DLDA

Practice Questions

Unit-1

1. Convert

i. $(15.234)_{10}$ to Binary

ii. $(15.234)_{10}$ to octal

iii. C1B4 Hexadecimal number to octal

iv. $(564)_8$ into base5 number

v. (11001101.0101)2 to base-8 and base-4

2. i. Subtract (111001)2 from (101011) using 1's complement?
   Ii. Subtract (111001)2 from (101011) using 2's complement?

3. a) Represent the decimal number 3452 in i)BCD ii)Excess-3 iii) Gray code
   B) Determine the value of base x if $(211)_x=(152)_8$

4. Convert the following to binary and then to gray code $(AB33)_{16}$

5. Perform the following Using BCD arithmetic $(7129)_{10} + (7711)_{10}$

6. What is a grey code and mention its advantages?

7. Perform the excess-3 addition of decimal numbers 85 and 67.

8. Deduce FACE16 in its binary, octal and decimal equivalent.

9. Convert the following gray code into binary and decimal numbers. (a)1011 (b)1001 0011 0111

10. A hexadecimal odometer displays F5EC. What are the next 7 reading?

Unit-2

1. Simplify the Boolean expressions to minimum number of literals
   (i) (A + B)(A + C')(B' + C')
   ii) AB + (AC)' + AB'C(AB + C)
   iii) (A+B)' (A'+B')'

2. Obtain the Complement of Boolean Expression
   i) A+B+A'B'C
   ii) AB + A (B +C) + B'(B+D)
3. Interpret OR gate and AND gate using NAND gates.
4. Name the gates that are called universal gates. Give the reason
5. Explain different laws of Boolean Algebra.
6. Write DeMorgan's law/theorems. Write them in equation form. Prepare the truth table to prove their correctness.
7. A logic circuit has four inputs, A,B,C,D. The output should be high when A is low and exactly two other inputs are low. Prepare a truth table. Obtain output expression. Draw the circuits with AND, OR logic gates
8. A logic circuit has four inputs. The output is high only when three and only three inputs are high. Design the logic circuit.
9. Draw the circuit of the function F=∑(0,6) with NAND gates
10. Prove-
    i. (X + Y' + XY)(X + Y')(X'Y) = 0
    ii. ABC + ABC' + AB'C + A'BC = AB + AC + BC
    iii. AB + (AC)' + AB'C(AB + C)=1
    iv. (A + B) (A = C) (B + C)=ABC
11. The following English expression describes the way a logic circuit needs to operate- T*he motor of the washing machine turns ON when the right temperature, the right water level and obviously when the door of the machine is closed.*

i. Identify inputs and output for the given English expression.
ii. Write the expression of output using Boolean algebra.
iii. Draw the truth table of output.
iv. Design the circuit using Boolean Logic.

12. The electronic lock is designed with four inputs ABCD.Consider that two combinations of input switches (0001 or 1011) generate a 1(HIGH) at the output and opens the lock and the LED turns ON.

v. Write the expression of output using Boolean algebra.
vi. Draw the truth table of output.
vii. Design the circuit using Boolean Logic.

13. A floor lamp in a staircase has two switches, one switch being at the ground floor (switch A) and the other one on the first floor (switch B). The bulb can be turned ON/OFF by any one of the switches irrespective of the state of the other switch.

viii. Identify inputs and output for the given English expression.

ix. Write the expression of output using Boolean algebra.
x. Draw the truth table of output.
xi. Design the circuit using Boolean Logic.

13. A warning light is turned ON and an ALARM is activated whenever the engine temperature exceeds 2100 F AND either the pressure exceeds 210 psi OR the speed drops below 5500 rpm. The truth table is constructed to get the Boolean expression.

Unit-3

1. Simplify the following Boolean expression using K-MAP and implement using NAND gates. F(W,X,Y,Z) = XYZ+WXY+WYZ+WXZ
2. Simplify the Boolean expression using K-MAPF(A,B,C,D) = ∑m(1,2,3,8,9,10,11,14) +d(7,15)
3. Reduce the expression f(x,y,z,w)= πM(0,2,7,8,9,10,11,15) & d (3,4) using K-Map?
4. Design the circuit by Using NAND gates F= ABC'+ DE+ AB'D'
5. Design the circuit by Using NOR gates F= (X+Y). (X'+Y'+Z')
6. A digital system has 3 bits A, B and C as input. The output Y is 1 when two adjacent bits or 3 equal to 1.
   (i) Develop the k-map for Y and minimize.
   (ii) Design the reduced function using NAND gates
7. Convert the given expression in canonical SOP form Y = AC + AB + BC
8. Write the POS representation of the following SOP function: f(x,y,z)= ∑m(0,1,3,5,7)
9. Minimize the function F(x, y, z) = ∑ m (0, 3, 4, 6, 7).
10. Write the POS form of the SOP expression f (x,y,z) = x'yz + xyz' + xy'z
11. Examine how to minimize the function: F(A, B, C, D)=∑m(0,4,6,8,9,10,12) +∑d(2,13) and implement it using only NOR gates.
12. Express the function Y = A + B'C in canonical SOP and canonical POS form.
13.) Write the maxterms corresponding to the logical expression Y = (A + B + C')(A + B' + C')(A' + B' + C)
14.) Minimize the function F(a,b,c,d)=∑(0,4,6,8,9,10,12) with d=∑(2,13). Implement the function using only NOR gates. (