A6 P1 DANG DUC

(a). (6 pts) Give all resolvents ***for each pair*** of clauses below:
1. $(p \vee q \vee \sim r \vee s)$
2. $(\sim q \vee \sim r \vee \sim s)$
3. (q)
4. $(\sim q)$

$(p \vee q \vee \sim r \vee s)$ and $(\sim q \vee \sim r \vee \sim s)$: (p V s V ~r V ~s), (p V q V ~q V ~r)

$(p \vee q \vee \sim r \vee s)$ and (q): no resolvent

$(p \vee q \vee \sim r \vee s)$ and (~q): (p V s V ~r)

$(\sim q \vee \sim r \vee \sim s)$ and (q): (~r V ~s)

$(\sim q \vee \sim r \vee \sim s)$ and (~q): no resolvent

(q) and (~q): empty set

(b). (1 pt) What is the result of resolving any clause against itself?

There's no resolvent because every literal has no negate literal.

(c). (1 pt) Convert to CNF (show your work): $x \Rightarrow (y \Rightarrow z)$

$y \Rightarrow z$ is equal to: ~y V z

$x \Rightarrow$(~y V z) is equal to: ~x V (~y V z)

Apply distribution law: ~x V (~y V z) is **(~x V ~y) V (~x V z)**

(d). (1 pt) Convert to CNF (show your work): $(x \vee y) \Rightarrow z$.

$(x \vee y) \Rightarrow z$ is equal to ~(x V y) V z = **(~x ∧ ~y) V z**

(e). (2 pts) Convert to CNF (show your work): $(x_1 \wedge y_1) \vee (x_2 \wedge y_2) \vee (x_3 \wedge y_3)$

(f). (2 pts) As a function of n, how many clauses would be in the CNF conversion of:
$(x_1 \wedge y_1) \vee (x_2 \wedge y_2) \vee \ldots \vee (x_n \wedge y_n)$

2^n