Answer to the exercise on CNF

Rewrite all sentences in $KB = \{p \vee q \supset r,\ r \supset s,\ p\}$ in conjunctive normal form.

Answer:

$p \vee q \supset r$ is by definition of $\supset$ equivalent to $\neg(p \vee q) \vee r$

$\neg(p \vee q) \vee r$ is by de Morgan's law equivalent to $(\neg p \wedge \neg q) \vee r$

By distributivity, $(\neg p \wedge \neg q) \vee r$ is equivalent to $(\neg p \vee r) \wedge (\neg q \vee r)$.

The last formula is in CNF and corresponds to two clauses, $[\neg p, r]$ and $[\neg q, r]$.

$r \supset s$ is equivalent to $\neg r \vee s$ which corresponds to the clause $[\neg r, s]$.

So KB rewritten in clausal form is $\{[\neg p, r], [\neg q, r], [\neg r, s], [p]\}$.