFH	; Compare A with data FFH.
F008	CA, 12, F0		JZ	STOP	; Jump to label STOP if z=1.
F00B	0D		DCR	C	; Decrement content of C by 1.
F00C	C2, 04, F0		JNZ	UP	; Jump to label UP if z=0.
F00F	21, BB, AA		LXI	H,AABBH	; Initialize HL AABBH if not found data.
F012	CF	STOP	RST	1	; Stop processing.

DATA (Before Execution)

Address	**DATA**
C000H	**04H**
C001H	**02H**
C002H	**FFH**
C003H	**FFH**
C004H	**FFH**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	FF	FF	03	00	8D	54	0F	C0	02	FFEB	F013

Result Data After Execution

Address	**Result**
H	**C0H**
L	**02H**
HL	**C002H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ But in Result number of 1's are 3 So that Result is odd. It is modified P=0.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 10 SLIP NO 16

Q1)a) A block of data is stored in MLs from C001H. The length of the block is stored at M.L.C000H. Writes a program that searches for the first occurrences of data byte FFH in the given block. Stores the address of this occurrences in the HL pair. If number is not found then HL pair must contains FFFFH.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	11, 00, C0		LXI	D,C000H	; Initialize DE register pair.
D003	1A		LDAX	D	; Load A with DE register pair content.
D004	4F		MOV	C,A	; Copy content of A into register C.
D005	13	LOOP	INX	D	;Increment DE register pair address by 1.
D006	1A		LDAX	D	; Load A with DE register pair content.
D007	FE, FF		CPI	FFH	; Compare A with data FFH.
D009	C2, 10, D0		JNZ	NEXT	; Jump to label NEXT if z=0.
D00C	EB		XCHG		; Exchanges address of HL & DE.
D00D	C3, 17, D0		JMP	STOP	; Unconditional jump to label STOP.
D010	0D	NEXT	DCR	C	; Decrement content of C register by 1.
D011	C2, 05, D0		JNZ	LOOP	; Jump to label LOOP if z=0
D014	21, FF, FF		LXI	H, FFFFH	; Initialize HL with data FFFFH if data FFH is not found.
D017	CF	STOP	RST	1	; Stop processing

DATA (Before Execution)

Address	DATA
C000H	**04H**
C001H	**02H**
C002H	**03H**
C003H	**04H**
C004H	**05H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	05	01	00	C0	04	55	0F	FF	FF	FFEB	D018

RESULT : Data After Execution

Address	Result
H	**FFH**
L	**FFH**
HL	**FFFFH**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT :10 SLIP NO 17

Q1)a) A block of data is stored in MLs from C000H TO C004H. Writes a program to finds the number if odd as well as even numbers in the given block. Stores the results immediately after the end of the block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,CO		LXI	H,C000H	Initialize HL address as C000H
F003	0E,05		MVI	C,05H	Set block counter
F005	16,00		MVI	D,00H	Clear D regi & set as odd counter
F007	1E,00		MVI	E,00H	Clear E regi & set as even counter
F009	7E	BACK	MOV	A, M	Moves memory to ACC
F00A	0F		RRC		Rotate determine which determines the number is odd or even
F00B	D2,12,F0		JNC	NEXT	If CY=0 when execution of RRC instruction then increments even counter byte otherwise increments odd byte
F00E	14		INR	D	Increments D content if CY=1 when RRC instruction execution
F00F	C3,16,F0		JMP	GO	Jumps unconditionally to label GO & executes instruction INX H
F012	1C	NEXT	INR	E	Increments E counter if CY=0 when execution of instruction RRC instruction
F013	C3,16,F0		JMP	GO	Jumps unconditionally
F016	23	GO	INX	H	Increments HL address
F017	0D		DCR	C	Decrements block counter
F018	C2,09,F0		JNZ	BACK	If block counter # 0 i.e. C#0 then goto label BACK & executes instruction MOV A,M
F01B	72		MOV	M,D	Moves content in memory from D
F01C	23		INX	H	Increments HL address
F01D	73		MOV	M, E	Moves content in memory from E
F01E	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	05H
C001H	02H
C002H	07H
C003H	09H
C004H	B7H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	DB	01	00	04	01	55	0F	C0	06	FFEB	F01F

