**Electronics I Worksheet 3**

1. Given the two binary numbers X = 1010100 and Y = 1000011, perform the subtraction (a) X - Y and (b) Y - X by using 2’s complements.
2. Using BCD codes perform the operation 167 + 456
3. What is the exact number of bytes in a system that contains (a) 32K bytes, (b) 64M bytes, and (c) 6.4G bytes?
4. Convert the following numbers with the indicated bases to decimal: (a) (4310) 5 (b) (198) 12 (c) (435) 8 and (d) (345) 6
5. Determine the base of the numbers in each case for the following operations to be correct: (a) 14/2 = 5 (b) 54/4 = 13 (c) 24 + 17 = 40.
6. Convert the hexadecimal number 64CD to binary, and then convert it from binary to octal.
7. Obtain the 1’s and 2’s complements of the following binary numbers: (a) 00010000 (b) 00000000 (c) 11011010 (d) 10101010
8. Find the 16’s complement of C3DF.
9. Convert decimal +49 and +29 to binary, using the signed‐2’s‐complement representation and enough digits to accommodate the numbers. Then perform the binary equivalent of (+29) + (-49), (-29) + (+49), and (-29) + (-49). Convert the answers back to decimal and verify that they are correct.
10. Simplify the expression x(x’ + y)
11. Simplify the expression (x + y)(x + y’)
12. Simplify the expression (x + y)(x’ + z)(y + z)
13. Reduce the following Boolean expressions to the indicated number of literals:

(a) A’C’ + ABC + AC’ to three literals

(b) (x’y’ + z)’ + z + xy + wz to three literals

(c) A’B(D’ + C’D) + B(A + A’CD) to one literal

Q.14: Implement the Boolean function F = xy + x’y’ + y’z

(a) With AND, OR, and inverter gates

(b) With AND and inverter gates

(c) With NAND and inverter gates

(d) With NOR and inverter gates