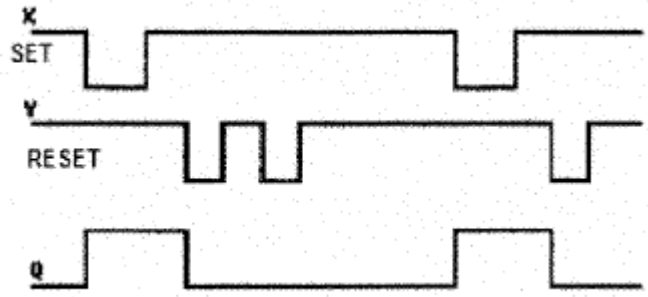
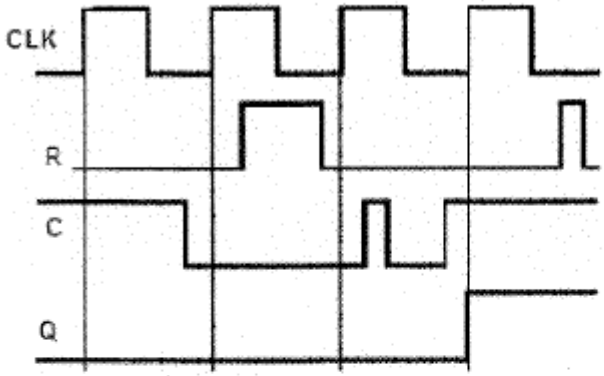
LISTA 2 - CIRCUITOS DIGITAIS – RESOLUÇÃO

1.

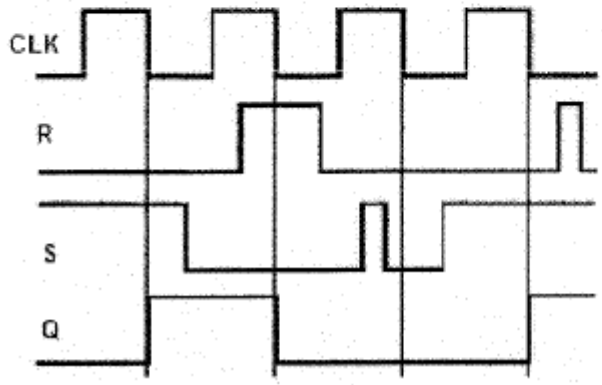


2.

Assuming that Q=0 initially (for the positive edge triggered S-C FF).



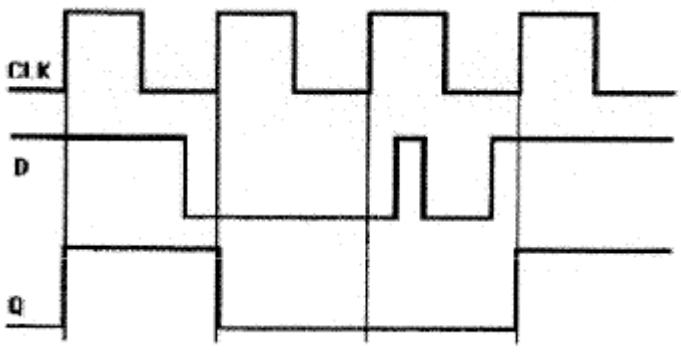
Assuming that Q=0 initially (for the negative edge triggered S-C FF).



3.

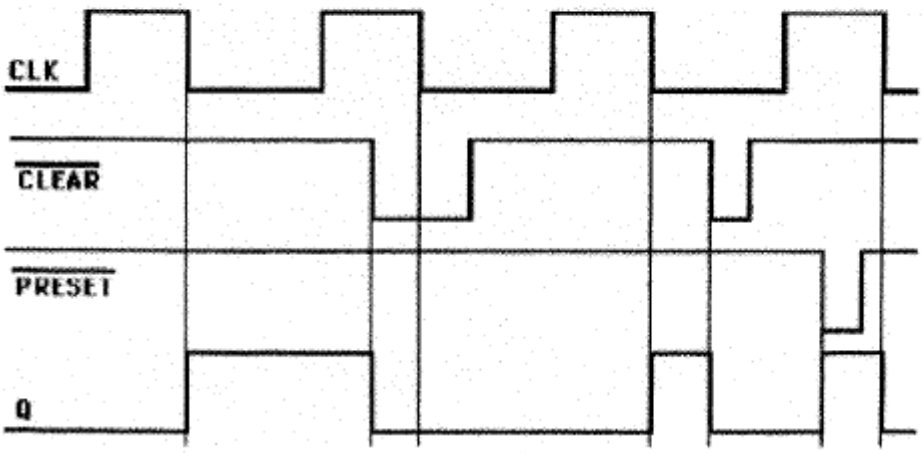
(a) Connect the J and K inputs permanently HIGH. The Q output will be a squarewave with a frequency of 5 KHz.