RESULT : Data After Execution

Address	Result
C005H	04H
C006H	01H

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT :10 SLIP NO 17

Q1)a) A block of data is stored in MLs from C000H TO C004H. Writes a program to finds the number if odd as well as even numbers in the given block. Stores the results immediately after the end of the block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
F000	21,00,CO		LXI	H,C000H	Initialize HL address as C000H
F003	0E,05		MVI	C,05H	Set block counter
F005	16,00		MVI	D,00H	Clear D regi & set as odd counter
F007	1E,00		MVI	E,00H	Clear E regi & set as even counter
F009	7E	BACK	MOV	A, M	Moves memory to ACC
F00A	E6,01		ANI	01H	Rotate determine which determines the number is odd or even
F00C	FE,01		CPI	01H	Compare A with B
F00E	DA,15,F0		JZ	NEXT	If CY=0 when execution of RRC instruction then increments even counter byte otherwise increments odd byte
F011	14		INR	D	Increments D content if CY=1 when RRC instruction execution
F012	C3,19,F0		JMP	GO	Jumps unconditionally to label GO & executes instruction INX H
F015	1C	NEXT	INR	E	Increments E counter if CY=0 when execution of instruction RRC instruction
F016	C3,19,F0		JMP	GO	Jumps unconditionally
F019	23	GO	INX	H	Increments HL address
F01A	0D		DCR	C	Decrements block counter
F01B	C2,09,F0		JNZ	BACK	If block counter # 0 i.e. C#0 then goto label BACK & executes instruction MOV A,M
F01E	72		MOV	M,D	Moves content in memory from D
F01F	23		INX	H	Increments HL address
F020	73		MOV	M, E	Moves content in memory from E
F021	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	**03H**
C001H	**02H**
C002H	**04H**
C003H	**06H**
C004H	**08H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	01	00	01	04	55	0F	C0	06	FFEB	F022

RESULT : Data After Execution

Address	Result
C005H	**01H**
C006H	**04H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

6) CY = 1 ∴ Result is 9-bit .
7) P = 1 ∴ Result is Even.
8) AC = 1 ∴ Carry is given from bit 3 to bit 4.
9) Z = 1 ∴ Result is zero.
10) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT :10 SLIP NO 17

Q1)a) A block of data is stored in MLs from C000H TO C004H. Writes a program to finds the number if odd as well as even numbers in the given block. Stores the results immediately after the end of the block.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment/Remark
D000	0E, 05		MVI	C,05H	; Move Immediate data 05H into C regi.
D002	21, 00, CO		LXI	H,C000H	; Initialize HL
D005	16, 00		MVI	D,00H	; Move immediate data to regi C & clear.
D007	1E, 00		MVI	E,00H	; Move immediate data to regi E & clear.
D009	CD, 10, D0		CALL	CHECK	; Subroutine Call
D00C	72		MOV	M,D	;Copy D to HL
D00D	23		INX	H	; Increment HL address by 1.
D00E	73		MOV	M,E	; Copy E to HL.
D00F	CF		RST	1	; Stop processing.
SUBROUTINE (CHECK)					
D010	7E	CHECK	MOV	A,M	; copy HL to A.
D011	0F		RRC		; Rotate right without carry.
D012	D2, 19, D0		JNC	NEXT	; Jump to label NEXT if cy=0.
D015	14		INR	D	; Increment D by 1.
D016	C3,1A, D0		JMP	GO	; Unconditional jump to label GO.
D019	1C	NEXT	INR	E	; Increment content of E by 1.
D01A	23	GO	INX	H	; Increment HL address by 1.
D01B	0D		DCR	C	; Decrement content of C regi. by 1.
D01C	C2,10, D0		JNZ	CHECK	; Jump to label CHECK if z=0
D01F	C9		RET		; Return from subroutine.

