

# CS-211 Sp04

## Weeks 9-10, Solutions

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(Sec 10.2, p. 404-405)

4 A)

X	Y	Z	XVYZ
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

B)  $\bar{X}yZ \vee X\bar{y}\bar{Z} \vee X\bar{y}Z \vee Xy\bar{Z} \vee XyZ$

8. A)  $XyZ \vee X\bar{y}\bar{Z} \vee \bar{X}y\bar{Z} \vee \bar{X}\bar{y}Z$   
 B) See A).

(Sec 10.3 p. 410-411)

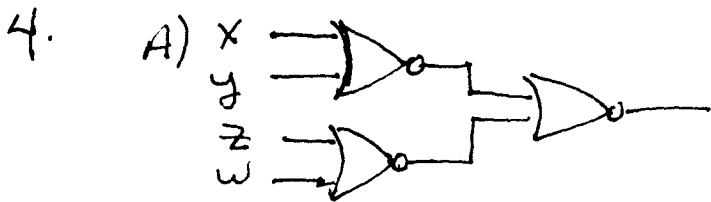
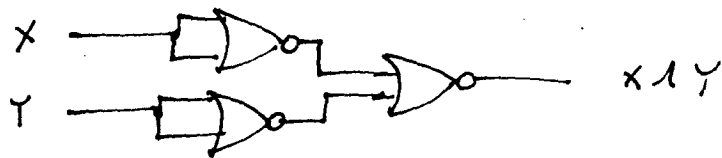
2.  $\bar{X} = \overline{(X \vee X)}$ , so



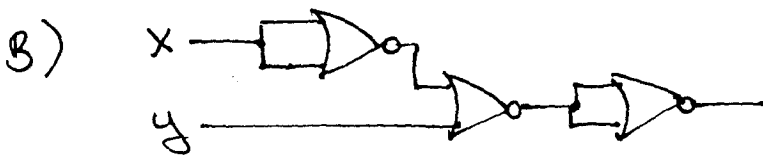
$X \vee Y = \overline{(\overline{X \vee Y})}$ , so



$X \wedge Y = \overline{(\overline{X \wedge Y})}$ , so



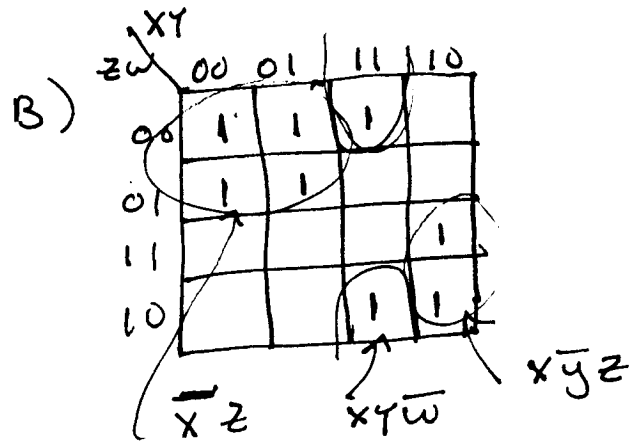
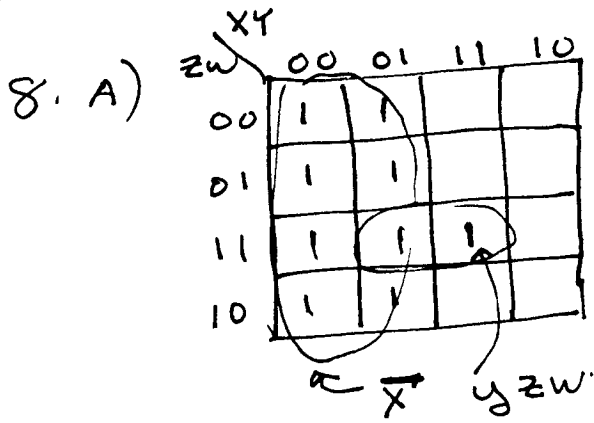
$$(X \vee Y)(Z \vee W) = \overline{\overline{(X \vee Y) \vee (Z \vee W)}}$$



$$\overline{(X \vee Y)} = \bar{X} \wedge \bar{Y}$$

8. A)  $x=y=C_I=0$  B) Exactly two of  $x, y, C_I$  equal 1  
 C)  $x=y=C_I=1$ .

(Section 10.4. pp. 416-417)



- 10 A)  $wx \vee wy \vee wz \vee xy \vee xz \vee yz$ .  
 Each term is essential.

B)  $w(x \vee y \vee z) \vee x(y \vee z)$ .

(Section 10.5 pp. 421-422)

- 6 A)  $1 = 6, 0 = 1$ . B) The atoms: 2, 3.

c)  $D_6$  and  $\mathcal{P}(\{2,3\})$  are isomorphic.

$\varphi(1) = \emptyset, \varphi(6) = \{2,3\}, \varphi(2) = \{2\}, \varphi(3) = \{3\}$ .

Supplemental problems

1 A) for  $D_{50}$ :

$\overline{1} = 50$   
 $\overline{50} = 1$   
 $\overline{2} = 25$   
 $\overline{25} = 2$   
 $\overline{5} = \text{d.n.e}$   
 $\overline{10} = \text{d.n.e}$

for  $D_{1001}$ :

$\overline{1} = 1001$   
 $\overline{1001} = 1$   
 $\overline{7} = 143$       $\overline{143} = 7$   
 $\overline{13} = 77$       $\overline{77} = 13$   
 $\overline{11} = 91$       $\overline{91} = 11$