

$$\underline{1/a} \quad u'y'z' + u'yz + uy'z + u'yz'$$

$$= (u'y'z') + (u'yz') + (u'yz) + (uyz)$$

$$= (u'y'z') + (u'yz) + (uyz)$$

$$= (u'y(z' + z)) + (uyz) [u + u' = 1]$$

$$= (u'y \cdot 1) + (uyz) [u + u' = 1]$$

$$= (y \cdot 1)u' + (uyz) [u \cdot 1 = 1]$$

$$= (u'y) + (uyz)$$

$$= (y(u' + u)z)$$

$$= y(u' + u)z [u + (u' \cdot y) = u + y]$$

Ans

$$\begin{aligned}
& \textcircled{b} (u' + y') \cdot (u + y) \\
&= (uu') + (uy') + (yu') + (yy') \\
&= 0 + (uy') + (yu') + (yy') \quad [u \cdot u = 0] \\
&= (uy' + 0) + yu' + yy' \\
&= uy' + yu' + yy' \\
&= uy' + (yu' + 0) \quad [y \cdot y' = 0] \\
&= uy' + yu' \quad \underline{\text{Ans}} \quad [u + 0 = u]
\end{aligned}$$

$$\begin{aligned}
& \textcircled{c} (a' + b')' (a + b')' \\
&= (a'' \cdot b') \cdot (a' \cdot b'') \quad [(u + y)' = u' \cdot y'] \\
&= (a \cdot b') \cdot (a' \cdot b) \quad [\cancel{u}'' = u] \\
&= (a \cdot a') \cdot (b \cdot b') \quad [a \cdot a' = 0] \\
&= 0 \cdot (b \cdot b') \\
&= 0 \quad \underline{\text{Ans}}
\end{aligned}$$

$$2/ \textcircled{a} \quad u'y' + uy'$$

$$= u' + y' \cdot u + y'$$

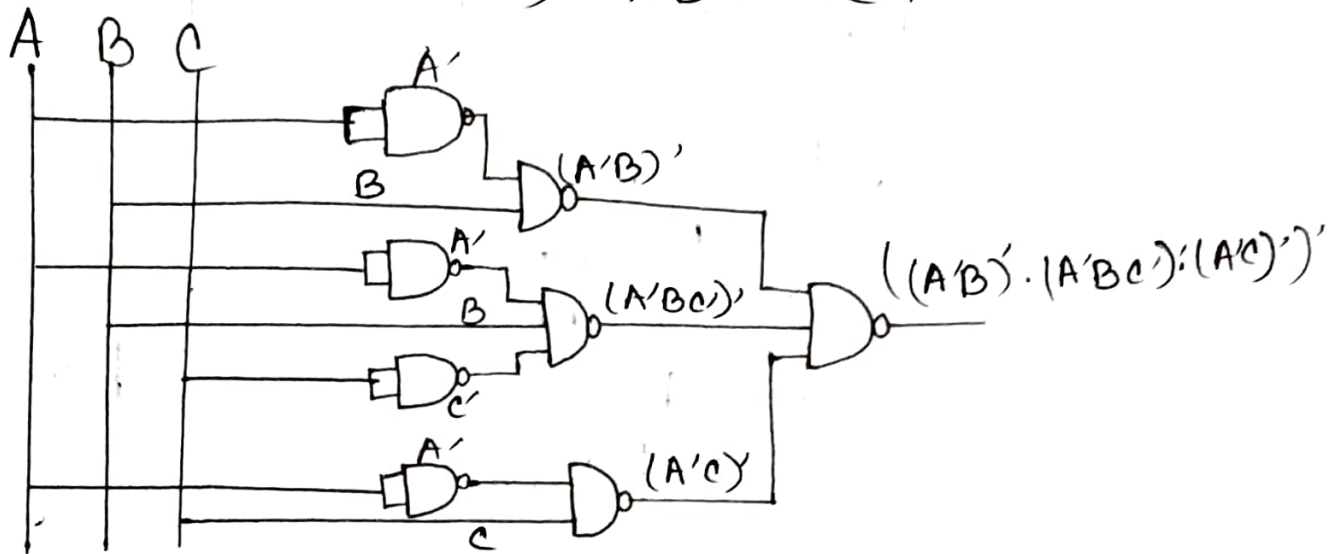
$$= u + y \cdot u' + y \quad \underline{\text{Ans}}$$

