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$$1) F(A, B, C, D) = \sum m(0, 1, 3, 5, 7, 8, 9, 11, 13, 15)$$

AB \ CD	00	01	11	10
00	1	1	1	
01		1	1	
11		1	1	
10	1	1	1	

from k-map

$$F = 0 + \bar{B}\bar{C}$$

$$2) A = 110110, B = 010110$$

By 2's complement method

$$2's \text{ complement of } B = 11101010 \text{ (In 8 bit format)}$$

$$A = 00110110$$

$$A + B = \begin{array}{r} 00110110 \\ 11101010 \\ \hline 10010000 \end{array}$$

Discarding the end carry

$$A - B = 100000$$

By B's complement

$$1's \text{ complement of } B = 101001$$

$$A + B$$

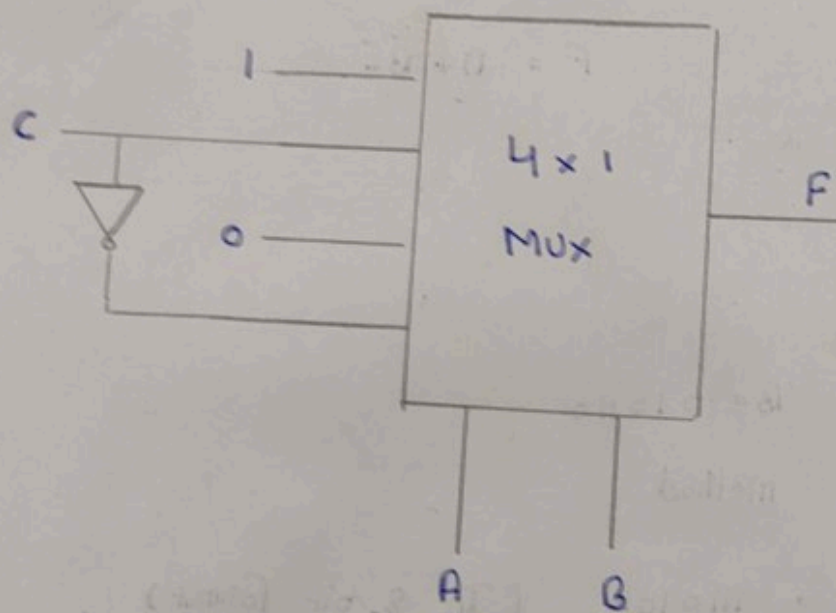
$$\begin{array}{r} 110110 \\ 101001 \\ \hline 101111 \end{array}$$

Add the carry

$$A - B = 100000$$

4) $F(A, B, C) = \sum m(0, 1, 3, 6)$

	I_0	I_1	I_2	I_3
\bar{C}	⑥	2	4	⑦
C	①	③	5	7
	1	C	0	\bar{C}



5) To create state table, we need state equation and these can be easily obtained from the given figure

$$A^+ = A \oplus T_A = A \oplus (x.B)$$

$$T_A = x.B$$

$$B^+ = B \oplus T_B$$

$$B = x$$

$$y = A^+ . B^+$$

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Present state	Input	Next state		output	T_A	T_B
A	B	x	A^+ B^+	y		
0	0	0	0 0	0	0	0
0	0	1	0 1	0	0	1
0	1	0	0 1	0	0	0
0	1	1	1 0	0	1	1
1	0	0	1 0	0	0	0
1	0	1	1 1	1	0	1
1	1	0	1 1	1	0	0
1	1	1	0 0	0	1	1

6) $Q_1 = Q_2 = 0$

