COE 202, Term 122
Digital Logic Design

Quiz# 2

Date: Saturday, Feb. 23

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

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

$= A B + \bar{B} C + A C D + A C \bar{D}$ as $AB\bar{D}$ is absorbed by AB

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

$= A B + \bar{B} C + A C$ as $D + \bar{D} = 1$

$= A B + \bar{B} C$ by consensus

(ii) $\overline{((A + \bar{B} C).(A + \bar{C} \bar{D}) + \overline{AC})}$

$= \overline{(\overline{[(A + \bar{B} C).(A + \bar{C} \bar{D})]} + \overline{AC})}$

$= (\left[\overline{\overline{(A + \bar{B} C)}} + \overline{(A + \bar{C} \bar{D})}\right].\overline{\overline{AC}})$

$= ([(A + \bar{B} C) + \bar{A}.(C + D)].AC$

$= AC + A\bar{B} C$

$= AC$

Q2. Express the function $F(A, B, C) = A + \bar{B}\,C$ as:

(i)   Sum of minterms $F(A, B, C) = \Sigma\, m(\ )$

$$F(A, B, C) = \sum m(1, 4, 5, 6, 7)$$

(ii)   Product of maxterms $F(A, B, C) = \prod M(\ )$

$$F(A, B, C) = \prod M(0, 2, 3)$$