

Assignment-4

1. If the waveforms in Figure 7-70 are applied to an active-HIGH S-R latch, draw the resulting Q output waveform in relation to the inputs. Assume that Q starts LOW.

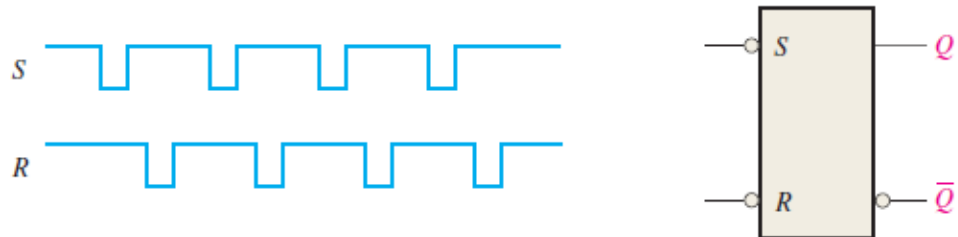


FIGURE 7-70

2. Solve Problem 1 for the input waveforms in Figure 7-71 applied to an active-LOW \bar{S} - \bar{R} latch.



FIGURE 7-71

3. Solve Problem 1 for the input waveform in Figure 7-72.



FIGURE 7-72

4. For a gated S-R latch, determine the Q and \bar{Q} outputs for the inputs in Figure 7-73. Show them in proper relation to the enable input. Assume that Q starts LOW.

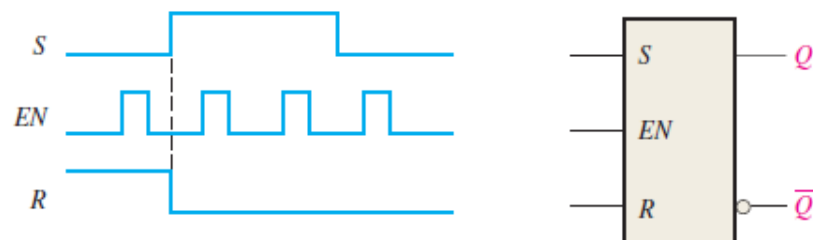


FIGURE 7-73

5. Determine the output of a gated D latch for the inputs in Figure 7-74.



FIGURE 7-74

6. Determine the output of a gated D latch for the inputs in Figure 7-75.



FIGURE 7-75

9. The Q output of an edge-triggered D flip-flop is shown in relation to the clock signal in Figure 7-78. Determine the input waveform on the D input that is required to produce this output if the flip-flop is a positive edge-triggered type.

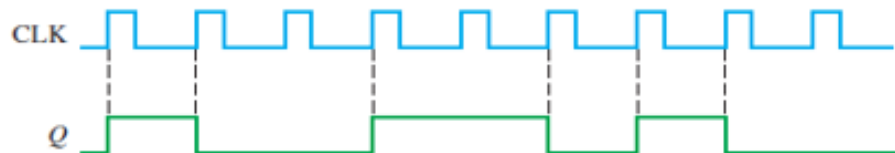


FIGURE 7-78

10. Draw the Q output relative to the clock for a D flip-flop with the inputs as shown in Figure 7-79. Assume positive edge-triggering and Q initially LOW.



FIGURE 7-79

11. Solve Problem 10 for the inputs in Figure 7-80.

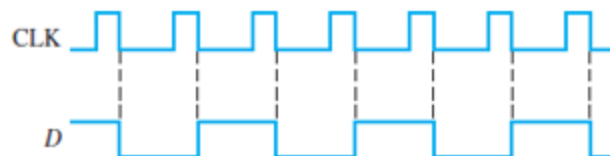


FIGURE 7-80

12. For a positive edge-triggered D flip-flop with the input as shown in Figure 7-81, determine the Q output relative to the clock. Assume that Q starts LOW.

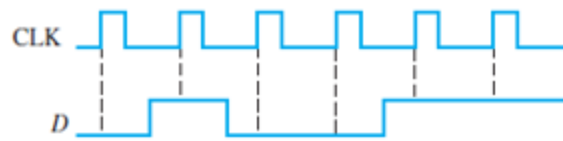


FIGURE 7-81

13. Solve Problem 12 for the input in Figure 7-82.

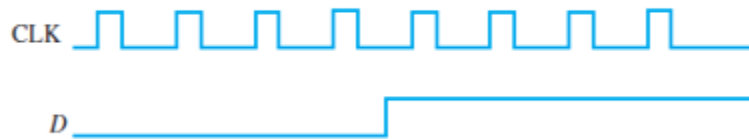


FIGURE 7-82

14. Determine the Q waveform relative to the clock if the signals shown in Figure 7-83 are applied to the inputs of the J-K flip-flop. Assume that Q is initially LOW.

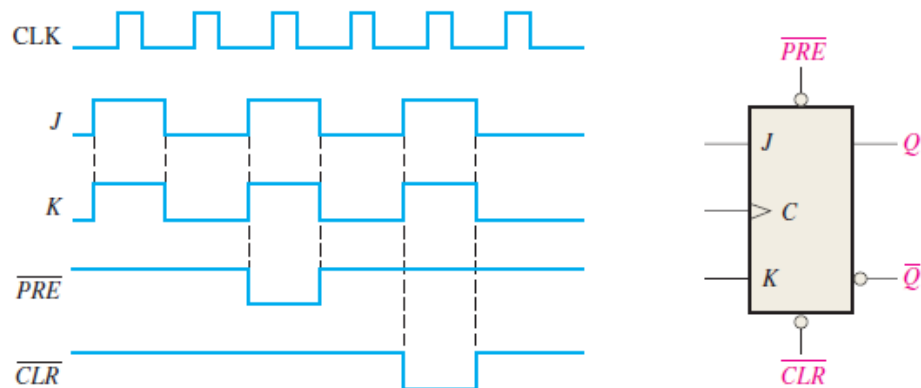


FIGURE 7-83

15. For a negative edge-triggered J-K flip-flop with the inputs in Figure 7-84, develop the Q output waveform relative to the clock. Assume that Q is initially LOW.

