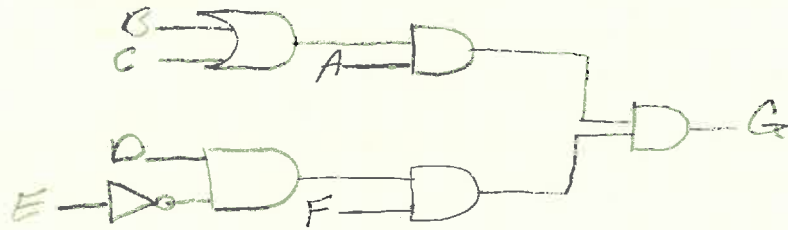


HW #1

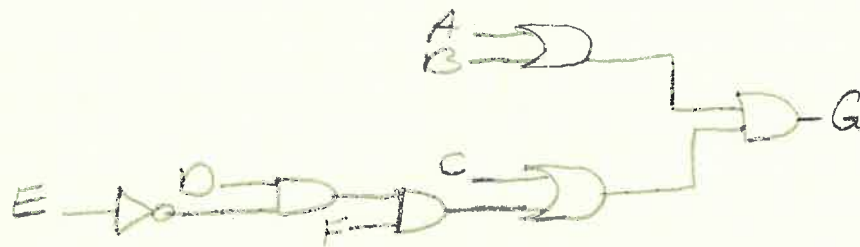
1-1. (a)

$$G = A(B+C) \times (\overline{D}EF)$$



(b)

$$G = (A+B) \times (C+D\overline{E}F)$$



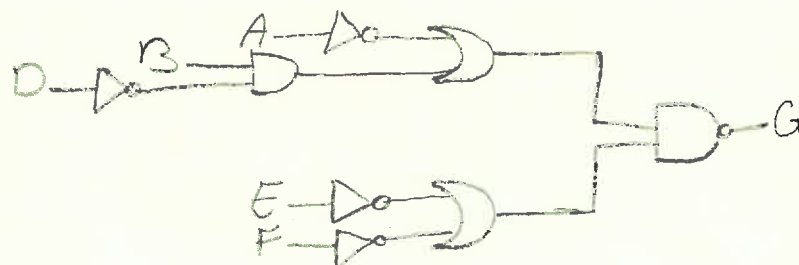
1-3. (a)

$$G = A(\overline{B} + \overline{D}) + EF$$

$$= \overline{A(\overline{B} + \overline{D})} \overline{EF}$$

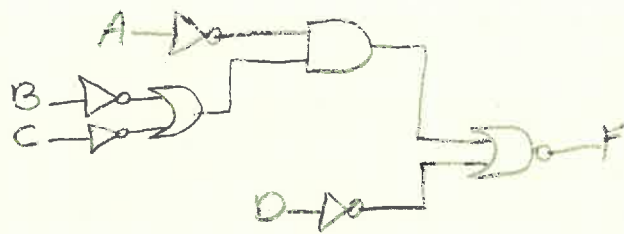
$$= (\overline{E} + \overline{F})(\overline{A} + \overline{(\overline{B} + \overline{D})})$$

$$= (\overline{E} + \overline{F})(\overline{A} + B\overline{D})$$



1-3 (b)

$$\begin{aligned}
 F &= (A + BC) \cdot 0 \\
 &= \overline{(A + BC)} + \bar{0} \\
 &= \overline{\bar{A} \cdot \bar{B} \cdot \bar{C}} + \bar{0} \\
 &= \overline{\bar{A} (\bar{B} + \bar{C})} + \bar{0}
 \end{aligned}$$



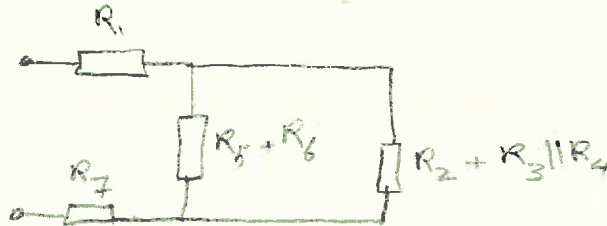
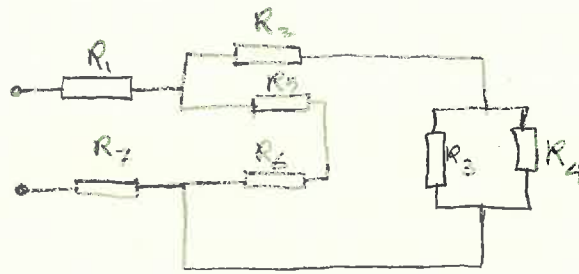
1-5

$$\begin{aligned}
 F &= X + \overline{X + Y} + XY \\
 &= X + (\bar{X} \cdot \bar{Y}) + XY \\
 &= X(1 + Y) + (\bar{X} \bar{Y}) \\
 &= \overline{\overline{X + X \bar{Y}}} = \overline{\bar{X} \cdot (X + Y)} = \overline{X \bar{X} + \bar{X} Y} \\
 &= \overline{0 + \bar{X} Y} = \overline{\bar{X} Y} = X + Y
 \end{aligned}$$

