DIGITAL ELECTRONICS (14B11EC317)

Tutorial-2

Q1 **For the following Boolean function:**

F = xy'z + x'y'z + w'xy + wx'y + wxy

(i) Obtain the truth table.

(ii) Draw the logic diagram using the original Boolean function.

(iii) Use Boolean algebra to simplify the function to minimum number of literals.

(iv) Draw the logic diagram from the simplified expression.

Sol. F= Y'Z + XY + WY

Q2 **Minimize the following Boolean expression using laws of Boolean algebra:**

(i) **F(A,B,C) = ABC + A'B + ABC'+ AC**

Sol. F= B+AC

(ii) **F(A,B,C) = A'C'+ ABC + AC'+AB'**

Sol. F= A+C'

(iii) **F(A,B,C,D) = (BC' + A'D) (AB' + CD')**

Sol. F= 0

Q3 **Express the following Boolean function in canonical sum form:**

(i) **F(A,B,C,D) = B'D + A'D + BD**

(ii) **F(A,B,C) = BC + AB + C**

(iii) **F(A,B,C) = (AB + C) (B + AC)**

(iv) **F(A,B,C,D) = (A' + B') (C' + D') (B' + D)**

Q4 **Express the following Boolean function in canonical product of sum form:**

(i) **F(A,B,C,D) = B'D + A'D + BD**

(ii) **F(A,B,C) = BC + AB + C**

(iii) **F(A,B,C) = (AB + C) (B + AC)**

(iv) **F(A,B,C,D) = (A' + B') (C' + D') (B' + D)**

Q5 **Simplify the following Boolean expression in (a) sum of Product (b) Product of sum**

(i) **F(A,B,C,D) = π(1,3,5,7,12,13,14,15)**

Sol.

Sop:-F = A'.D' + A.B'

POS:- F= (A + D') (A' + B')

(ii) **F(A,B,C) = $\sum$(0,1,2,5,7)**

Sol.

Sop:-F = A'.B' + A'.C' + A.C

POS:- F= (A' + C) (A + B' + C')

(iii) **F(A,B,C,D,E) = $\sum$(0,1,4,5,16,17,21,25,29)**

Sol.

Sop:- F = y = A'.B'.D' + B'.C'.D' + A.D'.E

POS:- F= (D') (A + B') (B' + E) (A' + C' + E)