Q-16

$\Big((p \Rightarrow q) \wedge (r \Rightarrow q)\Big)$ is valid $\equiv \Big((\neg p \vee q) \wedge (\neg r \vee q)\Big)$ is valid.

$(\because a \Rightarrow b \equiv \neg a \vee b)$

$\equiv q \vee (\neg p \wedge \neg r)$ is valid.

$(\because a \vee (b \wedge c) \equiv (a \vee b) \wedge (a \vee c))$

$\equiv \neg (p \vee r) \vee q$ is valid.

$\equiv (p \vee r) \Rightarrow q$ is valid.

Thus proved.