

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.

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

- (i) $F(A,B,C) = ABC + A'B + ABC' + AC$
- (ii) $F(A,B,C) = A'C' + ABC + AC' + AB'$
- (iii) $F(A,B,C,D) = (BC' + A'D)(AB' + CD')$

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) $F(A,B,C,D) = \pi(1,3,5,7,12,13,14,15)$
- (ii) $F(x,y,z) = \sum(0,1,2,5,7)$
- (iii) $F(A,B,C,D,E) = \sum(0,1,4,5,16,17,21,25,29)$