

#5.

- a) $P \rightarrow r$
- b) $P \wedge q \rightarrow r$
- c) $(p \vee q) \leftrightarrow r$

#9.

| p | q | r | $(p \rightarrow q) \wedge (p \rightarrow r)$ |
|---|---|---|--|
| T | T | T | T |
| T | T | F | F |
| T | F | T | F |
| T | F | F | F |
| F | T | T | T |
| F | T | F | T |
| F | F | T | T |
| F | F | F | T |

#10.

$[p \wedge (p \rightarrow q)] \rightarrow q$ is a tautology.