DIGITAL ELECTRONICS:
T FLIPFLOP

SNS COLLEGE OF ENGINEERING

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An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

T FlipFlop

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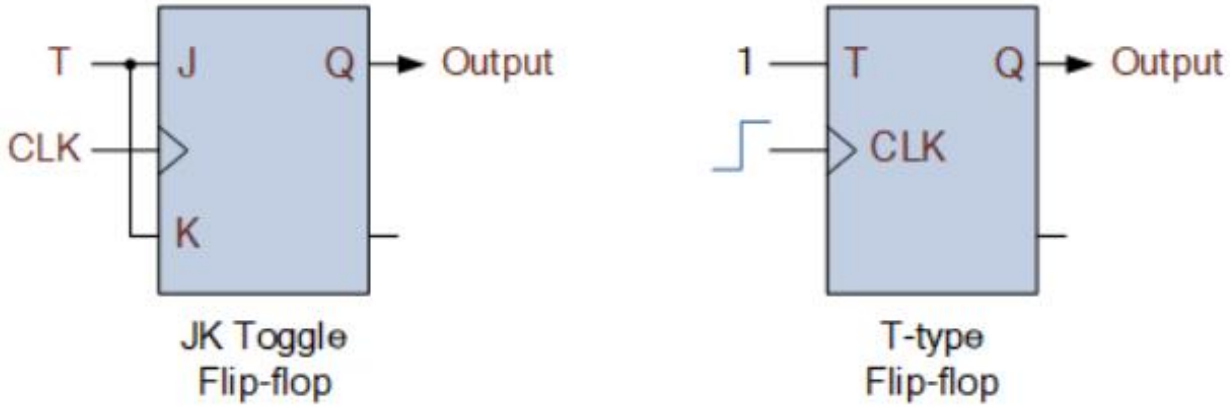
T FLIPFLOP

- ✓ The “T flip flop,” is a single input version of JK flipflop.
- ✓ T Flipflop is obtained from the JK type if both inputs are tied together.
- ✓ The output of the T flipflop “toggles” with each clock pulse.



