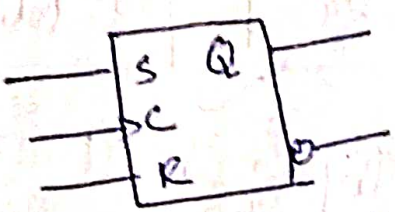
→ Flip-flops :→ The storage elements in clocked sequence circuit are called flip-flops. A flip-flop is a binary cell capable of storing one bit of information. It has two outputs one for normal value and one for the complement value of the bit stored in it. The difference between various flip-flops is in the no. of inputs they posses and in the manner in which the inputs affect the binary state.

Types of flip-flops :-

① SR-flip-flop :→ (set-reset flip flop)

It has 3 inputs, labeled as S, R and C (clock). It has an output Q and its complemented output. The overhead triangle shaped symbol in front of C is designated to be dynamic → input



Graphical Symbol

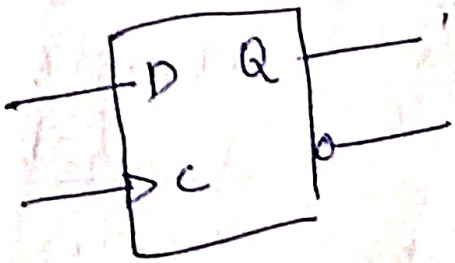
S	R	T(Q+1)
0	0	Q↑ no change
0	1	0 clear to 0
1	0	1 set to 1
1	1	indeterminate

Characteristic table

② D (Delay) flip-flop :→

↳ slight modification of SR-flip flop

An SR flip-flop is converted to D-flip-flop by insert→ an inverter b/w S and R assign→ the symbol D to the ~~input~~ ~~sign~~ single input

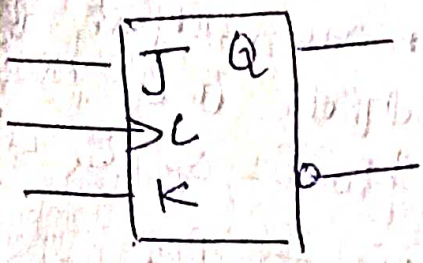


D	T(Q+1)
0	0 clear to 0
1	1 set to 1

③ JK-flip-flop :→

→ refinement of SR flip-flop

Indeterminate condition of SR- type is defined by JK flip flop.

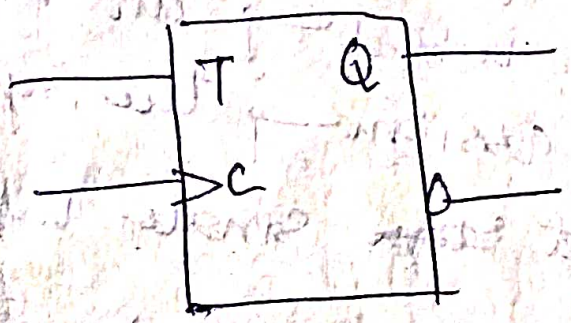


Graphical symbol

J	K	t(Q+1)
0	0	t(Q) no change
0	1	0 clear to 0
1	0	1 set to 1
1	1	t'(Q) complem

④ T (toggle) flip-flop :→

→ Obtained from JK flip-flop when J and K are combined to provide a single input designated to T.



Graphical Symbol

T	T(Q+1)
0	Q(t) nochange
1	Q'(t) complemet

Characteristics table