

## OBSERVAÇÃO GERAL:

Obs.: Para todos os biestáveis mostrados à seguir, considere:  
 - tempo de *setup*,  $t_s$  maior que zero (aprox.. 20 ns) e;  
 - tempo de *hold time*,  $t_h$  nulo (0 ns).

1) Complete a forma de onda na saída do biestável RS mostrado na figura 10-5:

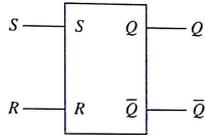
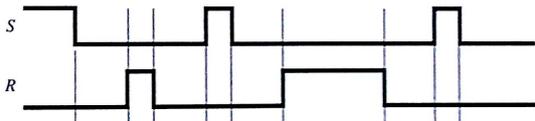


Figure 10-5



Solution:

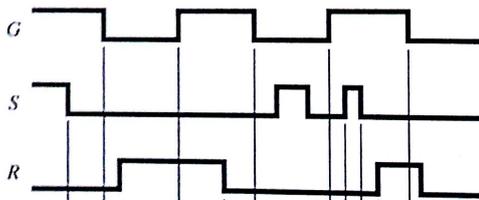
Q

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Função:

Obs. Note que ele inicia SETADO.

2) Complete a forma de onda na saída de um Latch RS, cuja entrada G habilita seu funcionamento (enable ativo alto).



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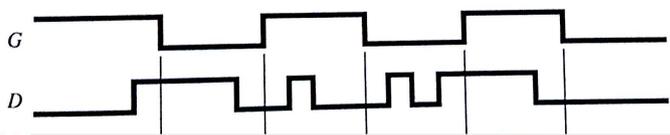
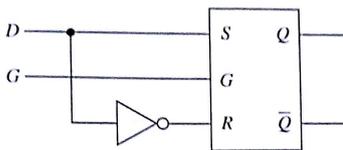
Q

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Função:

Obs.: Este biestável inicia SETADO.

3) Complete a forma de onda na saída do biestável abaixo:



Solution:

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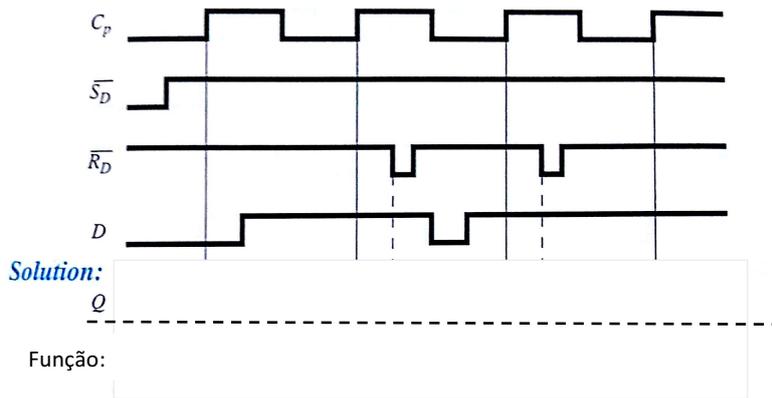
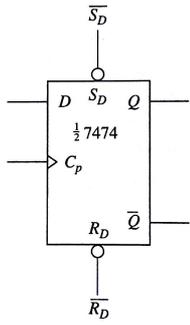
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Função:

Obs: Desta vez o biestável inicia RESETADO.

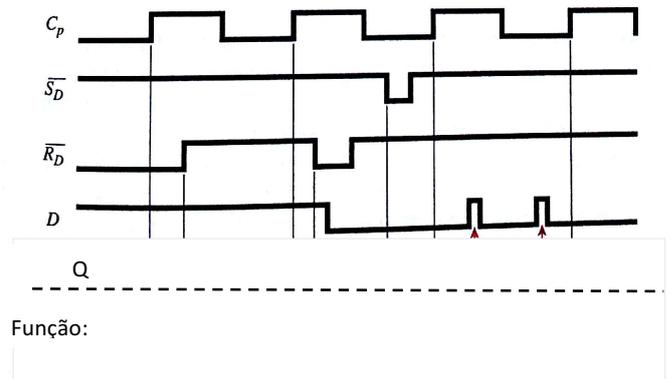
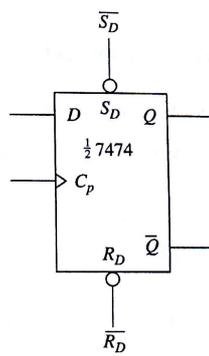
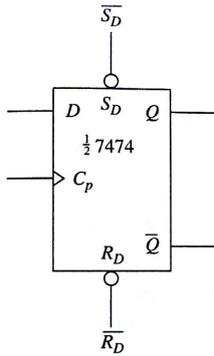
Continua →

