University of Technology
Computer science Department
Subject: Logic design
Final Exam 2008-2009 First trial
Class: First / Software
Examiner: Dr. Emad K. Jbbar

Answer only Five equations

Q1  Simplify the following expression using Boolean algebra laws, and then draw the output
Using NAND gate only

\[ F = \overline{(A \oplus B)} \oplus \overline{(C \oplus D)} + \overline{A} \overline{B} \overline{C} \overline{D} + A B C D \]

Q2  A- Find the result of the following:
\[ (((101010)_{2} + (F20)_{16}) \times (55)_{8}) - (12)_{10} \]

B- Use CSA to implement (27) \times 2 with sketch

Q3  A- Design combinational circuit to implement traffic light circuit

B- Implement the following function with multiplexer \( F(A, B, C, D) = (0,5,6,8,13,15) \)
and draw block diagram, use \( C \) as left most variable

Q4  A- Let \( F_1 = \Sigma(4,5,6,7) \) and \( (1,2,3) \) are Don’t Care cells find \( F \) such that \( F = F_1 \)

B- Store 76 in Rotate left/right register and determine the state of the register after five
clock pulse

Q5 Design counter with the following binary sequence \((0,6,1,4,5,7)\) and repeat.

Q6 Transmitted code word received as \((1110101)\) find error location by using hamming code