Name: KEY **Id#**

COE 202, Term 121
Digital Logic Design

Quiz# 2

Date: Wednesday, Sep. 26

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

(i) $\overline{W}X(\overline{Z} + \overline{Y}Z) + X(W + \overline{W}YZ)$

$= \overline{W}X(\overline{Z} + \overline{Y}) + X(W + YZ)$ by consensus

$= \overline{W}X\overline{Z} + \overline{W}X\overline{Y} + XW + XYZ$ by distributive law

$= \overline{W}X\overline{Z} + \overline{W}X\overline{Y} + XW + XYZ + X\overline{Z} + X\overline{Y}$ by consensus

$= XW + XYZ + X\overline{Z} + X\overline{Y}$ by absorbtion

$= XW + XYZ + X\overline{Z} + X\overline{Y} + XZ$ by consensus

$= XW + XY + X\overline{Y} + X(Z + \overline{Z})$ by distributive law

$= XW + XY + X\overline{Y} + X$ since $Z + \bar{Z} = 1$

$= X$ by absorption

(ii) $\overline{((\overline{A + \overline{B} + C}).(\overline{AB} + \overline{C}\,\overline{D}) + \overline{ACD})}$

$= \left((A + \overline{B} + C) + (AB.(C + D))\right).ACD$

$= (A + \overline{B} + C).ACD + (AB.(C + D)).ACD$

$= (ACD + ACD\overline{B}) + (ACDB + ACDB)$

$= ACD + ACDB$

$= ACD$