4.

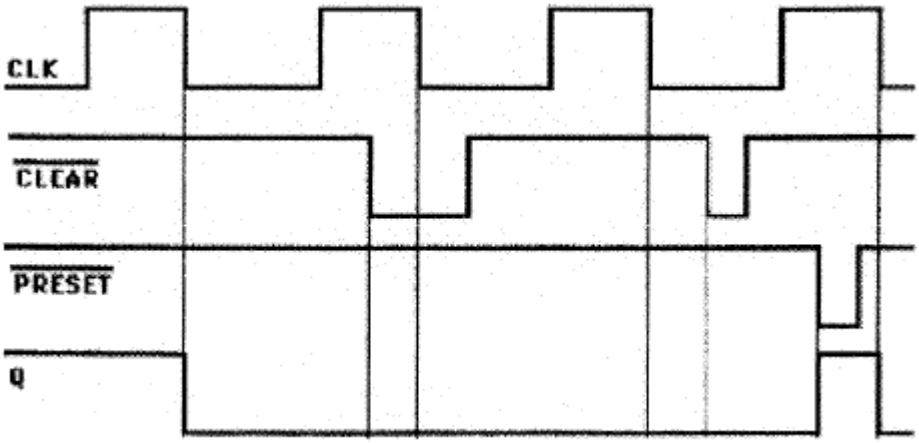


5.

J=K=1 so FF will toggle on each CLK negative-going edge, unless either $\overline{\text{PRESET}}$ or $\overline{\text{CLEAR}}$ inputs is LOW.



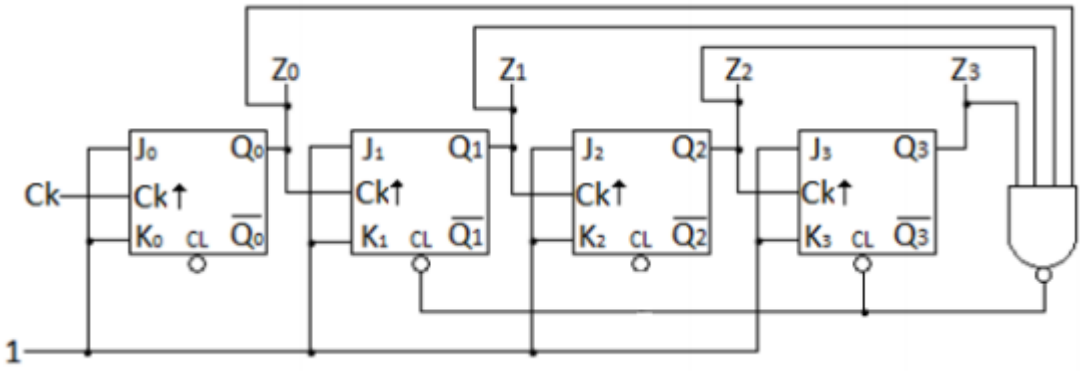
6.



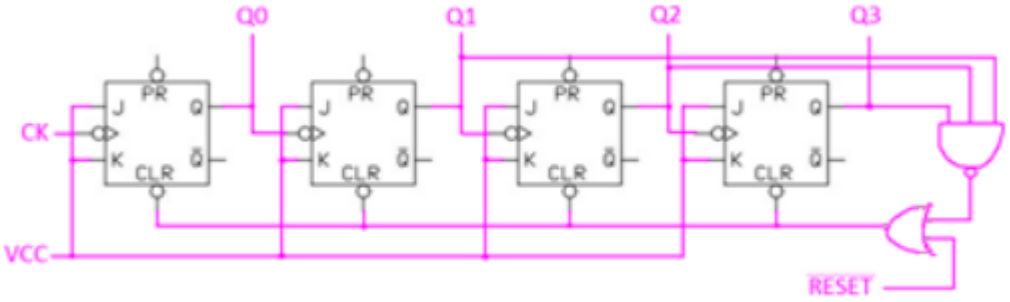
7.

10 FFs

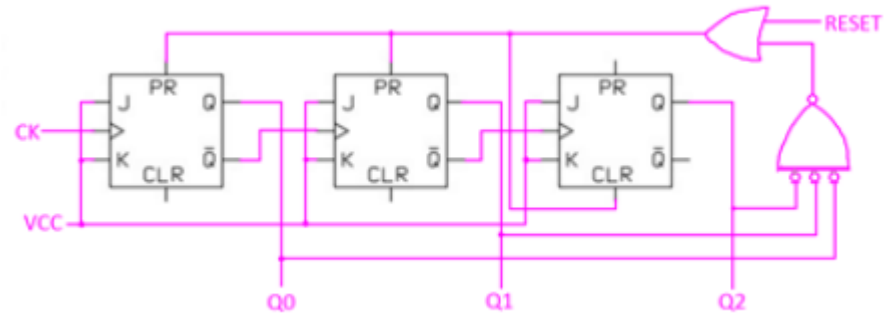
8.