DATA (Before Execution)

Address	DATA
C000H	**01H**
C001H	**02H**
C002H	**03H**
C003H	**04H**
C004H	**05H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	82	01	00	03	02	55	0F	C0	06	FFEB	D010

RESULT : Data After Execution

Address	Result
C005H	**03H**
C006H	**02H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 55 = 01010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is Even.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 11

SLIP NO 18

Q1)a) Writes a program that separates the two nibbles of a number stored in ML C000H and stores the same in MLs C001H and C002H. The program must also multiply the two nibbles and stores the product in ML C003H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	21,00,C0		LXI	H,C000H	Initialize HL address as C000H
D003	7E		MOV	A , M	Moves content in ACC from memory
D004	E6,0F		ANI	OFH	Mask off 4bit of LSB's
D006	47		MOV	B, A	Moves content in B regi from Acc
D007	7E		MOV	A, M	Moves content in ACC from memory
D008	E6,F0		ANI	FOH	Mask off 4-bit of MSB's
D00A	0F		RRC		Exchanges contents of masked data
D00B	0F		RRC		
D00C	0F		RRC		
D00D	0F		RRC		
D00E	4F		MOV	C, A	Moves content in C regi from ACC
D00F	23		INX	H	Increments HL address
D010	70		MOV	M, B	Moves content in memory from B
D011	23		INX H		Increments HL address
D012	71		MOV	M, C	Moves contents in memory from C register
D013	3E,00		MVI	A, 00H	Clears content of ACC i.e. sum=00
D015	80	LOOP	ADD	B	[A] = [A] + [B]
D016	0D		DCR	C	Decrements counter
D017	C2,15,D0		JNZ	LOOP	If counter # 0 i.e. C # 0 then goto label LOOP and executes instruction ADD B
D01A	23		INX	H	If C=0 then increments HL address
D01B	77		MOV	M, A	Moves content in memory from A
D01C	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	24H
C001H	24H
C002H	24H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	08	04	00	00	00	54	0F	C0	03	FFEB	D01D

Result Data After Execution

Address	Result
C001H	04H
C002H	02H
C003H	08H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 11 SLIP NO 18

Q1)a) Writes a program that separates the two nibbles of a number stored in ML C000H and stores the same in MLs C001H and C002H. The program must also multiply the two nibbles and stores the product in ML C003H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	21, 00, C0		LXI	H,C000H	; Initialize HL
D003	7E		MOV	A,M	; Copy HL into register A.
D004	E6, OF		ANI	0FH	; ANDing A with data 0FH and maskoff MSB
D006	47		MOV	B,A	; Copy A into B.
D007	7E		MOV	A,M	; Copy HL into A.
D008	E6, FO		ANI	FOH	; ANDing A with data F0H and maskoff LSB
D00A	OF		RRC		; Rotate right 4 times and exchanges two 4bit nibbles.
D00B	OF		RRC		
D00C	OF		RRC		
D00D	OF		RRC		
D00E	57		MOV	D,A	; Copy A into D.
D00F	4A		MOV	C,D	; Copy D into C.
D010	3E, 00		MVI	A,00H	; Move immediate data 00H into A & clear.
D012	CD,18, D0		CALL	MUL	; Calls a subroutine.
D015	23		INX	H	; Increment HL address by 1.
D016	77		MOV	M,A	; Copy A content into HL location.
D017	CF		RST	1	; Stop processing.
SUBROUTINE MUL					
D018	80	MUL	ADD	B	; A = A + B
D019	0D		DCR	C	; Decrement C by 1.
D01A	C2, 18, D0		JNZ	MUL	; Jump to label MUL if z=0
D01D	C9		RET		; Return from subroutine.

DATA (Before Execution)

Address	DATA
C000H	13H
C001H	13H
C002H	13H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	03	03	00	01	00	54	0F	C0	01	FFEB	D018

Result Data After Execution

Address	Result
C001H	03H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 11 SLIP NO 18

