Name: KEY Id#

COE 202, Term 112

Digital Logic Design

Quiz# 2

Date: Monday, Feb. 18

# 

# **Q1**. Simplify the following Boolean functions to the minimum number of literals sum of product s expressions using algebraic manipulation:

## A D’ + A’ B D’ + A’ C D’ + B’ C’ D’

= D’ ( A + A’ B + A’ C + B’ C’) by distributive law

= D’ (A + A’ B + B + A’ C + C + B’ C’) by consensus

= D’ (A + B + C + B’ C’) by absorption

= D’ (A + B + C + B’) by consensus

= D’ (1)

= D’

## { [ (A B)’ A ]’ [ (A B)’ B]’ }’

= (A B)’ A + (A B)’ B by Demorgan’s law

= (A B)’ (A + B) by distributive law

= (A’ + B’) (A + B) by Demorgan’s law

= A’ A + A’ B + A B’ + B B’ by Demorgan’s law

= A’ B + A B’

## (A + B + C)(A + B + C’) (A’ + C’)(B + C’)

# We first take the dual to make simplification easier.

Dual = A B C + AB C’ + A’ C’ + B C’

= A B ( C + C’) + A’ C’ + B C’ by distributive law

= A B + A’ C’ + B C’

= A B + A’ C’ by consensus law

We now take the dual again:

(A + B) (A’ + C’)

= A A’ + A C’ + A’ B + B C’ by distributive law

= A C’ + A’ B + B C’

= A C’ + A’ B by consensus law