

$$\begin{aligned}
 (c) \quad & \frac{AB'C'(D+BC') + C'D+A'B'}{P4b} \\
 & = \frac{AB'C'D+AB'BC'+C'D+A'B'}{P5b} \\
 & = \frac{AB'C'D+C'D+A'B'}{T3a} \\
 & = C'D+A'B'
 \end{aligned}$$

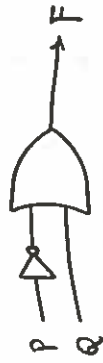
$$\begin{aligned}
 (d) \quad & F = ((X'Y)' + XY' + Z(X+YZ))' + X'Z' \\
 & \frac{F'}{T5b} = \frac{(X'Y)' + XY' + Z(X+YZ)}{T5a \& b} + X'Z' \\
 & = \frac{X+Y'+XY'+Z(X(Y'+Z'))}{T3a} + X'Z' \\
 & = \frac{X+Y'+XY'+Z+XZZ'+X'Z'}{P4b} + X'Z' \\
 & = \frac{X+Y'+XY'+Z+X'Z'}{P5b} + X'Z' \\
 & = \frac{X+Y'+XY'+Z+X'Z'}{T3a}
 \end{aligned}$$

$$\begin{aligned}
 & = X+Y'+X'Z' \\
 & = Y'+X+X'Z' \\
 & \frac{}{T4a}
 \end{aligned}$$

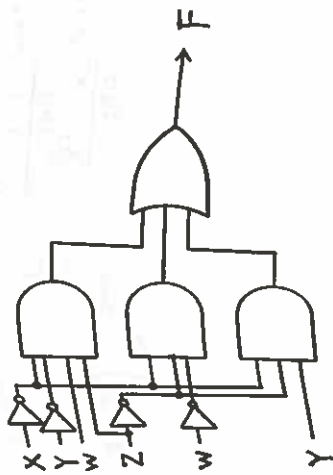
$$\begin{aligned}
 & = Y'+X+Z' = X+Y'+Z' \\
 & F = (F')' = (X+Y'+Z')' = X'YZ
 \end{aligned}$$

$$\begin{aligned}
 (e) \quad & \frac{XY'Z+XY'Z'+XZ'Y+YZ'X+XZ'Y'}{T1a} \\
 & = \frac{XY'Z+XY'Z'+XYZ'+XY'Z'}{P4b} \\
 & = \frac{XY'(Z+Z') + XZ'(Y+Y')}{P5a} \\
 & = XY' + XZ'
 \end{aligned}$$

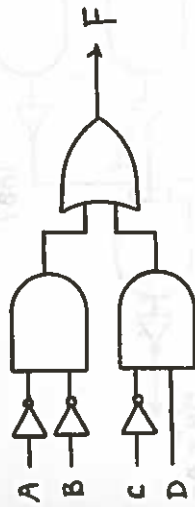
$$2.18 (a) F = P' + Q$$



$$(b) F = X'YZ' + W'X'Z' + WX'Y'Z$$



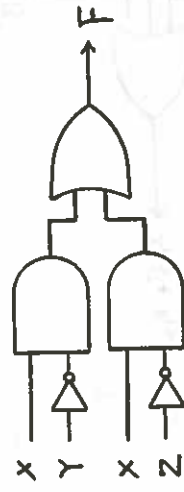
$$(c) F = C'D + A'B'$$



$$(d) F = X'YZ$$



$$(e) F = XY' + XZ'$$



$$\begin{aligned}
 2.19 (a) \quad & P(A, B, C) = A'B'C' + A'B'C + A'B'BC + AB'C \\
 (b) \quad & P(A, B, C) = A'B'C' + A'B'BC + A'B'BC + AB'C
 \end{aligned}$$

$$\begin{aligned}
 & = A'B'C' + A'B'BC + A'B'BC + AB'C \\
 & \frac{}{T1a} \\
 & = A'B'C' + A'B'BC + A'B'BC + AB'C \\
 & = (A'B'C' + A'B'BC) + (A'B'BC + AB'C) \\
 & \frac{}{P4b} \frac{}{P4b} \\
 & = A'B'(C' + C) + A'C(B' + B) + B'C(A' + A) \\
 & \frac{}{P5a} \frac{}{P5a} \\
 & = A'B' + A'C + B'C
 \end{aligned}$$