Q1)a) Writes a program that separates the two nibbles of a number stored in ML C000H and stores the same in MLs C001H and C002H. The program must also multiply the two nibbles and stores the product in ML C003H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
F000	3A, 00, C0		LDA	C000H	; Load A with Memory location C000H.
F003	E6, 0F		ANI	0FH	; ANDing A with data 0FH and maskoff MSB
F005	5F		MOV	E,A	; Copy A to E.
F006	3A, 00, C0		LDA	C000H	; Load A with ML C001H.
F009	E6, F0		ANI	F0H	; ANDing A with data F0H and maskoff LSB
F00B	0F		RRC		; Rotate right without carry A with 4 times and exchanges two 4bit nibbles.
F00C	0F		RRC		
F00D	0F		RRC		
F00E	0F		RRC		
F00F	4F		MOV	C,A	; Copy A to C.
F010	16, 00		MVI	D,00H	; Move immediate data in regi D & clear.
F012	21, 00, 00		LXI	H,0000H	; Clear HL.
F015	19	LOOP	DAD	D	; HL = HL + DE
F016	0D		DCR	C	; Decrement C regi content by 1.
F017	C2, 15, F0		JNZ	LOOP	; jump to label LOOP if z=0.
F01A	22, 03, CO		SHLD	C003H	; Store HL to two consecutive ML C003H and C004H.
F01D	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	25H
C001H	25H
C002H	25H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	02	01	00	00	05	54	0F	00	0A	FFEB	F01E

Result Data After Execution

Address	Result
C003H	0AH
C004H	00H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 11 SLIP NO 19

Q1)a) A 4-byte hex number beginning with lower order byte is stored from MLs C000H. Writes a program that checks whether the given number is consider in hex is palindrome or not. If the number is palindrome then ML D000H must contains AAH else contains FFH.

Memory Address	Opcodes	Label	Mnemonics	Operand	Comment
F000	21,00,D0		LXI	H, D000H	; Initialize HL.
F003	36,FF		MVI	M, FFH	; Move immediate data FFH to HL location
F005	2A,00,C0		LHLD	C000H	; Load HL with two consecutive ML contents C000H and C001H.
F008	3A,03,C0		LDA	C003H	; Load A with ML data C003H.
F00B	0F		RRC		; Rotate right A without carry.
F00C	0F		RRC		; Rotate right A without carry.
F00D	0F		RRC		; Rotate right A without carry.
F00E	0F		RRC		; Rotate right A without carry.
F00F	95		SUB	L	; A = A – L
F010	C2, 23,F0		JNZ	STOP	; Jump to label STOP if z=0
F013	3A,02,C0		LDA	C002H	; Load A with ML data C002H.
F016	0F		RRC		; Rotate right A without carry.
F017	0F		RRC		; Rotate right A without carry.
F018	0F		RRC		; Rotate right A without carry.
F019	0F		RRC		; Rotate right A without carry.
F01A	94		SUB	H	; A = A – H
F01B	C2, 23, F0		JNZ	STOP	; jump to label STOP if z=0.
F01E	21, 00, D0		LXI	H, D000H	Initialize DE
F021	36, AA		MVI	M, AAH	; Load immediate data AAH to HL
F023	CF	STOP	RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	ABH
C001H	BCH
C002H	CBH
C003H	BAH

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	01	00	00	00	54	0F	D0	00	FFEB	F024

Result Data After Execution

Address	Result
D000H	AAH

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 11

SLIP NO 19

Q1)a) A 4-byte hex number beginning with lower order byte is stored from MLs C000H. Writes a program that checks whether the given number is consider in hex is palindrome or not. If the number is palindrome then MLD000H must contains 00H else contains FFH.

Memory Address	Opcodes	Label	Mnemonics	Operand	Comment
F0000	21, 00, C0		LXI	H,C000H	; Initialize HL
F003	11, 03, C0		LXI	D,C003H	; Initialize DE
F006	0E, 01		MVI	C,01H	;Move Immediate data 01H into register C.
F008	7E	LOOP	MOV	A,M	; Copy HL to register A.
F009	0F		RRC		; Rotate right A without CY
F00A	0F		RRC		; Rotate right A without CY
F00B	0F		RRC		; Rotate right A without CY
F00C	0F		RRC		; Rotate right A without CY
F00D	EB		XCHG		; Exchanges addresses of HL and DE.
F00E	BE		CMP	M	; Compare A with HL content.
F00F	C2, 21, F0		JNZ	EXIT	; Jump on label EXIT if z=0.
F012	EB		XCHG		; Exchanges addresses of HL and DE.
F013	23		INX	H	; Increment HL address by 1.
F014	1B		DCX	D	; Decrement address of DE by 1.
F015	0D		DCR	C	; Decrement content of C by 1.
F016	C2,08, F0		JNZ	LOOP	; Jump to label LOOP if z=0
F019	21, 00, D0		LXI	H,D000H	; Initialize DE register pair.
F01C	36, AA		MVI	M,AAH	; Move immediate data AAH into HL.
F01E	C3,26, F0		JMP	STOP	; Unconditional jump to label STOP.
F021	21, 00, D0	EXIT	LXI	H,D000H	; Initialize DE register pair.
F024	36, FF		MVI	M,FFH	; Move immediate data FFH to HL.
F026	CF	STOP	RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	CBH
C001H	A9H
C002H	9AH
C003H	BCH

