Name: **Id#**

COE 405, Term 162

Design & Modeling of Digital Systems

Quiz# 1

Date: Tuesday, Feb. 28, 2017

Q.1. One of the design optimization criteria is the area of the design. Discuss why area optimization is important. List two other design optimization criteria and discuss how they can be optimized.

Q.2. Consider the function: $F(A, B, C) = (A \oplus B) + (A \oplus C)$

    (i)   Compute the expansion of F using the **Orthonormal Basis** $\{\varnothing_1 = \overline{A}\,\overline{B}, \varnothing_2 = \overline{A}B, \varnothing_3 = A\overline{B}, \varnothing_4 = AB\}$.

    (ii)   Compute the function $\overline{F}$ utilizing the orthonormal based expansion of the function.

Q.3. It is required to design a combinational circuit that computes the equation Y=X-3, where X is an n-bit signed 2's complement number.

    (i) Design the circuit as a modular iterative circuit where each module receives a single bit of the input, X_i.

    (ii) Derive the truth table of your 1-bit module in (i).