4) Complete a forma de onda na saída do próximo biestável:



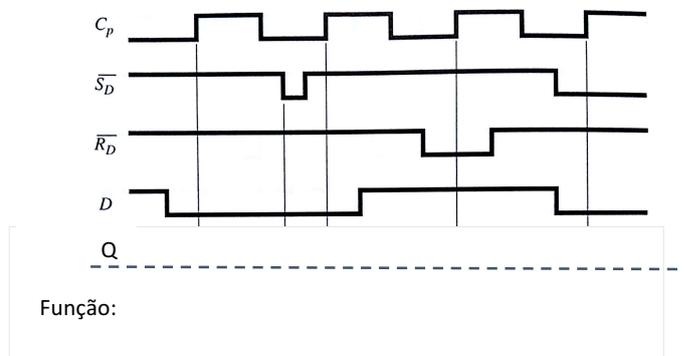
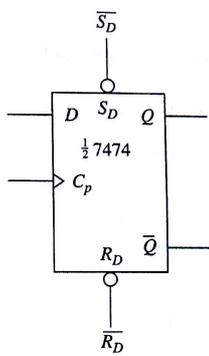
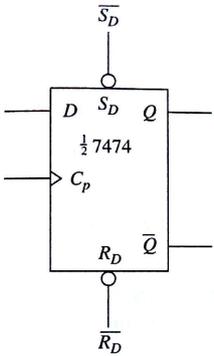
Obs.: Não se sabe o estado inicial do biestável.

5) Complete a forma de onda na saída do CI 7474 (ver figura abaixo), ~~supondo que o biestável inicia RESETADO.~~



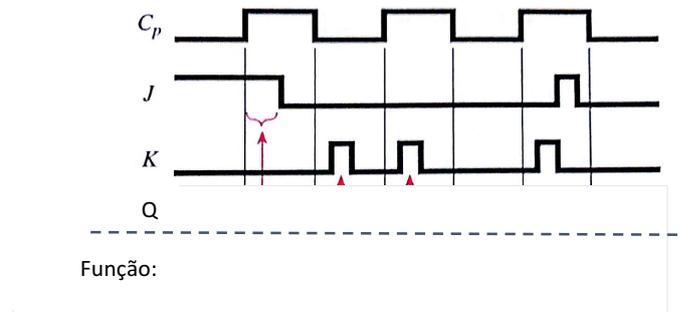
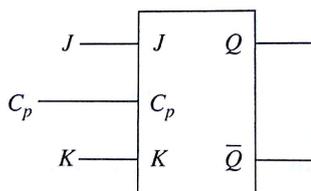
Obs.: Não se sabe o estado inicial do biestável.

6) Idem ao item anterior:



Obs.: Neste caso não se sabe como iniciam os biestáveis.

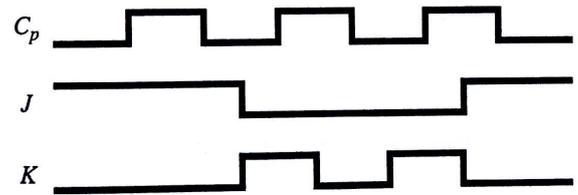
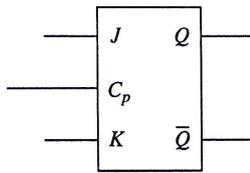
7) Complete a forma de onda na saída do JK abaixo:



Obs.: Inicia RESETADO.