Result

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	BC	01	00	C0	02	54	0F	D0	00	FFEB	F027

RESULT: Data After Execution

Address	Result
D000H	AAH

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 11

SLIP NO 20

Q1)a) Write a program that multiplies two 1-byte hex numbers, stored in consecutive MLs starting from C000H by rotation. Stores the two byte result in the consecutive MLs starting from C002H beginning with lower order byte.

Memory Address	Opcodes	Label	Mnemonics	Operand	Comment
D000	21, 00, C0		LXI	H,C000H	; Initialize HL
D003	5E		MOV	E,M	; Copy HL content to E.
D004	16, 00		MVI	D,00H	; Move immediate data 00H to D & clear.
D006	23		INX	H	; Increment HL by 1.
D007	7E		MOV	A,M	; Copy HL to A.
D008	21, 00, 00		LXI	H,0000H	; Initialize HL & clear.
D00B	0E, 08		MVI	C,08H	; Move immediate data 08H to C.
D00D	29	UP	DAD	H	; HL = HL + HL
D00E	07		RLC		; Rotate left accumulator without carry.
D00F	D2, 13, D0		JNC	DN	; Jump if cy=0 to label DN
D012	19		DAD	D	; HL= HL + DE
D013	0D	DN	DCR	C	; Decrement C by 1.
D014	C2, 0D, D0		JNZ	UP	; Jump on label UP if z=0
D017	22, 02, C0		SHLD	C002H	; Store HL to two consecutive ML C002H & C003H.
D01A	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	03H
C001H	02H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	02	01	00	00	03	54	0F	00	06	FFEB	D01B

RESULT: Data After Execution

Address	Result
C002H	06H
C003H	00H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 11

SLIP NO 20

Q1)a) Write a program that multiplies two 1-byte hex numbers, stored in consecutive MLs starting from C000H by rotation. Stores the two byte result in the consecutive MLs starting from C002H beginning with lower order byte.

Memory Address	Opcodes	Label	Mnemonics	Operand	Comment
D000	21, 00, C0		LXI	H,COOOH	; Initialize HL
D003	5E		MOV	E,M	; Copy HL to register E.
D004	16, 00		MVI	D,00H	; Move immediate 00H to D & clear.
D006	23		INX	H	; Increment HL by 1.
D007	7E		MOV	A,M	; Copy HL to A.
D008	21, 00, 00		LXI	H,0000H	; Initialize HL and clear.
D00B	0E, 08		MVI	C,08H	; Move immediate data 08H to C.
D00D	17	MUL	RAL		; Rotate left A with carry.
D00E	D2,12, D0		JNC	GO	; jumps to label GO if cy =0
D011	19		DAD	D	; HL = HL + DE
D012	0D	GO	DCR	C	; Decrement C by 1.
D013	CA, 1A, D0		JZ	STORE	; Jump on label STORE if z=1.
D016	29		DAD	H	; HL = HL + HL.
D017	C3, 0D, D0		JMP	MUL	; Unconditional jump to label MUL
D01A	22, 02, C0	STORE	SHLD	C002H	; Store HL to two consecutive ML C0002H & C003H.
D01D	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	09H
C001H	23H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	00	01	00	00	09	54	0F	01	3B	FFEB	D01E

RESULT: Data After Execution

Address	Result
C002H	3BH
C003H	01H

Flags After Execution & Interpret's its meaning is

After Execution = F = 54 = 01010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 But 1's=3=odd ∴ Result is odd & p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 1 ∴ Result is zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 12 SLIP NO 21

