MATRUSRI ENGINEERING COLLEGE
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Digital Logic Design

UNIT I Important Questions

1. Simplify the Boolean function to minimum number of literals
   a) xy+x'z+yz
   b) abc+a'b+abc'
   c) x'y'z+yz+xz
   d) abc+a'b+abc'
   e) a'c+a'b'c'+a'bc'
   f) ab+a'b+ab'+a'b'
   g) (a+b)(a+b')(a'+c)
   h) xyz'+x'yz+xyz+x'yz
2. Simplify the expression using Boolean algebra
   a) (A+B)(A+B')(A'+C)
   b) xyz'+x'yz+xyz+x'yz
3. Given the two binary functions x=1010100 and y=1000011. Perform the subtraction
   a) x-y
   b) y-x using 2's complement and 1's complement
4. Represent (+10, -10, +27, -27) in (i) Sign magnitude (ii) two's complement
5. Find the 2's complement of 00110101.
6. Perform subtraction (34-42) using 1's complement.
7. Subtract 65_{10} from 32_{10} using 2's complement. Represent the result in 8-bit binary.
8. Convert the gray number 101011 to binary code.
9. Convert the binary number to gray code.
   a) 11011101
   b) 110101
   c) 1101011
10. Convert the following
    a) Decimal 628_{10} to Octal and Hexadecimal
    b) Octal 4521_8 to Hexadecimal
    c) $(367.23)_{10} = (\ )_2$
    d) $(ABCD.EF)_{16} = (\ )_8$
    e) $(7654)_8 = (\ )_{10}$
11. Convert A0F9.0EB to Decimal, binary and octal
12. Convert $(254)_8$ and $(12570)_8$ to decimal, binary and hexadecimal.
13. Convert the following to excess-3 code
    a) 110
    b) 1011
14. What is gray code.
15. What is an Cyclic code and explain with an example.
16. Define the un-Weighted code.
17. Specify and explain different Boolean algebra AXIOMS and Theorems.

18. What is the basic law of Boolean algebra. explain any two.
19. State Commutative, Associative, Distributive law and prove using truth table.
20. Demonstrate by means of truth table to identify x+yz=(x+y)(x+z)
21. State the principal of Duality.
22. State and prove DeMorgan's theorems.
23. State and prove Consensus theorem.
24. Expand the expressions using Demorgan's law: ((XY)'+X'+XY)'
25. Prove the following
    a) AB+A'C+BC = AB+A'C
    b) A(A+B) = A
26. Realise basic gates using NAND gates
27. Draw AND gate symbol and write its truth table.
28. Prove that NAND gate is an universal gate.
29. Realise basic gates using NANDS gates only.
30. Realise a function of f(x,y)=xy+x'y' using NOR gates.
31. Draw XOR gate symbol and write its truth table.
32. Simplify the Boolean function in SOP and POS for f(a,b,c,d) = Σm(0,1,2,5,8,9,10)
33. Explain x'+y' to minterms and maxterms
34. Convert into standard/canonical form and realize using universal gates:
    F= AC+AB+BC into SOP and realize using NAND gates
    F= A(A+B)(A+B+C) into POS and realize using NOR gates
35. Simplify the following 3 variable Boolean expressions using Boolean algebra
    a) f(a,b,c)= Σm(0,1,3,4,7)
    b) f(a,b,c)=∏M(1,3,5,7)