Assignment 12

1. A PN flip-flop has four operations, reset to 0, hold, complement and set to 1 when inputs PN are 00,01,10,11 respectively. Tabulate the characteristic table, excitation table and show how the PN FF can be converted to a D FF.

2. A sequential circuit with two flip-flops A and B, two inputs x, y and a output z has the following behavior:
   $A(t+1) = \bar{x}.y + x.B;\ B(t+1) = \bar{x}.A + x.B; z = A$
   Draw the logic diagram of the circuit, list the state table and draw the state transition graph.

3. Design a sequential circuit with two D flip-flops A and B and one input x such that when x = 0, the state of the circuit remains the same. When x = 1, the circuit goes through the state transitions from 00 to 01, to 11, to 10 and back to 00, and repeats.

4. Design a synchronous counter that goes through the following repeating sequence 0, 2, 1, 4, 3,6,5,7.

5. Design a synchronous counter using T flip-flops that goes through the following repeating sequence 0, 1, 3,7,6,4. Take the unused states as don't care states. Check if the circuit corrects itself if by chance it happens to go to one of the unused states. If not, correct the problem.

6. From a frequency of 10KHz, generate a signal of frequency 1KHz having the following waveform