

1. $(P \wedge Q) \Leftrightarrow (R \Rightarrow S)$

$2^n = 2^4 = 16$

P	Q	R	S	$(P \wedge Q)$	$(R \Rightarrow S)$	$(P \wedge Q) \Leftrightarrow (R \Rightarrow S)$
T	T	T	T	T	T	T
T	T	T	F	T	F	F
T	T	F	T	T	T	T
T	T	F	F	T	T	T
T	F	T	T	F	T	T
T	F	T	F	F	F	F
T	F	F	T	F	T	T
T	F	F	F	F	T	T
F	T	T	T	F	T	T
F	T	T	F	F	F	F
F	T	F	T	F	T	T
F	T	F	F	F	T	T
F	F	T	T	F	T	T
F	F	T	F	F	T	T
F	F	F	T	F	T	T
F	F	F	F	F	T	T

Contingencia

2. $[(P \Rightarrow Q) \wedge (Q \Rightarrow R)] \Rightarrow (P \Rightarrow R)$

P	Q	R	$P \Rightarrow Q$	$Q \Rightarrow R$	$(P \Rightarrow Q) \wedge (Q \Rightarrow R)$	$P \Rightarrow R$	$[(P \Rightarrow Q) \wedge (Q \Rightarrow R)] \Rightarrow (P \Rightarrow R)$
T	T	T	T	T	T	T	T
T	T	F	T	F	F	F	T
T	F	T	F	T	F	T	T
T	F	F	F	T	F	F	T
F	T	T	T	T	T	T	T
F	T	F	T	F	F	F	T
F	F	T	T	T	T	T	T
F	F	F	T	T	T	T	T

tautología

3. $[(P \vee Q) \vee R] \Leftrightarrow [P \vee (Q \vee R)]$

P	Q	R	$P \vee Q$	$(P \vee Q) \vee R$	$Q \vee R$	$P \vee (Q \vee R)$	$[(P \vee Q) \vee R] \Leftrightarrow [P \vee (Q \vee R)]$
T	T	T	T	T	T	T	T
T	T	F	T	T	T	T	T
T	F	T	T	T	T	T	T
T	F	F	T	T	F	T	T
F	T	T	T	T	T	T	T
F	T	F	T	T	T	T	T
F	F	T	T	T	T	T	T
F	F	F	F	F	F	F	T

$$4. (p \Rightarrow q) \wedge (q \Rightarrow r)$$

p	q	r	$p \Rightarrow q$	$q \Rightarrow r$	$(p \Rightarrow q) \wedge (q \Rightarrow r)$
V	V	V	V	V	V
V	V	F	V	F	F
V	F	V	F	V	F
V	F	F	F	V	F
F	V	V	V	V	V
F	V	F	V	V	V
F	F	V	V	V	V
F	F	F	V	V	V

contingencia

$$5. (p \Rightarrow q) \wedge r$$

p	q	r	$p \Rightarrow q$	$(p \Rightarrow q) \wedge r$
V	V	V	V	V
V	V	F	V	F
V	F	V	F	F
V	F	F	F	F
F	V	V	V	V
F	V	F	V	F
F	F	V	V	V
F	F	F	V	F

Contingencia

$$(\neg p \vee q) \Rightarrow (\neg q \Rightarrow r)$$

p	q	r	$\neg p$	$\neg q$	$\neg p \vee q$	$\neg p \Rightarrow r$	$(\neg p \vee q) \Rightarrow (\neg p \Rightarrow r)$
V	V	V	F	F	V	V	V
V	V	F	F	F	V	F	F
V	F	V	F	V	V	V	V
V	F	F	F	V	V	F	F
F	V	V	V	F	V	V	V
F	V	F	V	F	V	F	F
F	F	V	V	V	V	V	V
F	F	F	V	V	V	V	V

contingencia

$$(\phi, (\beta, \gamma)) = (\beta, \gamma)$$

Contingence