Q1)a) Write a program that performs the following in the given sequential order :

1. Clears all flags.
2. Loads 00h in accumulator and stores all flags in the stack. This should be done to demonstrate (using stack) , that flags are not affected by data transfer instructions.
3. Logically OR the accumulator with itself to set zero flag and stores all the flags in the stack. This should be done to demonstrate (using stack) that flags are affected by logic instructions.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	31,99,C0		LXI	SP,C099H	Initialize stack address as C099H
D003	2E,00		MVI	L , 00H	Clear L register
D005	E5		PUSH	H	Place L on flag
D006	F1		POP	PSW	Clear flags
D007	3E,00		MVI	A , 00H	Load 00H
D009	F5		PUSH	PSW	Saves flags on stack
D00A	E1		POP	H	Retrieve flags in L register
D00B	7D		MOV	A , L	Get content in ACC
D00C	D3,00		OUT	00H	Display flags
D00E	3E,00		MVI	A , 00H	Load 00H again
D010	B7		ORA	A	Set flags & reset CY,AC flags
D011	F5		PUSH	PSW	Saves flag on stack
D012	E1		POP	H	Retrieves flags in L
D013	7D		MOV	A , L	Get content in ACC
D014	E6,40		ANI	40H	Masks all flags except ‘Z’ flag
D016	D3,01		OUT	01H	Display flag on port 1
D018	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	**DATA**
C099H	**12H**
C098H	**00H**
C097H	**00H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	40	01	00	00	00	10	0F	00	44	C099	D019

Result Data After Execution

Address	**RESULT**
C099H	**12H**
C098H	**40H**
C097H	**10H**

Flags After Execution & Interpret’s its meaning is

After Execution = F = 10 = 00010000

1) CY = 0 ∴ Result is 8-bit .
2) P = 0 ∴ Result is odd .
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 13 SLIP NO 22

Q1)a) Writes a program to converts a 2-digit BCD numbers stored at ML C000H into its binary equivalent and stores the binary value in ML C001H

Memory Address	Opcodes	Label	Instructions	Operand	Comment
D000	21,00,C0		LXI	H, C000H	Set memory pointer in HL
D003	01,01,CO		LXI	B, C001H	Set 2nd memory pointer in BC rp
D006	7E		MOV	A , M	Moves memory TO ACC
D007	C5		PUSH	B	Stores BC to stack
D008	D5		PUSH	D	Stores DE to stack
D009	47		MOV	B, A	Moves ACC to B
D00A	E6,0F		ANI	OFH	Makes logical ANDing
D00C	4F		MOV	C, A	Moves A to C
D00D	78		MOV	A, B	Moves B to A
D00E	E6,F0		ANI	FOH	Makes logical ANDing
D010	0F		RRC		Shifts two nibbles and exchanges its contents
D011	0F		RRC		
D012	0F		RRC		
D013	0F		RRC		
D014	57		MOV	D, A	Moves A TO D
D015	AF		XRA	A	Reset CY flag
D016	1E,0A		MVI	E, OAH	Set E = 0AH
D018	83	SUM	ADD	E	[A] = [A] + [E]
D019	15		DCR	D	Decrement count
D01A	C2,18,D0		JNZ	SUM	If count # 0 then jumps to label SUM & executes instruction ADD E
D01D	89		ADD	C	If count = 0 then [A] = [A]+[D]
D01E	D1		POP	D	Restores data of stack to DE
D01F	C1		POP	B	Restores data of stack to BC
D020	02		STAX	B	Stores ACC to B
D021	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	DATA
C000H	99H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	63	C0	01	00	00	14	0F	C0	00	FFEB	D022

Result Data After Execution

Address	Result
C001H	63H

Flags After Execution & Interpret's its meaning is

After Execution = F = 14 = 00010100

1) CY = 0 ∴ Result is 8-bit .
2) P = 0 But 1's=2=even. So that Result is even. ∴ p=1 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book
Q3) Term Work
Q4) Oral (Viva Vice)

EXPERIMENT : 13

SLIP NO 22

Q1)a) Writes a program to converts a 2-digit BCD numbers stored at ML C000H into its binary equivalent and stores the binary value in ML C001H

