2011025869 강은경 Homework 1

Pg.13, Q6)

a) If you have the flu then you'll miss the final examination

b) If you not miss the final examination then you'll pass the course and If you pass the course then you'll not miss the final examination.

c) If you miss the final examination then you'll not pass the course.

d) You have the flu or you miss the final examination or you pass the course.

e) If you have flu and you miss the final examination, you don't pass the course.

f) You not miss the final examination and you pass the course. OR You have flu and you miss the final examination.

Pg.13, Q7)

a) $p \wedge q$ b) $p \wedge \neg q$ c) $\neg p \wedge \neg q$

d) $p \vee q$ e) $p \rightarrow q$ f) $(p \vee q) \wedge (\neg p \rightarrow \neg q)$

g) $\neg p \leftrightarrow q$

Pg.14, Q21)

a)

p	¬p	¬p∧p
T	F	F
F	T	F

b)

p	¬p	p⊕¬p
T	F	T
F	T	T

c)

p	q	¬q	p⊕¬q	(p⊕¬q)→q
T	T	F	T	T
T	F	T	T	F
F	T	F	F	T
F	F	T	T	T

d)

p	q	(p∨q)	(p∧q)	(p∨q)→(p∧q)
T	T	T	T	T
T	F	T	F	F
F	T	T	F	F
F	F	F	F	F

e)

p	q	¬p	¬q	(p→q)	(q→p)	(p→q)↔(¬q→¬p)
T	T	F	F	T	T	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

f)

p	q	(p→q)	(q→p)	(p→q)→(q→p)
T	T	T	T	T
T	F	F	T	T
F	T	T	F	F
F	F	T	T	T

Pg.14 Q22)

a)

p	p	p⊕p
T	T	F
F	F	F

b)

p	¬p	p⊕¬p
T	F	T
F	T	T

c)

q	p	¬q	p⊕¬q
T	T	F	T
F	T	T	F
T	F	F	F
F	F	T	T

d)

p	q	¬p	¬q	(¬p⊕¬q)
T	T	F	F	F
T	F	F	T	T
F	T	T	F	T
F	F	T	T	F

e)

p	q	(p⊕q)	¬q	(p⊕¬q)	(p⊕q)∨(p⊕¬q)
T	T	F	F	T	T
T	F	T	T	F	T
F	T	T	F	F	T
F	F	F	T	T	T

1)

P	Q	(P∨Q)	P∧Q	(P∨Q)∧(P∧Q)
T	T	T	T	T
T	F	T	F	F
F	T	T	F	F
F	F	F	F	F

Pg15, Q29)

a) 1010 1110
0101 0001

bitwise and 0000 0000
OR 1111 1111
XOR 1111 1111

b) 1111 0000
1010 1010

bitwise and 1010 0000
OR 1111 1010
XOR 0101 1010

c) 00 0011 0001
10 0100 1000

bitwise and 00 0000 0000
OR 10 0111 1001
XOR 10 0111 1001

d) 11 1111 1111
00 0000 0000

bitwise and 00 0000 0000
OR 11 1111 1111
XOR 11 1111 1111

Pg33, Q6)

a)

P	Q	¬P	(P∨Q)	¬P∧(P∨Q)	[¬P∧(P∨Q)]→Q
T	T	F	T	F	T
T	F	F	T	F	T
F	T	T	T	T	T
F	F	T	F	F	T

b)

P	Q	R	(P→Q)	(Q→R)	(P→R)	(P→Q)∧(Q→R)
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	T	F	T	T	F
T	F	F	F	T	F	F
F	T	T	T	T	T	T
F	T	F	T	F	T	T
F	F	T	T	T	T	T
F	F	F	T	T	T	T

[(P→Q)∧(Q→R)]→(P→R)
T
F
T
T
T
T
T
T

c)

P	Q	(P→Q)	P∧(P→Q)	[P∧(P→Q)]→Q
T	T	T	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	T

d)

P	Q	R	(P∨Q)	(P→R)	(Q→R)	(P∨Q)∧(P→R)
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	T	T	T	T	T
T	F	F	T	F	T	F
F	T	T	T	T	T	T
F	T	F	T	F	F	F
F	F	T	F	T	T	T
F	F	F	F	T	T	F

(P∨Q)∧(P→R)∧(Q→R)	[(P∨Q)∧(P→R)∧(Q→R)]→R
T	T
F	T
T	T
F	T
T	T
F	T
F	T
F	T

Pg 51, Q18)

a) $\exists x(\neg R(x))$

b) $\forall x(T(x) \rightarrow (R(x) \wedge E(x))$.

c) $\forall x(R(x) \wedge E(x))$. d) $\forall x \exists x(\neg R(x) \wedge E(x))$.

e) $\exists x(T(x) \rightarrow (\neg R(x) \wedge E(x))$.

Pg61. Q10)

a) $\forall x \forall y((x<0) \wedge (y<0)) \rightarrow (x+y)<0)$

b) $\exists x \exists y((x>0) \wedge (y>0)) \rightarrow (x-y)<0)$

c) $\exists x \exists y((x^2+y^2) > (x+y)^2) \vee (x^2+y^2) = (x+y)^2)$

d) $\forall x \forall y(|xy| \rightarrow |x||y|)$

Pg62. Q15)

a) $\exists x \forall y \exists z \neg T(x,y,z)$.

b) $\exists x \forall y \neg P(x,y) \wedge \exists x \forall y \neg Q(x,y)$.

c) $\exists x \forall y(\neg P(x,y) \vee \forall z \neg R(x,y,z))$.

d) $\exists x \forall y(P(x,y) \wedge \neg Q(x,y))$.