

Name:

Id#

COE 405, Term 131

Design & Modeling of Digital Systems

Quiz# 1

Date: Tuesday, Oct. 1, 2013

Q.1. Consider the two functions: $F_1(A, B, C, D) = AB + BC + CD + \overline{A}\overline{D}$ and
 $F_2(A, B, C, D) = ABC + \overline{A}\overline{B}\overline{C} + \overline{A}D + A\overline{D}$

(i) Compute the expansion of F_1 and F_2 using the **Orthonormal Basis** $\{\phi_1 = \overline{A}\overline{B}, \phi_2 = \overline{A}B, \phi_3 = A\overline{B}, \phi_4 = AB\}$.

(ii) Compute the function $F_1 \oplus F_2$.

Q.2. It is required to design a combinational circuit that computes the equation $Y=3*X+2$, where X is an n -bit unsigned number.

- (i) Design the circuit as a modular 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).
- (iii) Derive minimized two-level sum-of-product equations for your 1-bit module circuit.