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	21, 00, C0		LXI	H, C000H	; Initialize HL.
D003	7E		MOV	A, M	; Copy HL into A
D004	E6, 0F		ANI	OFH	; ANDing A with 0FH & maskoff MSB
D006	47		MOV	B, A	; Copy A to B
D007	0E, 0A		MVI	C, 0AH	; Move Immediate 0AH to C.
D009	7E		MOV	A, M	; Copy HL to A.
D00A	E6, F0		ANI	F0H	; ANDing A with F0H & maskoff LSB.
D00C	0F		RRC		; Rotate right A without cy
D00D	0F		RRC		; Rotate right A without cy
D00E	0F		RRC		; Rotate right A without cy
D00F	0F		RRC		; Rotate right A without cy
D010	57		MOV	D, A	; Copy A to D.
D011	3E, 00		MVI	A, 00H	; Move Immediate 00H to A & clear.
D013	82	UP	ADD	D	; A = A + D.
D014	0D		DCR	C	; Decrement C by 1.
D015	C2, 13, D0		JNZ	UP	; Jump to label UP if z=0
D018	80		ADD	B	; A = A + B
D019	32, 01, C0		STA	C001H	; Store A into ML C001H.
D01C	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	DATA
C000H	89H

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	59	09	00	08	00	04	0F	C0	00	FFEB	D01D

Result Data After Execution

Address	Result
C001H	59H
C002H	00H
C003H	00H

Flags After Execution & Interpret's its meaning is

After Execution = F = 04 = 00000100

1) CY = 0 ∴ Result is 8-bit .
2) P = 1 ∴ Result is even. But 1's = 1= odd. So that p =0 modified.
3) AC = 0 ∴ Carry is not given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 13

SLIP NO 23

Q1a) Writes a program to converts a binary number stored at ML C000H into its BCD equivalent and stores the three digit BCD number in two consecutive MLs starting at C0001H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	21,00,C0		LXI	H, C000H	Set memory pointer in HL
D003	7E		MOV	A , M	Moves memory to ACC
D004	23		INX	H	Increments HL address
D005	06,64		MVI	B, 64H	Set [B] = 64H
D007	36,FF		MVI	M ,FFH	Set [M] = FFH
D009	34	UP	INR	M	Increments memory data
D00A	90		SUB	B	[A] = [A] – [B]
D00B	D2,09,D0		JNC	UP	Jumps to label UP if CY = 0
D00E	80		ADD	B	If CU =1 then [A] = [A]+[B]
D00F	23		INX	H	Increments HL address
D010	06,0A		MVI	B, 0AH	Sets [B]=0AH
D012	36,FF		MVI	M , FFH	Memory=M=FFH
D014	34	UP1	INR	M	Increments memory data
D015	90		SUB	B	[A] = [A] - [B]
D016	D2,14,D0		JNC	UP1	Jumps to label UP1 if CY=0
D019	80		ADD	B	If CY=1 then [A]=[A]+[B]
D01A	23		INX	H	Increments HL address
D01B	77		MOV	M , A	Moves content in memory from A
D01C	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	**DATA**
C000H	**35H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	03	0A	00	00	00	15	0F	C0	03	FFEB	D01D

Result Data After Execution

Address	**Result**
C001H	**00H**
C002H	**05H**
C003H	**03H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 15 = 00010101

1) CY = 1 ∴ Result is 9-bit .
2) P = 1 ∴ Result is even . But 1's = 3 = odd. So that p= 0 modified.
3) AC = 1 ∴ Carry is given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 13

SLIP NO 24

Q1)a) A 2-digit hex number is stored in ML C000H. Writes a program to coverts each digit of this number into ASCII equivalent, and stores the ASCII codes in MLs C001H and C002H.

