

## 2.26.1. Valuation and Counter-Valuation Sentence Problems

**A.** Without using truth tables or truth trees, decide whether each of the following argument is **valid** or **invalid**.

(1)	(2)	(3)	(4)
1. $(P \vee Q)$	1. $(P \vee Q)$	1. $\sim(P \vee Q)$	1. $\sim(P \vee Q)$
2. $(\sim P \vee \sim Q)$	2. $(P \vee \sim Q)$	<hr/>	<hr/>
3. $(\sim P \vee Q)$	<hr/>	$\therefore (\sim P \vee \sim Q)$	$\therefore (P \vee Q)$
<hr/>	$\therefore \sim(P \vee Q)$		
$\therefore \sim(P \vee \sim Q)$			

**B.** For each of the following sentences, state whether it is a **tautology**, a **contradiction**, or **neither**.

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