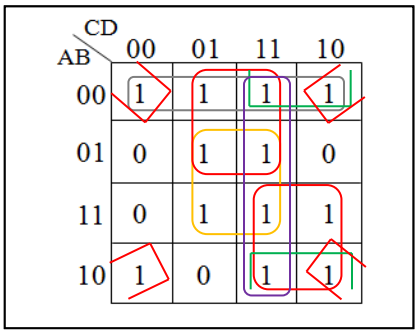
Name: KEY **Id#**

COE 202, Term 141
Digital Logic Design

Quiz# 3

Date: Tuesday, Oct. 28

Q1 For the following Boolean function shown in the K-map:



F(A, B, C, D)=Σ m(0, 1, 2, 3, 5, 7, 8, 10, 11, 13, 14, 15)

a. Identify all possible *prime implicants* of F and indicate which of these is essential.

b. Simplify the Boolean function F into a minimal sum-of-products expression.

a. Prime Implicants:

A'B', CD, A'D, BD, AC, B'C, B'D'

Essential Prime Implicants:

BD, AC, B'D'

b. **F =** BD + AC + B'D' + A'B' OR **F =** BD + AC + B'D' + A'D

Q2 Shown to the right is the K-Map of the Boolean function G subject to the don't care conditions D

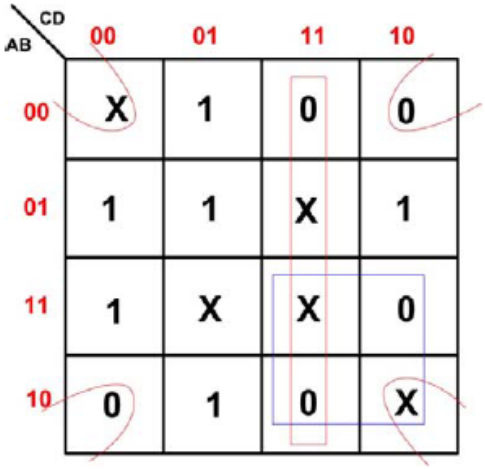
G(A, B, C, D) = ∑(1, 4, 5, 6, 9, 12)
D(A, B, C, D) = ∑(0, 7, 10, 13, 15)

Derive the minimal POS expression of G.

AB \ CD	00	01	11	10
00	X	1	0	0
01	1	1	X	1
11	1	X	X	0
10	0	1	0	X

G' = B' D' + A C + C D

$$G = (B + D)(\bar{A} + \bar{C})(\bar{C} + \bar{D})$$



Alternatively

$$G = (B + D)(\bar{A} + \bar{C})(B + \bar{C})$$