... ABC+A'BD=BD'+ABC'
See the truth table of problem 2.4(3)
$\sum m(5,6,7,12,13)$ NOT EQUAL TO $\sum m(4,6,12,13,14)$
---> False

(d) X'Z+X'Y+XZ = X'YZ'+X'YZ+X'Z
See the truth table of problem 2.4(4)
$\sum m(1,2,3,5,7)$ NOT EQUAL TO $\sum m(1,2,3)$
----> False

(e) (P+Q'+R)(P+Q'+R')=Q'+PR'+RP'
See the truth table of problem 2.4(5)
$\sum m(0,1,4,5,6,7)$ NOT EQUAL TO $\sum m(0,1,3,4,5,6)$
----> False

2.14 (a) Dual of $X \oplus Y$ = Dual of (XY'+X'Y)
=(X+Y')(X'+Y)
Complement of $X \oplus Y$ = (XY'+X'Y)'
=(XY')'(X'Y)'=(X+Y')(X'+Y)
They are equal

(b) $X\uparrow(Y\uparrow Z) \neq (X\uparrow Y)\uparrow Z$
$X\uparrow(Y\uparrow Z)=X\uparrow(YZ)'=(X(YZ)')'=X'+YZ$
$(X\uparrow Y)\uparrow Z=(XY)'\uparrow Z=((XY)'Z)'=XY+Z'$

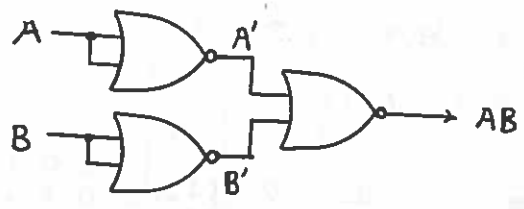
(c) $(X \oplus Y) \oplus Z = X \oplus (Y \oplus Z)$

$(X \oplus Y) \oplus Z$ $=(X'Y+XY') \oplus Z$
$=(X'Y+XY')'Z+(X'Y+XY')Z'$
$=(X+Y)(X'+Y)Z+X'YZ'+XY'Z'$
$=(XX'+X'Y'+XY+Y'Y)Z+X'YZ'+XY'Z'$
$=X'Y'Z+X'YZ'+XY'Z'+XYZ$

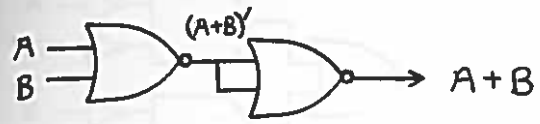
$X \oplus (Y \oplus Z)$ $=X \oplus (Y'Z+YZ')$
$=X'(Y'Z+YZ')+X(Y'Z+YZ')'$
$=X'Y'Z+X'YZ'+X(Y+Z')(Y'+Z)$
$=X'Y'Z+X'YZ'+X(YY'+Y'Z'+YZ+Z'Z)$
$=X'Y'Z+X'YZ'+XY'Z'+XYZ$

They are equal

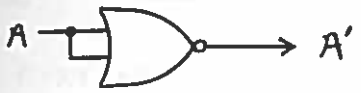
2.15 (a) AND



(b) OR



(c) NOT



2.16 (a) $P'(A,B,C)=\sum m(2,4,6,7)$
(b) $P'(A,B,C)=\prod M(0,1,3,5)$
(c) $P'Q=(\sum m(2,4,6,7))(\sum m(1,4,5,7))$
$=\sum m(4,7)$
(d) $P'+Q=(\sum m(2,4,6,7))+(\sum m(1,4,5,7))$
$=\sum m(1,2,4,5,6,7)$(Minterm)
$P'+Q=\prod M(0,3)$(Maxterm)

2.17 (a) $P'+PQR+QR'=\underset{T4a}{P'+PQR}+QR'$
$=P'+QR+QR'$
$=P'+Q(\underset{P5a}{R+R'})$
$=P'+Q$

(b) $\underset{P4b}{X'Y(Y'+Z')}+W'X'Z'+WX'Y'(\underset{T4a}{Z+Z'X})$
$=\underset{P5b}{X'YY'}+X'YZ'+W'X'Z'+\underset{P4b}{WX'Y'(Z+X)}$
$=X'YZ'+W'X'Z'+WX'Y'Z+\underset{P5b}{WX'Y'X}$
$=X'YZ'+W'X'Z'+WX'Y'Z$