Phil 225 -- Symbolic Logic
Homework 5 possible answers

1) a) $-(Ss \vee (\exists x)(Fxs \wedge Sx))$
$Ss \vee Sj$
$-Fjs$ The last sentence IS a consequence of the first two

b) $-(\exists x)(-Px \wedge Oxr)$
$Sc \rightarrow (Osr \wedge Cr)$
Sc
Ps The last sentence IS a consequence of the others.

c) $(x)(Fxs \rightarrow Fxj)$
$(x)(Fxr \rightarrow Fxs)$
$Fcr \rightarrow (\exists x)Fxj$ The last sentence IS a consequence.

d) $Cs \rightarrow Pc$
$(Cr \vee Cj) \rightarrow -Pc$
$(\exists x)Cx \rightarrow Cs$
$(\exists x)Cx \rightarrow -Cj$ The last sentence IS a consequence.

e) $(x)((Cx \wedge -Sx) \rightarrow -(\exists y)Fyx)$
OR $-(\exists x)(Cx \wedge -Sx \wedge (\exists y)Fyx)$
$Cr \wedge Cj$
$(x)((Cx \wedge Oxj) \rightarrow -Sx)$
$Orj \rightarrow -Fjr$ The last sentence IS a consequence.

2) a is not a consequence
D={0,1},
F: {<0,1>, <1,0>, <1,1>,<0,0>}
G: {{0,1> <1,0>}
b is a consequence

3)
a) neither
F and G empty makes it true

for false: D={0,1} F: {0} G: {1}

b) valid; hence any interpretation makes it true

c) neither
either F empty or G non-empty makes it true

To make it false, let F be non-empty but not the entire domain, and G empty makes it false (for the antecedent, pick x as anything not in F).

d) valid; hence any interpretation makes it true

e) neither

D={0,1}, F empty makes it true

F non-empty makes it false

f) inconsistent; hence any interpretation makes it false

4)

P	Q	R	((P	v	–	Q)	→	–	(R	&	–	(P	↔	R)))
T	T	T		**T**	F		***T***	**T**		F	F		T	
T	T	F		**T**	F		***T***	**T**		F	T		F	
T	F	T		**T**	T		***T***	**T**		F	F		T	
T	F	F		**T**	T		***T***	**T**		F	T		F	
F	T	T		**F**	F		***T***	**F**		T	T		F	
F	T	F		**F**	F		***T***	**T**		F	F		T	
F	F	T		**T**	T		***F***	**F**		T	T		F	
F	F	F		**T**	T		***T***	**T**		F	F		T	