

Assignment 1

1. Convert to octal and then to binary: $(789.25)_{10}$
2. Convert to hexadecimal and then to binary: $(868.45)_{10}$
3. Convert the given number to a base 5 number $(624.63)_7$
4. Draw the logic circuit of the expression $Y = AB'C + AB + BC$ using 2 input basic logic gates.
5. Find out 2's complement of the following number
 - (i) 11011001
 - (ii) 10001001
6. Find out 1's complement of the following number
 - (i) 11011001
 - (ii) 10001001
7. Represent in 1's complement form of the following number (a) -12 (b) +9
8. Represent in 2's complement form of the following number (a) -12 (b) +9
9. Consider the following minterms expression F:
 $F(P, Q, R, S) = \sum(0, 2, 5, 7, 8, 10, 13, 15)$. What is the minimal sum-of-products form for F?
10. Implement $Y = A' + BC$ only using NAND Gate.
11. Implement XOR gate using NAND gates.
12. Implement XNOR gate using NAND gates.
13. Use De-Morgan's law to find the complements of the following function
 - (a) $f(A, B, C, D) = [A + (BCD)'][((AD)' + B(C' + A))]$
 - (b) $F = (A' + B)(A + B + D)D'$
14. For the following expression draw the K map and find minimum expression
 $F(A, B, C, D) = \sum m(0, 2, 4, 5, 6, 8) + \sum d(1, 3, 7, 10)$.
15. Write the truth table for Full Adder and design the circuit using logic gates. Design Full Adder circuit using Half Adder and OR gate.
16. Write the truth table for Half Adder and design the circuit using logic gates.
17. Write the truth table for 2x1 MUX and design the circuit using logic gates.
18. Write the truth table for 4x1 MUX and design the circuit using logic gates.
19. Write the truth table for 1x4 DEMUX and design the circuit using logic gates.
20. Write the truth table for 4X1 MUX. Design 4X1 MUX using 2X1 MUX.
21. Write the truth table for 8X1 MUX. Design 8X1 MUX using 4x1 MUX and 2X1 MUX.
22. Implement $F(A, B, C) = \sum m(0, 2, 4, 5, 7)$ using 4x1 MUX.
23. Design a 3 bit 1's complement circuit. Write the truth table. Find out the minimized output expressions. Draw the circuit.
24. Design a 3 input circuit whose output is one increment of the input if input value is less than or equal to 5 otherwise output is same as input. Find out the minimized output expressions. Draw the circuit.
25. Design a 3 bit 2's complement circuit. Write the truth table. Find out the minimized output expressions. Draw the circuit.