$$\textcircled{b} \quad (u' + y + z') (u' + y') (u + z')$$

$$= (u' \cdot y \cdot z') + (u' \cdot y') + (u \cdot z')$$

$$= (u \cdot y' \cdot z) + (u' \cdot y) + (u' z) \quad \underline{\text{Ans}}$$

Q 3/ (a) Given,  $F(A, B, C) = A'B + A'BC + A'C$



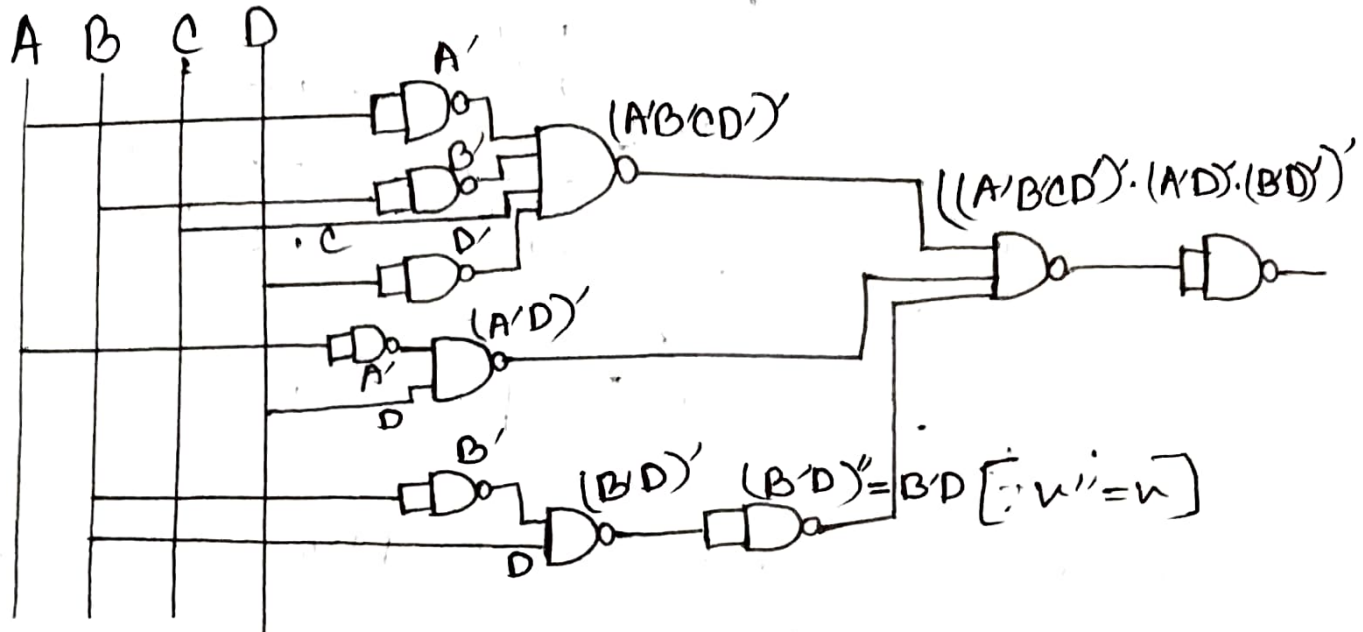
From the equation we got after creating the gates,  
 $((A'B)' + (A'BC)' + (A'C)')$