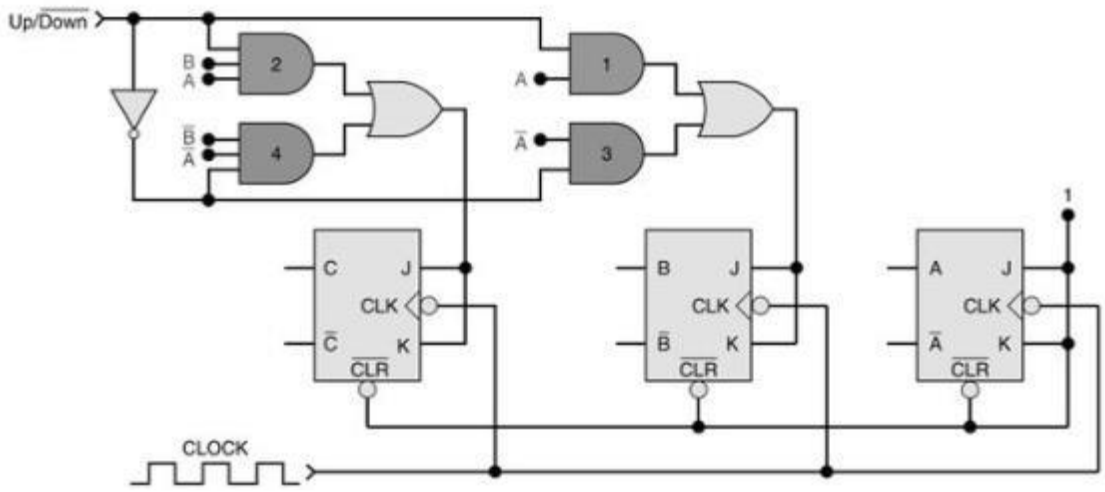
9.


Q0
Q1
Q2
Q3
CK
VCC
RESET
PR
J
K
CLR
Q
Q̄

10.

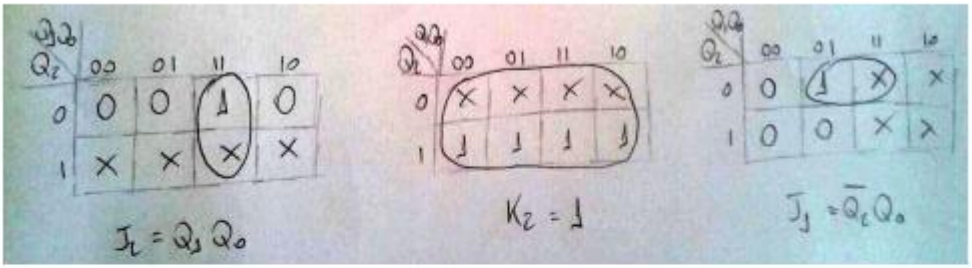

RESET
CK
VCC
Q0
Q1
Q2
PR
J
K
CLR
Q
Q̄

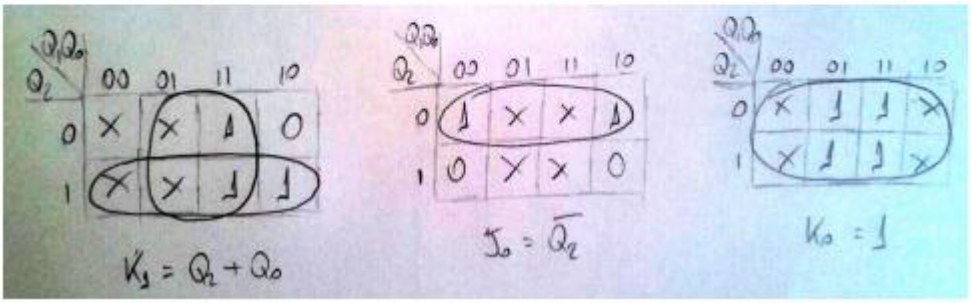
11.