Memory Address	Opcodes	Label	Mnemonic	Operand	Comment
D000	21, 00, C0		LXI	H, C000H	; Initialize HL.
D003	7E		MOV	A,M	; Copy HL to A.
D004	E6, F0		ANI	F0H	; ANDing A with data 0FH & maskoff LSB.
D006	0F		RRC		; Rotate right A without cy.
D007	0F		RRC		; Rotate right A without cy.
D008	0F		RRC		; Rotate right A without cy.
D009	0F		RRC		; Rotate right A without cy.
D00A	FE, 0A		CPI	0AH	; Compare A with data 0AH.
D00C	DA, 11, D0		JC	NEXT	; Jump to label NEXT if cy=1
D00F	C6, 07		ADI	07H	; A = A + 07H
D011	C6, 30	NEXT	ADI	30H	; A = A + 30H
D013	57		MOV	D , A	; Copy A to D.
D014	7E		MOV	A, M	; Copy HL to A.
D015	E6, 0F		ANI	0FH	; ANDing A with data 0FH.
D017	FE, 0A		CPI	0AH	; Compare A with data 0AH.
D019	DA, 1E, D0		JC	GO	; Jump to label GO if cy=1.
D01C	C6, 07		ADI	07H	; A = A + 07H.
D01E	C6, 30	GO	ADI	30H	; A = A + 30H.
D020	5F		MOV	E, A	; Copy A to E.
D021	EB		XCHG		; Exchanges addresses of HL & DE
D022	22, 01, C0		SHLD	C001H	; Stores HL to two consecutive ML C001H & C002H.
D025	CF		RST	1	; Stop processing.

DATA (Before Execution)

Address	**DATA**
C000H	**63H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	33	01	00	C0	00	04	0F	36	33	FFEB	D026

Result Data After Execution

Address	**Result**
C001H	**33H**
C002H	**36H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 04 = 00000100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ Result is even . But 1's = 1 = odd. So that p= 0 modified.
3) AC = 0 ∴ Carry is not given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)

EXPERIMENT : 13

SLIP NO 25

Q1)a) Two ASCII codes for hexadecimal digits are stored at MLs C000H and C001H. Writes an ALP to converts the codes into their hexadecimal equivalents. Stores the two respective hexadecimal equivalents as data in a single M.L. C002H.

Memory Address	Opcodes	Label	Mnemonic	Opeand	Comment
D000	3A,00,C0		LDA	C000H	Loads ACC with memory
D003	D6,30		SUI	30H	Subtracts 30H from ACC
D005	FE,0A		CPI	OAH	Compare with 0AH
D007	DA,0C,D0		JC	DOWN	If CY=1 then execute MOV B,A
D00A	D6,07		SUI	07H	If CY=0 then [A]=[A]-07
D00C	47	DOWN	MOV	B , A	Moves A to B
D00D	3A,01,C0		LDA	C001H	Loads ACC with memory location
D010	D6,30		SUI	30H	[A]=[A] - 30H
D012	FE,0A		CPI	0AH	Compare with 0AH
D014	DA,19,D0		JC	DOWN1	If CY=1 then executes MOV C,A
D017	D6,07		SUI	07H	If CY=0 then [A]=[A]-07H
D019	4F	DOWN1	MOV	C, A	Moves A to C
D01A	78		MOV	A, B	Moves B TO A
D01B	07		RLC		Shits lefts and exchanges contents
D01C	07		RLC		
D01D	07		RLC		
D01E	07		RLC		
D01F	81		ADD	C	[A]=[A]+[C]
D020	32,02,C0		STA	C002H	Stores result
D023	CF		RST	1	S/W interrupting

DATA (Before Execution)

Address	**DATA**
C000H	**38H**
C001H	**34H**

Q1)b) Enters the program on the microprocessor kit.

Q1)c) Execution of program

Registers	A	B	C	D	E	F	I	H	L	SP	PC
After Execution	84	08	04	00	00	A4	0F	FF	FE	FFEB	D024

Result Data After Execution

Address	**RESULT**
C002H	**84H**

Flags After Execution & Interpret's its meaning is

After Execution = F = 04 = 00000100

1) CY = 1 ∴ Result is 8-bit .
2) P = 1 ∴ Result is even . But 1's = 1 = odd. So that p= 0 modified.
3) AC = 0 ∴ Carry is not given from bit 3 to bit 4.
4) Z = 0 ∴ Result is non zero.
5) S = 0 ∴ Result is Positive.

Q2) Record Book

Q3) Term Work

Q4) Oral (Viva Vice)