



Ex: a) Find the sum of the following hexadecimal numbers and express the answer in binary and Binary Coded Decimal (BCD).

$$A3 + 7F$$

b) Find the product of the following binary numbers and express the answer in octal.

$$101011 \cdot 011001$$

c) A Flip-Flop circuit, truth table, and timing diagram are shown below. Fill in the missing waveform for Q in the timing diagram.

\overline{PRE}	\overline{CLR}	CLK	J	K	Q	\overline{Q}	MODE
0	1	X	X	X	1	0	Preset
1	0	X	X	X	0	1	Clear
0	0	X	X	X	-	-	not used
1	1	↑	0	0	Q	\overline{Q}	Hold
1	1	↑	0	1	0	1	Reset
1	1	↑	1	0	1	0	Set
1	1	↑	1	1	\overline{Q}	Q	Toggle
1	1	not ↑	X	X	Q	\overline{Q}	Hold

SOL'N: We use a truth table to map A and B to J and K.

A	B	J = A	K	Mode
0	0	0	0	Hold
0	1	0	1	Reset
1	0	1	1	Toggle
1	1	1	1	Toggle

The timing diagram below shows the modes at the up-going edges of the clock. When C goes low, the CLR overrides the J and K inputs, however.