Continua →

8) Complete a forma de onda na saída do



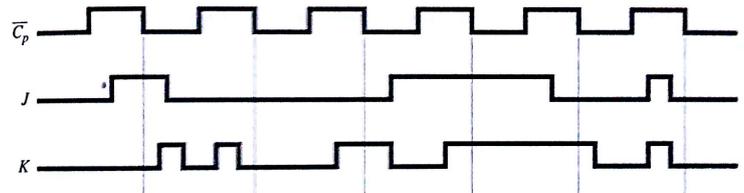
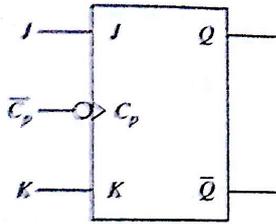
Q

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Função:

Obs.: Supor que inicia RESETADO.

9) Complete a forma de onda na saída do JK:



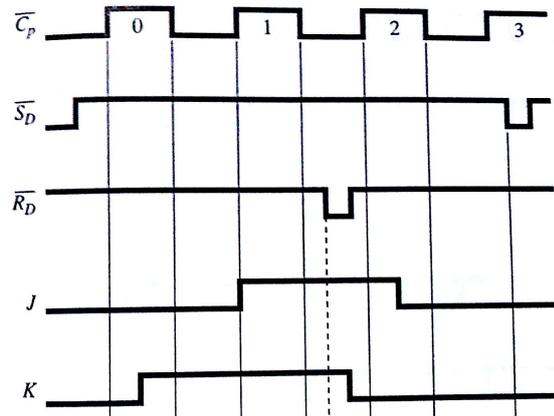
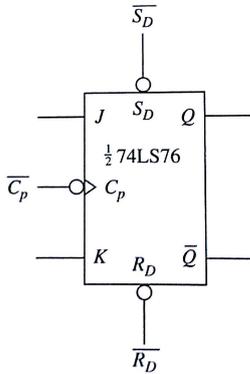
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Função

Obs.: Inicia RESETADO.

10) Complete a forma de onda na saída do JK MS (Master-Slave, J-K):

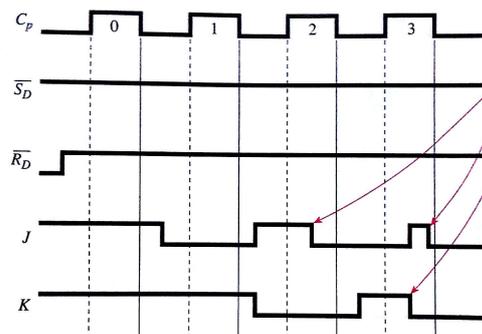
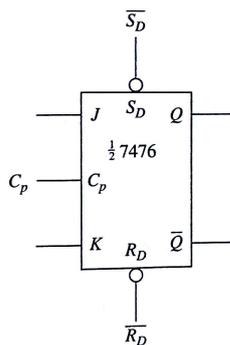


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Função

11) Complete a forma de onda na saída do JFF-JK (borda de subida)

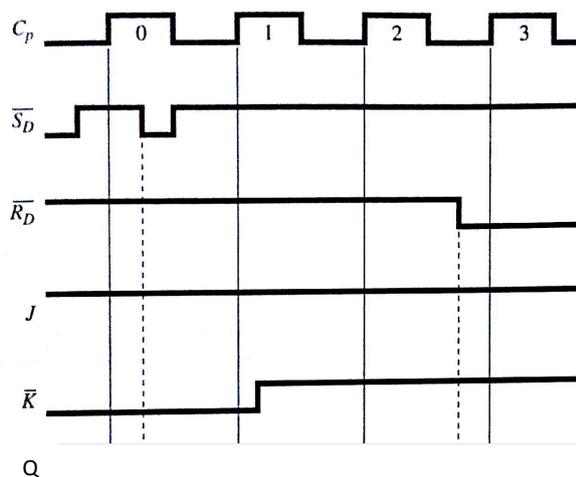
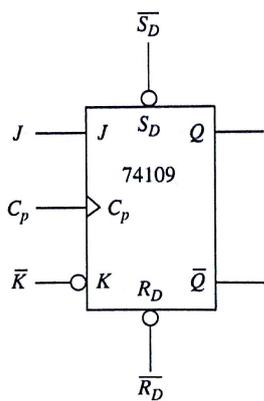


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Função

12) Complete a forma de onda na saída do 1/2 74109 ( $FF - \bar{J}K$ ):



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Função

Fim.