$$= (A'B)'' + (A'BC)'' + (A'C)'' \quad [u'' = u]$$

$$= (A'B) + (A'BC) + (A'C) \quad [(xy)' = x' + y']$$

$$= (A'B) + (A'BC) + (A'C) \quad [.]$$

3/ (b)  $F(A, B, C, D) = (A'B'CD' + A'D + (B+D)')'$



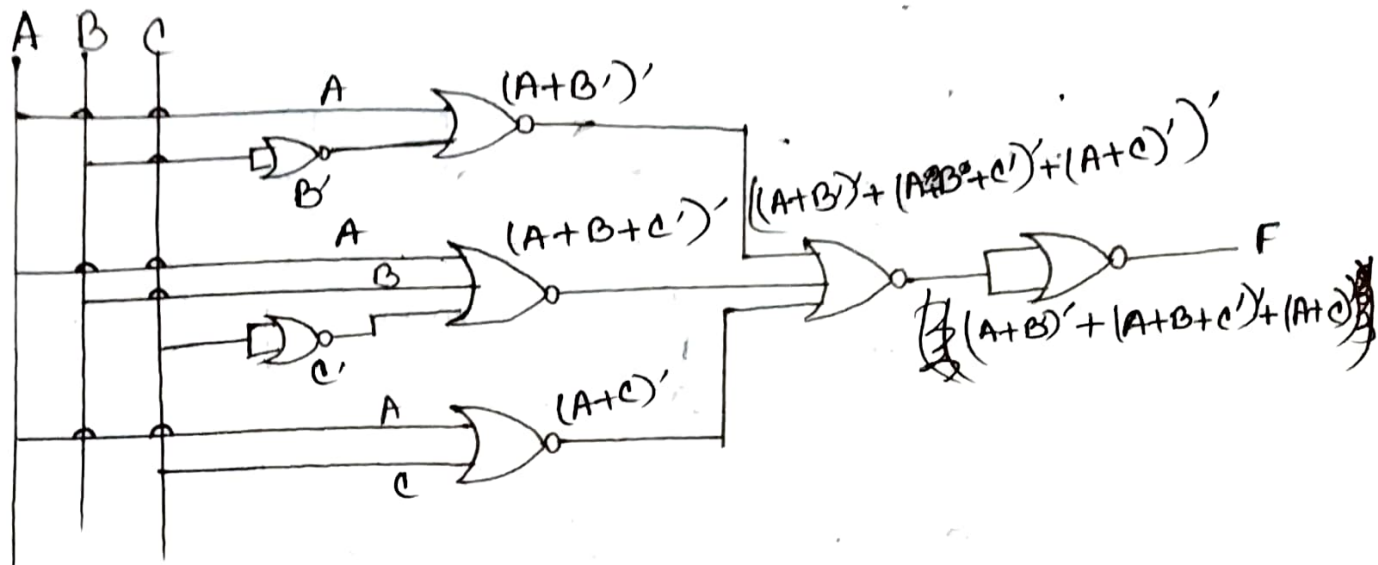
from the equation we can write,

$$((A'B'CD')' \cdot (A'D)' \cdot (B'D)')'$$

$$= (A'B'CD')'' + (A'D)'' + (B'D)'' \quad [(xy)' = x' + y']$$

$$= A'B'CD' + A'D + B'D \quad [u'' = u]$$

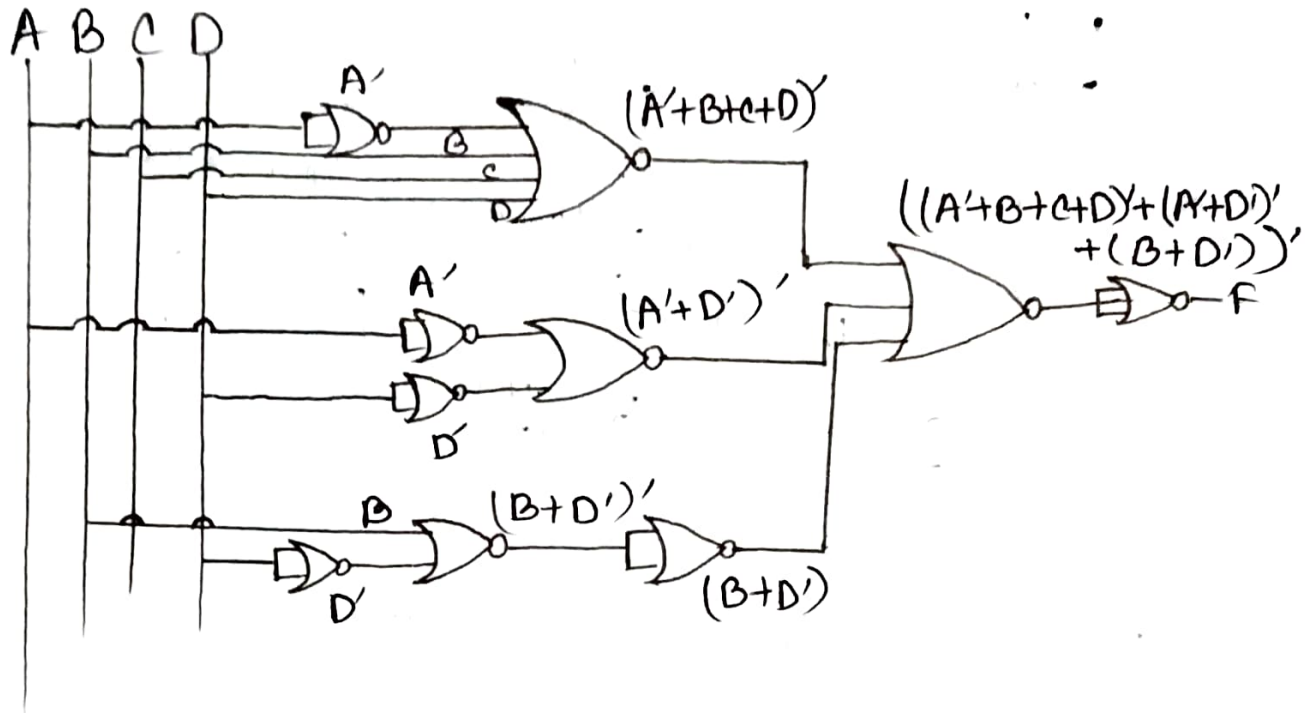
41 (a) Given,  $F(A, B, C, D) = A'B + A'B'C + A'C'$



From the equation we got we can write,

$$\begin{aligned}
 & (A+B')' + (A+B+C')' + (A+C)' \\
 & = A'B + A'B'C + A'C' \quad [(w+y)' = w' \cdot y'] \\
 & = A'B + A'B'C + A'C' \quad [w' = w]
 \end{aligned}$$

41 (6)  $F(A, B, C, D) = (AB'C'D' + AD + (B+D)')'$



From the equation we get we can write,

$$\{ (A' + B + C + D)' + (A' + D')' + (B + D) \}$$

$$= \{ A \cdot B' C' D' + AD + (B + D)' \}$$

$$= A \cdot B' C' D' + AD + (B + D)'$$