Problem 42.
If the argument is valid, identify the rule of inference that guarantees its validity. Otherwise, state whether the converse or the inverse error is made.

$$
\begin{array}{ll}
a. & p \vee q \\
b. & q \to r \\
c. & p \wedge s \to t \\
d. & \sim r \\
e. & \sim q \to u \wedge s \\
f. & \therefore t
\end{array}
$$

Proof.

(1)	$\sim r$	by (d)
	$q \to r$	by (b)
	$\therefore \sim q$	by modus tollens
(2)	$\sim q \to u \wedge s$	by (e)
	$\sim q$	by (1)
	$\therefore u \wedge s$	by modus ponens
(3)	$u \wedge s$	by (2)
	$\therefore s$	by specialization
(4)	$p \vee q$	by (a)
	$\sim q$	by (1)
	$\therefore p$	by elimination
(5)	p	by (3)
	s	by (4)
	$\therefore p \wedge s$	by conjunction
(6)	$p \wedge s \to t$	by (c)
	$p \wedge s$	by (5)
	$\therefore t$	by modus ponens