1-8

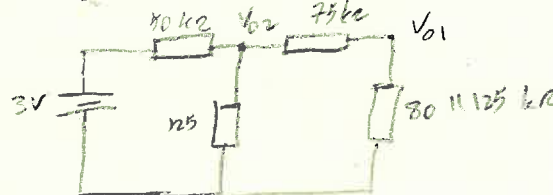
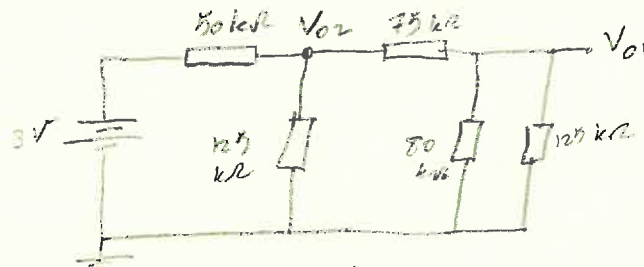
$$\begin{aligned}
 F &= X + XZ + \bar{X}Y \\
 &= X(1 + Z) + \bar{X}Y = X + \bar{X}Y = \overline{\overline{X + \bar{X}Y}} = \overline{\bar{X} \cdot (X + Y)} \\
 &= \overline{X \bar{X} + \bar{X} Y} = \overline{\bar{X} Y} = X + Y
 \end{aligned}$$

1-11.



$$R_{eq} = R_1 + (R_5 + R_6) \parallel (R_2 + R_3 \parallel R_4) + R_7$$

1-14. (a)



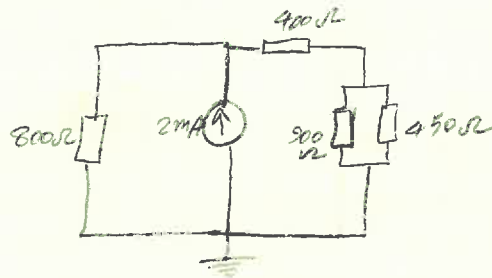
$$V_{01} = V_{02} \left(\frac{80 \parallel 125 \text{ k}\Omega}{75 + 80 \parallel 125} \right)$$

$$= V_{02} (0.394 \text{ k}\Omega) = 0.655 \text{ V}$$

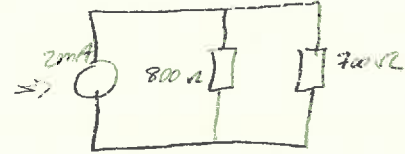
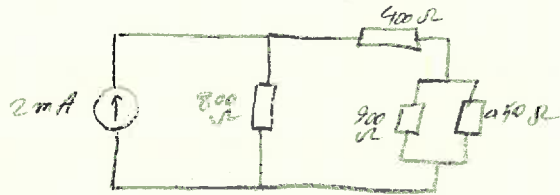
(b)

$$V_{02} = \frac{125 \text{ k}\Omega \parallel (75 + 80 \parallel 125) \text{ k}\Omega}{50 \text{ k}\Omega + 125 \parallel (75 + 80 \parallel 125) \text{ k}\Omega} \times 3 \text{ V} = 1.663 \text{ V}$$

1-17



(a)



$$R_{eq} = 900 \parallel (400 + 900 \parallel 450) = 373.33 \Omega$$

$$V = R_{eq} I$$

$$I_{700} = \frac{373.33 (\Omega) \times 2 (\text{mA})}{700} = 1.067 \text{ mA}$$

$$I_{450} = 1.067 \text{ mA} \left(\frac{900}{900 + 450} \right) = 0.711 \text{ mA}$$

b)

$$V_{800} = R_{eq} \times 2 \text{ mA} = 373.33 \Omega \times 2 \text{ mA} = 746.66 \text{ mV}$$

c)

$$I_{800} = \frac{373.33 (\Omega) \times 2 (\text{mA})}{800} = 0.933 \text{ mA}$$

$$I_{400} + I_{800} = 1.067 + 0.933 = 2 \text{ mA}$$