5-15

a) $W = \overline{AB} = \bar{A} + \bar{B}$

b) $Y = \overline{\bar{A}\bar{B}} = \bar{\bar{A}} + \bar{\bar{B}} = A + B$

c) $X = \overline{A+B} = \bar{A}\bar{B}$

d) $Z = A + B$

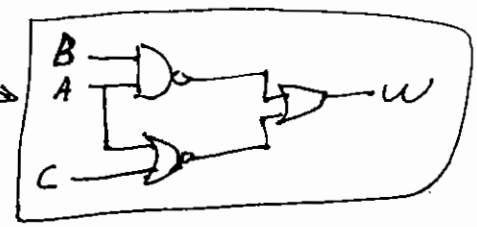
$\Rightarrow$ Eq. $\boxed{b}$ + $\boxed{d}$ Produce Equivalent Outputs

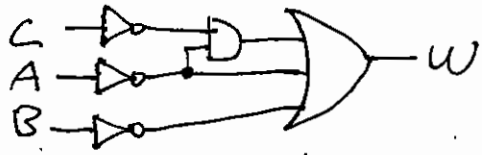
3 min)

5-17

a) $W = \overline{AB} + \overline{A+C}$

$W = \bar{A} + \bar{B} + \bar{A}\bar{C}$





(3 min)

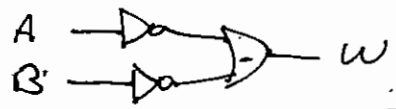
NOT FULLY SIMPLIFIED $\Rightarrow$

$W = \bar{A} + \bar{B} + \bar{A}\bar{C}$

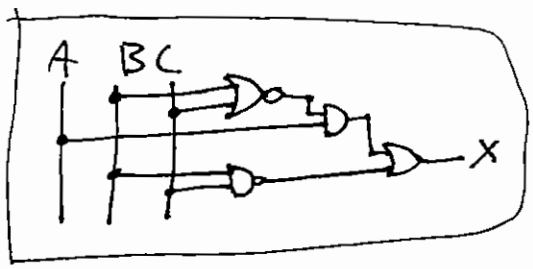
$\bar{A}(1+\bar{C}) + \bar{B}$

$W = \bar{A} + \bar{B}$

(2 min)



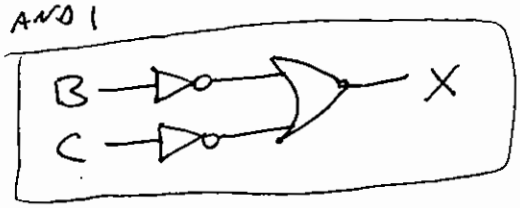
b) $X = A\overline{B+C} + \overline{BC}$



$X = A\bar{B}\bar{C} + \bar{B} + \bar{C}$ Demorgan

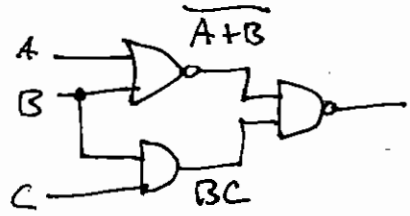
$X = \bar{C}(A\bar{B}+1) + \bar{B}$ Dist.

$\boxed{X = \bar{C} + \bar{B}}$ OR 1 AND 1



(3 min)

5-18b



$$\boxed{Y = \overline{(\overline{A+B})BC}}$$

$$Y = \overline{\overline{A+B}} + \overline{BC}$$ Demorgan

$$Y = A+B + \overline{B} + \overline{C}$$ NOT NOT + Demorgan

$$Y = A + 1 + \overline{C}$$ OR IS OPPOSITE

$1 - Y$

$\boxed{Y = 1}$ AND ONE

$\boxed{\text{Verify}}$ ✓

$\boxed{\text{3min}}$

5-24

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

$$Y = \overline{A}BC + A\overline{B}C + AB\overline{C}$$

(2min)

TOPS 35500

5-17c

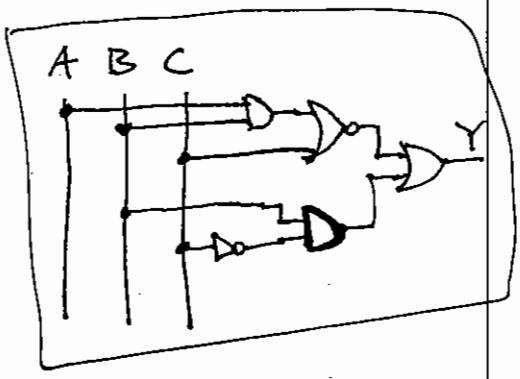
$$Y = \overline{(AB)+C} + B\bar{C}$$

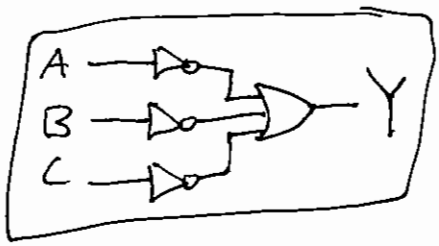
$$Y = \overline{AB} + \bar{C} + B\bar{C}$$

$$Y = \bar{A} + \bar{B} + \bar{C} + B\bar{C}$$

$$Y = \bar{A} + \bar{B} + \bar{C}(1+B)$$

$$\boxed{Y = \bar{A} + \bar{B} + \bar{C}}$$





(4 min)

5-17d

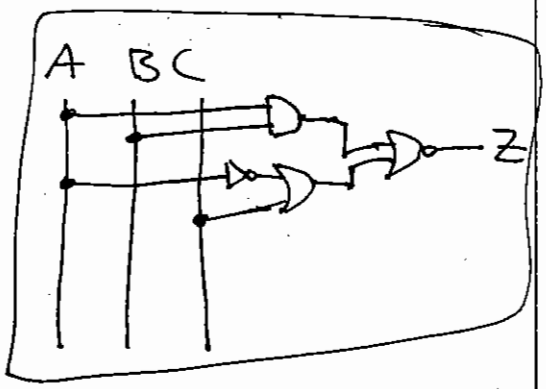
$$Z = \overline{AB + (\bar{A}+C)}$$

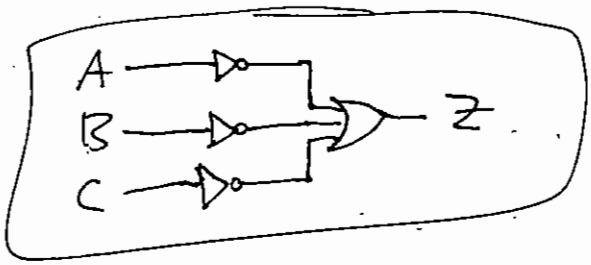
$$Z = \overline{AB} + \overline{(\bar{A}+C)} \quad \text{Demorgan}$$

$$Z = \bar{A} + \bar{B} + \bar{\bar{A}}\bar{C} \quad \text{Demorgan}$$

$$Z = \bar{A} + \bar{B} + A\bar{C} \quad \text{NOT NOT}$$

$$\boxed{Z = \bar{A} + \bar{B} + \bar{C}} \quad \text{RULE 10}$$





(4 min)