Up/Down
B
A
2
4
A
Ā
1
3
C
J
CLK
C̄
K
CLR
B
J
CLK
B̄
K
CLR
A
J
CLK
Ā
K
CLR
1
CLOCK

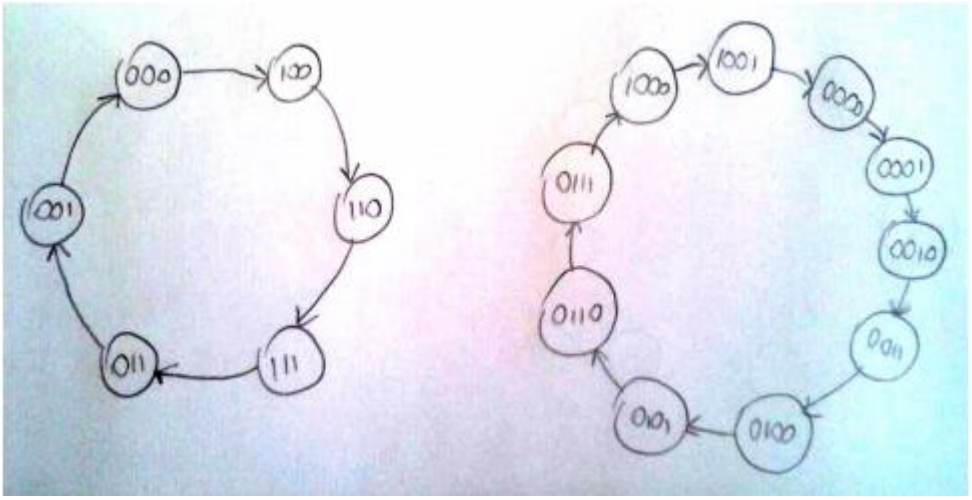
12.

Q_2	Q_3	Q_0	J_2	K_2	J_3	K_3	J_0	K_0
0	0	0	0	X	0	X	1	X
0	0	1	0	X	1	X	X	1
0	1	0	0	X	X	0	1	X
0	1	1	1	X	X	1	X	1
1	0	0	X	1	0	X	0	X
1	0	1	X	1	0	X	X	1
1	1	0	X	1	X	1	0	X
1	1	1	X	1	X	1	X	1





13.



14. a

CLOCK	LOAD	E.S	E.P.A	E.P.B	E.P.C	E.P.D	S.P.A	S.P.B	S.P.C	S.P.D	S.S
X	1	X	0	0	0	0	0	0	0	0	0
BD	0	1	X	X	X	X	1	0	0	0	0
BD	0	1	X	X	X	X	1	1	0	0	0
BD	0	0	X	X	X	X	0	1	1	0	0
BD	0	1	X	X	X	X	1	0	1	1	1
BD	0	1	X	X	X	X	1	1	0	1	1
BD	0	0	X	X	X	X	0	1	1	0	0
BD	0	0	X	X	X	X	0	0	1	1	1
BD	0	0	X	X	X	X	0	0	0	1	1
BD	0	0	X	X	X	X	0	0	0	0	0

b

LOAD deve estar em nível baixo ALTO no momento do carregamento dos dados de entrada. Após isso, LOAD deve ir para nível BAIXO e devem ser aplicados 3 pulsos de clock para que os dados sejam apresentados de forma completa na saída serial.

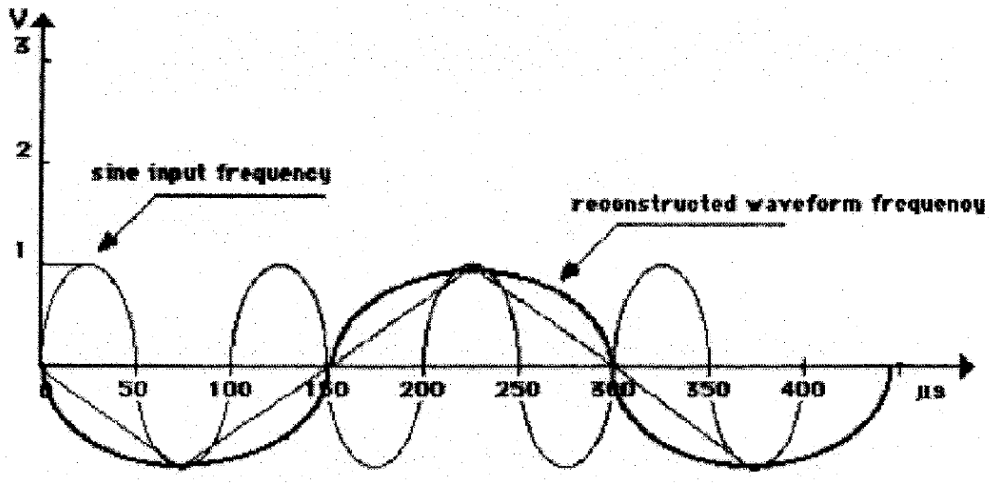
15.

FALSO. A resolução **percentual** só depende do número de bits! [1/((2^N)-1)]. Logo, a resolução percentual é a mesma, independentemente do fundo de escala utilizado.

16.

VERDADEIRO

17.



(a) Since the Flash ADC samples at intervals of 75µs, the sample frequency is 1/75µs =13.33 kHz.
(b) The sine wave has a period of 100 µs or a F=10 kHz. Therefore, the difference between the sample frequency and the input sine wave frequency is 3.3 kHz.
(c) The frequency of the reconstructed waveform is approximately 1/300 µs or 3.33 kHz.