Homework #10

6.16* The BCD ripple counter shown in Fig. 6.10 has four flip-flops and 16 states, of which only 10 are used. Analyze the circuit and determine the next state for each of the other six unused states. What will happen if a noise signal sends the circuit to one of the unused states?

6.19 The flip-flop input equations for a BCD counter using *T* flip-flops are given in Section 6.4. Obtain the input equations for a BCD counter that uses (a) *JK* flip-flops and (b)* *D* flip-flops. Compare the three designs to determine which one is the most efficient.

6.21* The counter of Fig. 6.14 has two control inputs—*Load* (*L*) and *Count* (*C*)—and a data input, (I_i).

(a) Derive the flip-flop input equations for *J* and *K* of the first stage in terms of *L*, *C*, and *I*.

(b) The logic diagram of the first stage of an equivalent circuit is shown in Fig. P6.21. Verify that this circuit is equivalent to the one in (a).

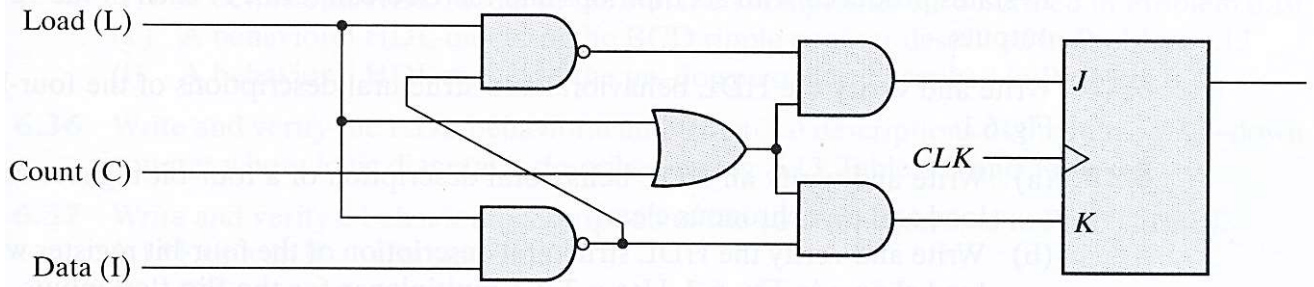

FIGURE P6.21

6.24* Design a counter with T flip-flops that goes through the following binary repeated sequence: 0, 1, 3, 7, 6, 4. Show that when binary states 010 and 101 are considered as don't care conditions, the counter may not operate properly. Find a way to correct the design.

6.28 Using D flip-flops,

(a) *Design a counter with the following repeated binary sequence: 0, 1, 2, 4, 6.