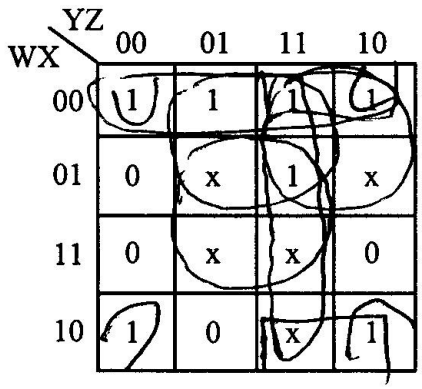
Name: **Id#**

COE 202, Term 122
Digital Logic Design

Quiz# 3

Date: Monday, March 11

Q1. For the Boolean function F(W, X, Y, Z)=Σ m(0, 1, 2, 3, 7, 8, 10), d(W, X, Y, Z)=Σ m(5, 6, 11, 13, 15) shown in the k-map below:



(i) Identify all the *prime implicants* and the *essential prime implicants* of F.

(ii) Simplify the Boolean function **F** into a minimal sum-of-products expression.

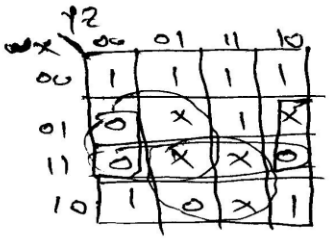
(iii) Simplify the Boolean function **F** into a minimal product-of-sums expression.

(i) Prime Implicants : $\bar{w}\bar{x}$, $\bar{w}y$, $\bar{w}z$, xz, yz, $\bar{x}\bar{z}$, $\bar{x}y$

Essential Prime Implicants : $\bar{x}\bar{z}$

(ii) Minimal sop : $F = \bar{x}\bar{z} + \bar{w}z$

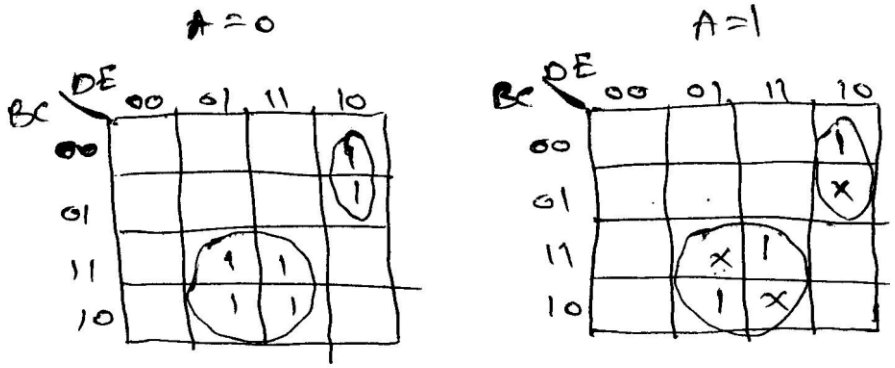
(iii)



$\bar{F} = wz + x\bar{z}$

$F = (\bar{w} + \bar{z})(\bar{x} + z)$

Q2. The following Boolean expression: BE + B`DE` is a simplified version of the expression: A`BE + BCDE + BC`D`E + A`B`DE` + B`C`DE`. Are there any don`t care conditions? If so, what are they?



Yes, the don't care conditions are

m22, m27, m29