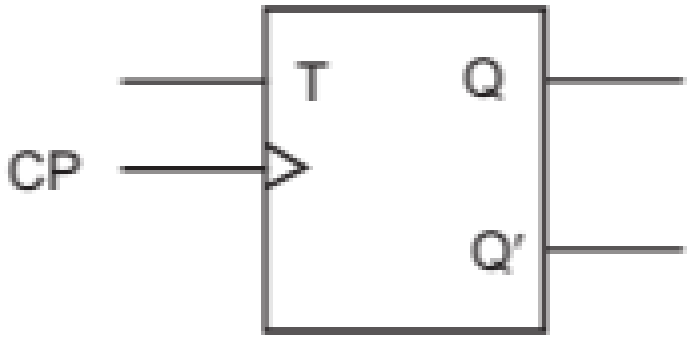
T FLIPFLOP

APPLICATIONS

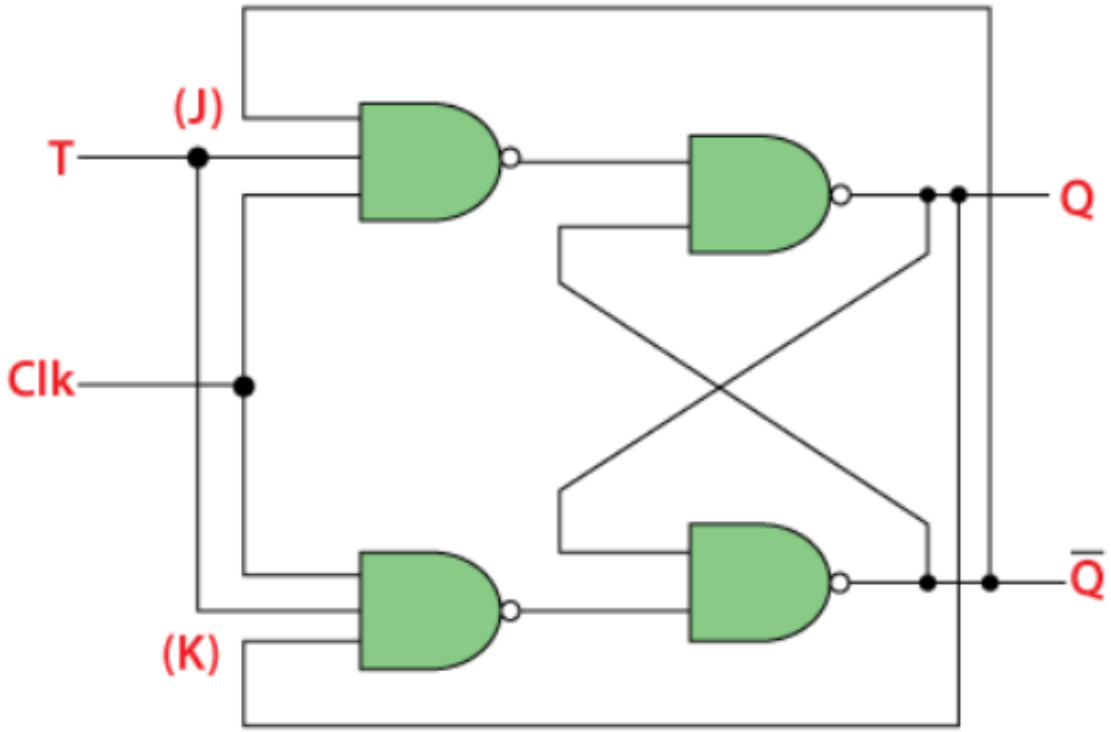
- ✓ Counters
- ✓ Shift Registers
- ✓ Memory Units
- ✓ Frequency Division

T FLIP FLOP

- ✓The inputs will affect the output only when the clock signal changes from low to high for positive, or from high to low for negative.
- ✓However, when an edge applied to the clock input, the Flip-Flop will hold or latch the last output (Q) if T=0, and will toggle it to its complement if T=1.



T FLIPFLOP WITH NAND GATE



T FLIPFLOP TRUTH TABLE

T	Q_n	Q_{n+1}	
0	0	0	Unchanged/hold
0	1	1	Unchanged/hold
1	0	1	Toggle
1	1	0	Toggle

T FLIPFLOP CHARACTERISTIC TABLE

The characteristic table for this type of flip-flop exhibits the transition of present state to next state based on the input conditions and clock triggers.

Q	T	Q(t+1)
0	0	0
0	1	1
1	0	1
1	1	0

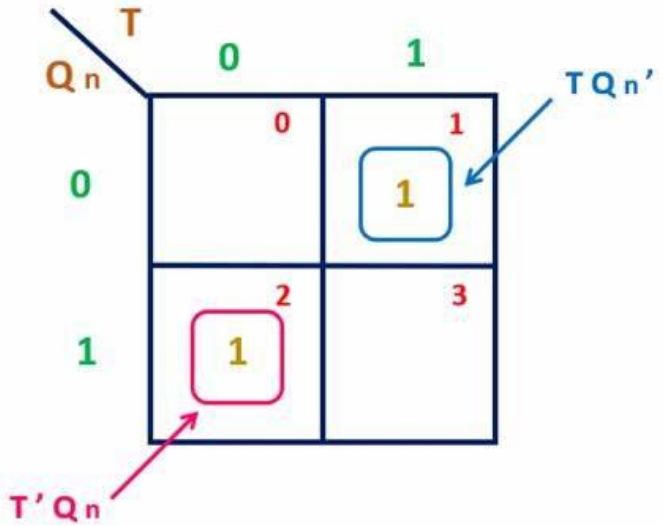
T FLIPFLOP EXCITATION TABLE

The excitation table of T flip-flop indicate the excitations required to take the flip-flop from the present state to the next state.

T	Q_n	Q_{n+1}	
0	0	0	Unchanged/hold
0	1	1	Unchanged/hold
1	0	1	Toggle
1	1	0	Toggle

T FLIPFLOP CHARACTERISTIC EQUATION

The characteristic equation is an algebraic expression for the characteristic table's binary information. It specifies the value of the next state of a flip-flop in terms of its present state and present excitation.



$$Q(n+1) = TQn' + T'Qn = T \text{ XOR } Qn$$

Assessment

1. How many input terminal does T FF has?

a) 1 b) 2 c)3

2. Write the Characteristic Equation of T FF

Thank
you