Visvesvaraya National Institute of Technology, Nagpur

Department of Electronics & Communication Engineering

Digital Circuits and Hardware Design (ECL216)

Practice Questions-1 (16th Aug 2023)

Submission deadline :- 1 Sept 2023

Q.1 Convert the following binary numbers to decimal & Gray code: 101110; 1110101; and 11011010 and convert gray code 1000101; and 11111010 to binary

Q.2 Convert the following numbers with the indicated bases to decimal: ($(4310)_5$; $(5O)_7$ and $(198)_{12}$.

Q.3 Convert the following decimal numbers to binary: 1231; 673; and 1998.

Q.4 Convert the following decimal numbers to the bases indicated.

a. 7562 to octal   b. 1938 to hexadecimal c. 175 to binary

Q.5 Convert the hexadecimal number F3A7C2 to binary and octal.

Q.6 Write your name in ASCII using an 8-bit code with the leftmost bit always 0. Include a space between names and a period after a middle initial.

Q.7 Decode the following ASCII code:

1001010 1001111 1001000 1001110 0100000 1000100 1001111 1000101

Q.8 Perform the following arithmetic operations with the decimal numbers using 2's compliment arithmatics.

a) 46-55   b) -17 -47   c) 44 – 22

Q.9 Simplify the following expressions using Boolean algebra to one variable

a) A'B(D'+C'D)+B(A+A'CD)

b)(A'+C) (A'+C') (A'+B+C'D)

Q.10 Simplify the following expressions using Boolean algebra.

a. AB + A (CD + CD')   b. (BC' + A'D) (AB' + CD')

Q.11 Using DeMorgan's thoerm, show that

a. $(A + B)'(A' + B')' = O$ b. $A + A'B + A'B' = 1$

Q.12. Given the Boolean function

$F = xyz' + x'y'z + xyz$

a. List the truth table of the function.

 b. Draw the logic diagram using the original Boolean expression.

c. Simplify the algebraic expression using Boolean algebra.

d. List the truth table or the function from the simplified expression and show that it is the same as the truth table In part (a).

Q.13 Simplify the following function & implement them with NANAD gate circuit only

A)$F = BD + BC'D + AB'C'D'$ b) $G = AB' + ABD + ABD' + A'C'D' + A'BC'$

Q.14 Find the complement & dual of the function given below & reduce it to minimum no. of literals $F = [(ab)'a][(ab)'b]$