Name: Id#

COE 202, Term 201

Digital Logic Design

Quiz# 2 Solution

Date: Sunday, Sep. 20, 2020

**Question 1.** Using Boolean Algebraic manipulations, minimize the following functions to minimum the number of literals in **sum of products** representation. **Show your work clearly step by step indicating the used properties of Boolean Algebra**: **(13 points)**

1. **(5 points)** F1 = (x’y’ + z)’ + z + xy + wz

= (x’y’ + z)’ + z + xy By Absorption

= (x’y’)’.z’ + z + xy By DeMorgans

= (x’y’)’ + z + xy By Simplification

= (x + y) + z + xy By DeMorgans

= x + y + z By Absorption

1. **(5 points)** F2 = A’B(D’ + C’D) + B(A + A’CD)

= A’B(D’ + C’) + B(A + A’CD) By simplification

= A’B(D’ + C’) + B(A + CD) By simplification

= B ( A’D’ + A’C’ + A + CD) By Distribution

= B (D’ + C’ + A + D) By simplification

= B ( 1 + C’ + A) By complement (x+x’=1)

= B.1 = B By (x+1=1) and (x.1=x)

1. **(3 points)** F3 = A’C’ + AD + BC’D

= A’C’ + A D + B C` D + C` D By consensus

= A’C’ + A D + C` D By absorption

= A’C’ + A D By consensus

OR = A’C’ + A D + B C’ D (A + A’)

= A’C’ + A D + A B C’ D + A’ B C’ D

= A`C` + A D By absorption