Digital Logic
Assignment I

Chapter 1
1. Define digital signal and digital operation?
2. Define digital signal level and draw the general input output voltage profile for TTL gates?
3. Define Gray Code and Excess 3 code with suitable example?
4. Converts
    a. $(62377)_{octal}$ to Decimal, Binary, Hexadecimal
    b. $(2AC5D)_{Hexadecimal}$ to Decimal, Octal, Binary
    c. $(10110)_2$ to Gray Code
    d. $(1011)_{Gray\ Code}$ to Binary
5. Differentiate analog signal and digital signal with suitable example

Chapter 2
1. Why NAND and NOR gates are called universal gates? Illustrate with example?
2. Construct the basic gates using only Universal gates?
3. Prove Positive XOR is equivalent to Negative XNOR
4. Realize XOR Gate using only NAND gates?
5. Obtain XOR gate using AND-OR-NOT gates?
6. Realize the logic circuit diagram of expression Y= (A+B)(A'+C)(B+D) using basic gates

Chapters 3
1. Prove
    a. $AB+CD= \overline{\overline{AB}.\overline{CD}}$
    b. $(A+B)(C+D)= \overline{\overline{A+B} + \overline{C+D}}$
    c. $x \oplus y= x+y$ (if xy=0)
2. Simplify
    a. $\overline{AB+A'+AB}$
    b. x'y+ y[z'(z'+y)]
    c. AB +$\overline{AC}$ + A$\overline{BC}$(AB+C)
    d. Y= ∑m(3,4,5,7,9,13,14,15) using K-Map
    e. F(A,B,C,D)=∑m(1,3,7,11,15), Ø=∑d(0,2,5)
    f. Y=∑m(7,9,10,11,12,13,14,15) using K-Map
    g. Y=∏(0,1,4,5,6,8,9,12,13,14) using K-Map
    h. F=∏(3,4,6,7,11,12,13,14,15) using K-Map
3. Obtain a reduced expression of the given expression and realized the function using NOR gate only. F(A,B,C,D)=∑m(0,1,2,8,10,11,14,15)
4. Obtain a reduced expression and realize the function using NAND gate only. F(A,B,C,D) = ∑m(3,4,5,,7,9,13,14,15) + ∑d(0,2,8)
5. Use the K-Map method to implement a following function and also draw a reduced circuit using NOR gate, F(A,B,C,D)= ∑m(0,2,4,6,8,10,15), d=∑m(3,11,14)
6. Simplify F(A,B,C,D)= ∏(0,2,5,8,10)+d(7,15). Write its standard SOP and implement the simplified circuit using NOR gate only.
7. Describe HDL with its advantages? Design 2 to 4 line decoder using HDL?
8. Design a logic circuit implement the following Boolen Function **F=A'C+AC'D'.** It is found that the circuit input combination A=C=1 can never occur. Find a simpler expression for F using proper don't care condition.