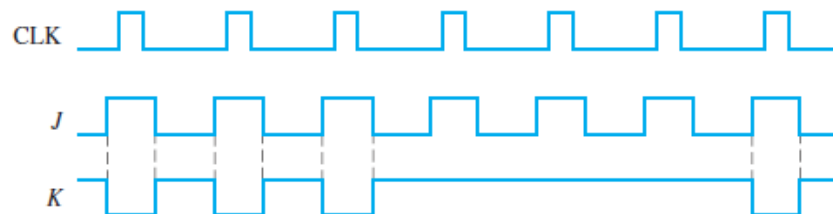
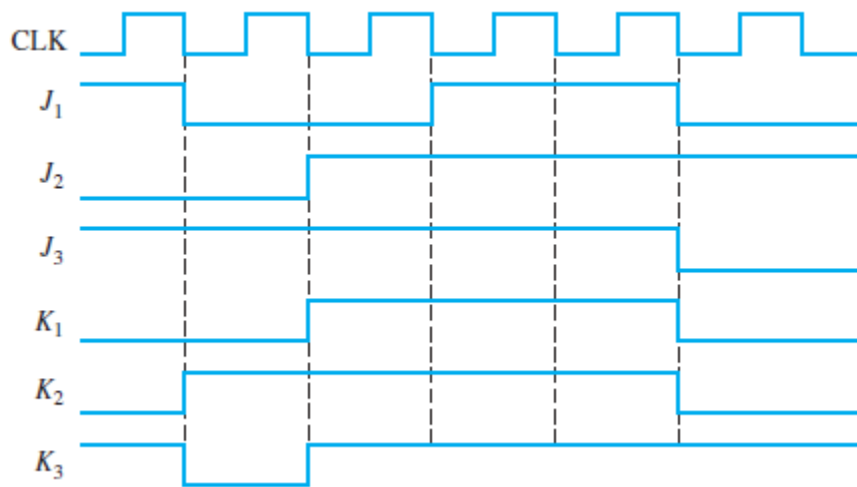


FIGURE 7-84

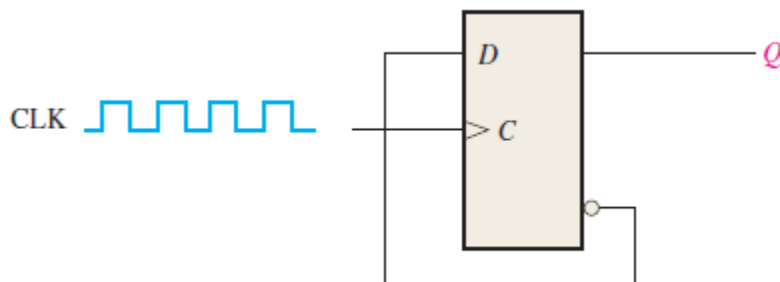
16. For the circuit in Figure -1, complete the timing diagram in Figure 2 by showing the Q output (which is initially LOW). Assume PRE and CLR remain HIGH.



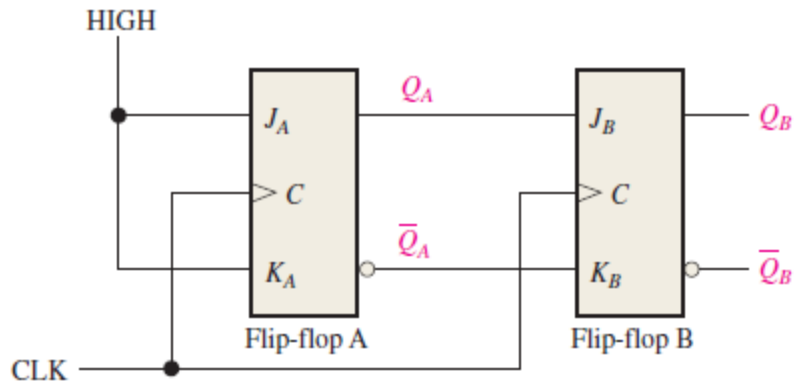
17. Show how to connect a 4-bit asynchronous counter for each of the following moduli. Also for 30kHz clock determine the frequency at the output of each counter.

(a) 9 (b) 11 (c) 13 (d) 14 (e) 15

18. A D flip-flop is connected as shown in Figure 7-90. Determine the Q output in relation to the clock. What specific function does this device perform?



19. For the circuit in Figure, develop a timing diagram for eight clock pulses, showing the QA and QB outputs in relation to the clock.



22. Design a counter to produce the following binary sequence. Use J-K flip-flops.
1, 4, 3, 5, 7, 6, 2, 1,
23. Design a counter to produce the following binary sequence. Use J-K flip-flops.
0, 9, 1, 8, 2, 7, 3, 6, 4, 5, 0, ...
24. Design a binary counter with the sequence shown in the state diagram of Figure.
(using D flip flop)

