Q.1. In an 8085 microprocessor, the content of the accumulator and the carry flag are A7 (in Hex) and 0, respectively, If the instruction RLC is executed, what will be the content of the accumulator (in hex) and the carry flag?

Soln: RLC - Rotate accumulator left

$[A_{n+1}] \leftarrow [A^n]$, $[A^0] \leftarrow [A^7]$, $[CS] \leftarrow [A^7]$

Before execution:-

Accumulator (Reg A) = A7H = $(10100111)_2$

Carry (CS) = 0

After execution:-

Accumulator (Reg A) = 4FH = $(01001111)_2$

carry (CS) = 1

Q.2. The following five instructions were executed on an 8085 microprocessor. What is the value of the accumulator immediately after the execution of the fifth instruction?

1. MVI A, 33H
2. MVI B, 78H
3. ADD B
4. CMA
5. ANI 32H

Soln:

CMA : Complement the Accumulator

ANI data : AND immediate data with accumulator

Execution:-

instruction	Register	value
line 1:	Accumulator	= 33H = $(00110011)_2$
line 2:	Reg B =	78H = 01111000_2
line 3:	Accumulator =	ABH = $(10101011)_2$
line 4:	Accumulator	= 54H = $(01010100)_2$
line 5:	Accumulator	= 10H = $(00010000)_2$

Hence, the value of Accumulator after execution of fifth instruction is 10H

Q.3 An 8085 assembly language program is given below. Assume that the carry flag is initially unset. What is the value of the accumulator after the execution of the program. Explain each step.

```
MVI A, 07H
RLC
MOV B, A
RLC
RLC
ADD B
RRC
```

Soln:-

MVI A, 07H // We move data (07H) immediately to accumulator.

RLC // We rotate the content of accumulator to left, and A_7 is stored to carry. (Bitwise)

MOV B, A // We copy the content of accumulator into Reg B.

RLC // We rotate the content of accumulator to left, and A_7 is stored to carry (Bitwise)

RLC // same as above

ADD B // Add the content of RegB to the content of accumulator.

RRC // we rotate the content of accumulator to right, and A_0 is stored to carry (Bitwise).

Instruction	Register	Value(in hex)	value in Binary	Carry
MVI A, 07H	A	07	00000111	0
RLC	A	0E	00001110	0
MOV B, A	B	0E	00001110	0
RLC	A	1C	00011100	0
RLC	A	38	00111000	0
ADD B	A	46	01000110	0
RR C	A	23	00100011	0

Q4 Which of the following instruction in 8085 does not belong to data transfer group?

a) LXI rp, data 16
b) MOV M, r
c) MVI M, data
d) ADC M

Soln:- ADC M, Add memory with carry to accumulator, also this instruction belongs to arithmetic group.

Q5 In an 8085 microprocessor, which one of the following instruction changes the content of the accumulator?

a) MOV B, M
b) PCHL
c) RNZ
d) SBI BEH

Soln: SBI BEH, Substract immediate data from accumulator with borrow.
As this instruction belong to arthimetic group which updates the data of accumulator.

Q.6 For 8085 microprocessor, the following program is executed. At the end of program, what is the value of the accumulator?

```
      MVI A, 05H
      MVI B, 05H
PTR:  ADD B
      DCR B
      JNZ PTR
      ADI 03H
      HLT
```

Soln: After the execution of 1st and 2nd instruction '05H' is moved to Reg A & Reg B.

After the execution of 3rd and 4th instruction the content of Reg B is added to ~~Reg~~ content of Reg A and the content of Reg B is decremented.

Due to JNZ instruction the program will run from PTR till Reg B value becomes 0.

Then 08 H is added to Content of Reg A.
Hence, the value of Accumulator is 17 H.

Q7. In a microprocessor, what is the name of ~~Re~~ register which holds the adress of the next instruction to be fetched.

Soln. Program counter (PC) is the register which holds the adress of the next instruction to be fetched.

Q.8 For the 8085 assembly language program given below, what is the value of the accumulator after the execution of the program. Eloborate each step.

Soln.

Memory adress	Instruction	explanation
3000	MVI A, 45H	45 H is moved immediately to the accumulator.
3002	MOV B, A	The content of accumulator i.e 45H, to the Reg B.
3003	STC	Carry is set to 1
3004	CMC	Carry is complimented, CY = 0
3005	RAR	the content of accumulator is rotated ~~thro~~ right through carry. content of accumulator is 22H.
3006	XRA B	XOR the content of Reg B with the Content of accumulator i.e 22 ^ 45 = 67 H

Hence, the value of accumulator is 67 H

Q.9. An 8085 assembly language program is given below. What is the content of the accumulator just after ~~execution of the program.~~ Etc execution of the ADD instruction on line 4?

Line 1 : MVI A, B5H
Line 2 : MVI B, 0EH
Line 3 : XRI 69H
Line 4 : ADD B
Line 5 : ANI 9BH
Line 6 : CPI 9FH
Line 7 : STA 3010H
Line 8 : HLT

Soln:- In line 1 and 2, the data B5H & 0EH moved to Reg A & Reg B respectively.

In line 3, the content of Reg A is XORed B5H ⊕ 69H = DCH

In line 4, the content of Reg B added to content of Reg A

i.e DCH + 0EH ⇒ EAH

Hence, the content of accumulator after the execution of 4th line is EAH.

Q.10 As 8085 assembly language program is given below. After execution, what will be the status of the CY and Z flags.

Line 1 : MVI A, B5H
2: ~~XRI 69H~~ MVI B, 0EH
3: XRI 6H
4: ADD B
5: ANI 9BH
6: CPI 9FH
7: STA 3010H
8: HLT

Soln: After execution of this 8085 assembly language program the status of CY flag is 1 and Z flag is 0.

8.11 In an 8085 microprocessor, the instruction CMP B has been executed while the content of the accumulator is less than that of Reg B. What is the status of Carry flag and zero flag.?

Soln. Let the content of accumulator is 05H
and the content of Reg B is 09H
then, after executing CMP instruction the status of Carry flag is 1 and zero flag is 0.

8.12 The content of Reg B and Accumulator (A) of 8085 microprocessor are 49H and 3AH respectively. What are the content of A and the status of Carry flag (CY) and Sign flag (S) after executing SUB B instruction?

Soln.

```
MVI  B, 49H
MVI  A, 3AH
SUB  B
HLT
```

After execution of above program,
the content of accumulator is F1H
Status of Carry flag (CY) = 1
Status of sign flag (S) = 1