A/W Tautological Implications: 08.03.2023

2) A Proposition p is set to B tautological implications if $p \to q$ is a tautology.

we denote $p \to Q$ are $p \Rightarrow Q$ 8

1) Show that $(P \to Q) \Rightarrow (\sim Q \to \sim P)$ Solution

is enough to prove that $(P \to Q) \Rightarrow (\sim Q \to \sim P)$ is a tautology.

P	Q	$P \to Q$	$\sim Q$	$\sim P$	$\sim Q \to \sim P$	que
T	T	T	F	F	T	T
T	F	F	T	F	F	T
F	T	T	F	T	T	T
F	F	T	T	T	T	T

Therefore, That : $(P \to Q) \Rightarrow (\sim Q \to \sim P)$ is a tautology.

2) Show that the statement is $(\sim p \wedge \sim Q) \rightarrow \sim(p \vee Q)$

P	Q	~P	~Q	(~p∧~Q)	(p∨Q)	~(p∨Q)	q
T	T	F	F	F	T	F	T
T	F	F	T	F	T	F	T
F	T	T	F	F	T	F	T
F	F	T	T	T	F	T	T

Therefore, The Last Column it is clearly that $(\sim p \wedge \sim Q) \rightarrow \sim(p \vee Q)$ is a tautology.

3) Show that the statement is

$$(\sim P \vee \sim Q) \rightarrow \sim(P \wedge Q)$$

P	Q	~P	~Q	(~P∨~Q)	(P∨Q)	~(P∨Q)	q
T	T	F	F	F	T	F	T
T	F	F	T	T	F	T	T
F	T	T	F	T	F	T	T
F	F	T	T	T	F	T	T

Therefore, The loss column is a learly that $(\sim P \vee \sim Q) \rightarrow \sim(P \wedge Q)$ is a.