

1) JK to T FlipFlop

• Truth table of T FlipFlop.

T	Q_n	Q_{n+1}
0	0	0
0	1	1
1	0	1
1	1	0

• Excitation table of JK.

Q_n	Q_{n+1}	J	K
0	0	0	x
0	1	1	x
1	0	x	1
1	1	x	0

• Append the excitation table of the given FF to the truth table of desired FF appropriately.

T	Q_n	Q_{n+1}	J	K
0	0	0	0	x
0	1	1	x	0
1	0	1	1	x
1	1	0	x	1

• K Map

J =

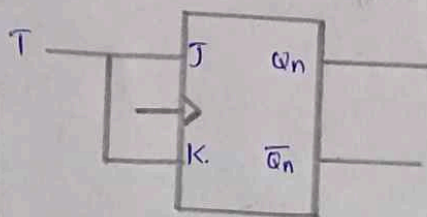
	Q_n	0	1
T	0	0	x
	1	1	x

= J = T

K =

	Q_n	0	1
T	0	x	0
	1	x	1

K = T



2) T to JK

• Truth table of JK.

J	K	Q_n	Q_{n+1}
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

• Excitation table of T

Q	Q_{n+1}	T
0	0	0
0	1	1
1	0	1
1	1	0

• combine tables.

J	K	Q_n	Q_{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	1

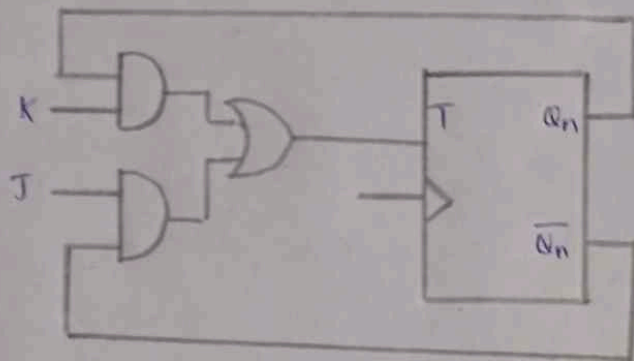
• Kmap.

		KQ_n			
		00	01	11	10
J	0	0	0	1	0
	1	1	0	1	1

$$T = KQ_n + JK + J\bar{Q}_n$$

$$= KQ_n + J\bar{Q}_n$$

• circuit diagram



3) SR to T

• Truth table of T flipflop

T	Q_n	Q_{n+1}
0	0	0
0	1	1
1	0	1
1	1	0

• Excitation table of SR

Q_n	Q_{n+1}	S	R
0	0	0	x
0	1	1	0
1	0	0	1
1	1	x	0

• combine tables.

T	Q_n	Q_{n+1}	S	R
0	0	0	0	x
0	1	1	x	0
1	0	1	1	0
1	1	0	0	1

• Draw K map

		Q_n	
		0	1
S =	T	0	x
	1	1	0

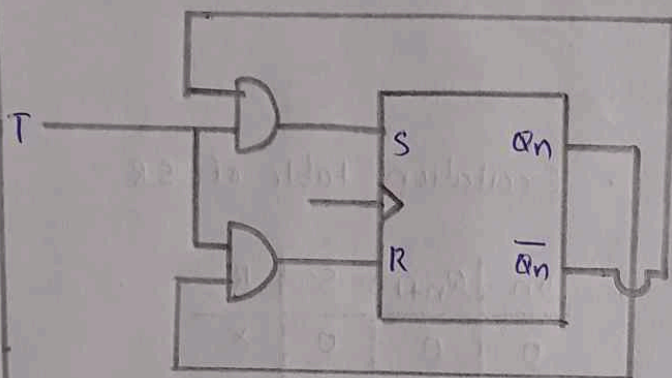
$$S = T \bar{Q}_n$$

$R =$

$T \backslash Q_n$	0	1
0	X	0
1	0	1

$$R = Q_n T$$

• Circuit Diagram



4) T to SR

• Truth table of SR.

S	R	Q_n	Q_{n+1}
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	10
1	1	1	10

• Excitation table of T

Q	Q_{n+1}	T
0	0	0
0	1	1
1	0	1
1	1	0

• combine table

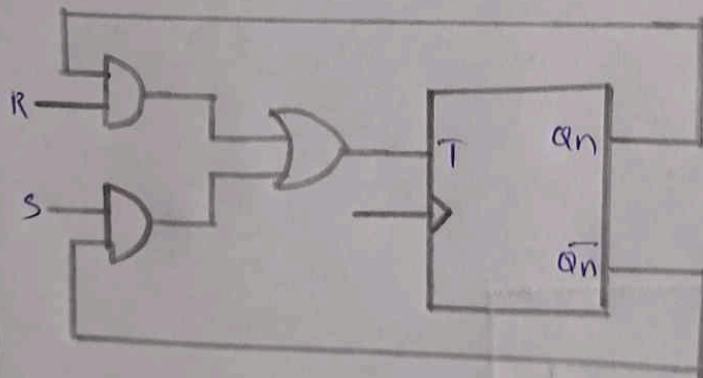
S	R	Q_n	Q_{n+1}	T
0	0	0	0	0
0	0	1	1	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	10	X
1	1	1	10	X

• Kmap

		RQ_n			
		00	01	11	10
T=	S	0	0	1	0
	1	1	0	X	X

$$T = RQ_n + S\overline{Q_n}$$

• Circuit diagram



5) T to D

• Truth table of D Flipflop

D	Q_n	Q_{n+1}
0	0	0
0	1	0
1	0	1
1	1	1

• Excitation table of T FF

Q_n	Q_{n+1}	T
0	0	0
0	1	1
1	0	1
1	1	0

• Combine tables

D	Q_n	Q_{n+1}	T
0	0	0	0
0	1	0	1
1	0	1	1
1	1	1	0

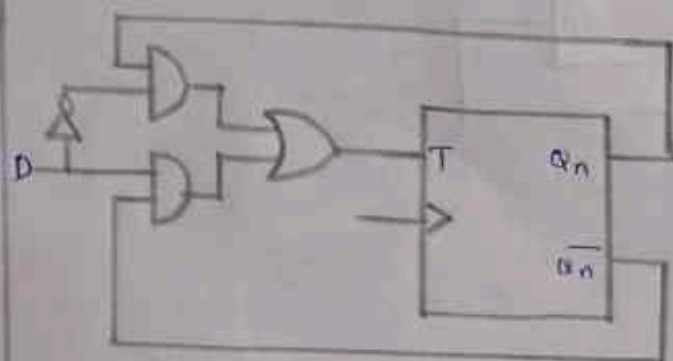
• Kmap

T =

D \ Q_n	0	1
0	0	1
1	1	0

$$T = D\bar{Q}_n + \bar{D}Q_n$$

• Circuit diagram



(b) D to T Flipflop

• Truth table of T flipflop

T	Q_n	Q_{n+1}
0	0	0
0	1	1
1	0	1
1	1	0

• Excitation table of D Flipflop

Q_n	Q_{n+1}	D
0	0	0
0	1	1
1	0	0
1	1	1

• Combine table

T	Q_n	Q_{n+1}	D
0	0	0	0
0	1	1	1
1	0	1	1
1	1	0	0

• K map

	Q_n	0	1
T	0	0	1
D	1	1	0

$$D = T\bar{Q}_n + \bar{T}Q_n$$

• circuit diagram

