Assignment #1

1. Convert the following decimal numbers into hexadecimal and octal number.
   a. 526 b. 681 c. 412
2. Perform the following subtraction of binary numbers using I)2's complement and II) 1's complement.
   a. 11011-1011 b. 10011-11001c. 100-10101
3. Convert the decimal 220.5 to base 3, base 4, base 8 and base 16.
4. What is digital system? List out important feature of digital system.
5. Differentiate analog system and digital system.
6. Write Short notes:
   a. BCD
   b. Error detection code
   c. Reflected code
   d. ASCII
7. List out 5 advantages of IC's
8. What is LSI? How is differs from VLSI?
9. Define r's Complement and (r-1)'s complement.
10. Write to process to obtain r's complement from (r-1)'s complement with examples.
11. Write BCD code, Excess -3 code, 84-2-1 code, 2421 code and Biquinary code for 1024.
12. What is parity bit? Explain how even and odd parity bit is obtained.

Assignment #2

1. Demonstrate by the means of truth tables the validity of following theorems.
   a. The associative laws. b. De Morgan's law.
2. Simplify the following Boolean functions to a minimum number of literals.
   a. (x+y)(x+y') b. (A+B)'(A'+B')' c. zx + zx'y
3. Obtain the truth table of function.
   a. F = xy + xy' + y'z b. F = xy + x'y' + xz + yz
4. Express the following functions in a sum of minterms and product of maxterms.
   a. F(A,B,C) = C(A' + B) + B' C
   b. F(x,y,z) = 1
   c. F (P,Q,R) = (P' + Q)(Q' + R)
5. What do you mean by universal gate?
6. Realize the following logic gates using NOR gates.
   a. OR gate b. AND gate
7. Obtain the simplified expressions in sum of products for the following Boolean functions.
   a. xy + x'y'z + xyz' b. A'B +BC' +B'C' c. x'z + w'xy' + w(x'y +xy')
8. Which gates can be used as inverters in addition to the NOT gate and how?
9. State and prove De-Morgan's theorem 1st and 2nd with logic gates and truth table.
10. Describe the three variable K-map with example.
11. Reduce the following expression using K-map.
    .A' + B (A + B' + D)(B'+C)(B+C+D).
12. Simplify the Boolean function using k-maps.
    F = X'yz + X'yz' + Xy'z + Xy'z
13. Write a procedure to reduce K- maps.

Assignment #3

1. Design the decoder using universal gates.
2. What is combinational logic? What are important features?
3. Differentiate between a MUX and DEMUX.
4. Explain the operation of Decoder.
5. Draw a block diagram, truth table and logic circuit of a 16 x 1 multiplexer and explain its working principle.
6. Design the full subtractor circuit with using Decoder and explain the working principle.
7. What is magnitude comparator? Design a logic circuit for a 4-bit magnitude comparator and explain it.
8. Design a 3 to 8 line decoder using two 2 to 4 line decoder and explain it.
9. Draw a logic circuit of 4x1 multiplexer.
10. Draw a block diagram, truth table and logic circuit of 1X16 Demultiplexer and explain its working principle.
11. Explain the programmable logic array (PLA)
12. What is a decoder? Implement the following using decoder.
    a. F (W X Y Z) = Σ(0,1,3,4,8,9,10)
    b. F (W X Y Z) = Σ(1, 3, 5, 6,11, 13,14)
13. Design a half adder logic using only NOR gate.
14. Design a half-subtractor circuit using only NAND gates.
15. Design a Full subtractor with truth table and logic gates.
16. Design a decimal adder with logic diagram and truth table.
17. What do you mean by full adder and full subtractor?

Assignment #4

1. Describe the clocked RS flipflop.
2. What do you mean by triggering of flip flop.
3. What is JK master slave flip-flop? Design its logic circuit, truth table and explain the working principle.
4. What is a flip-flop? Mention the application of flip-flop.
5. What do you mean by D-flip-flop?
6. What is sequential logic? What are the important features?
7. Explain the Master-slave S-R Flip-flop with logic diagram, truth table and timing diagram.
8. What is J – K flip flop? Explain
9. Differentiate between combinational logic and sequencial logic. List some applications of sequencial logic
10. Draw a parallel-in-parallel out shift register and explain it.
11. What are the shift Register operations?
12. Describe the ripple counter.
13. What are the various types of shift registers?
14. What do you mean by synchronous counter?
15. Explain the 4 bit ripple counter and also draw a timing diagram.
16. Design the 4 bit Synchronous up/down counter with timing diagram, logic diagram and truth table.
17. Explain the Ripple Counter.
18. What do you mean by shift registers? Explain.
19. Design a 3 bit synchronous counter and explain it.

20. What do you mean by asynchronous counter? Design a mod-6 synchronous counter using T Flip-flops.
21. Draw a logic diagram of a 4 bit ripple counter using D- flip flop.