Key for Practice Quiz - Thermodynamics

1. D. condensation
2. E. -566.60 kJ
3. C. $\Delta G° = $ -2.90 kJ; not forever
4. D. 28.4 kJ
5. C. 1.59×10^{-9}

6. *(p. 892)* For each of the following pairs, predict which (A or B) will have the greater entropy, and in one sentence indicate your reasoning.

	A	B
a.	1 mole of HI(g)	1 mole of HBr(g)
b.	1 mole of HI(g) at 20°C	1 mole of HI(g) at 30°C
c.	3 moles of H2(g) + 1 mole of N2(g)	2 moles of NH3(g)
d.	1 mole of H2(g), pressure = 1 atm	1 mole of H2(g), pressure = 0.1 atm
e.	1 mole of CO2(g)	1 mole of CO2(aq)
f.	1 mole of HCOOH(l)	1 mole of HCOOH(aq)

a. A has greater entropy. HI and HBr are chemically similar, but HI has the higher molar mass.
b. B has greater entropy. At the higher temperature, the sample has greater energy and there are more ways to distribute this energy among the molecules in the sample.
c. A has greater entropy, as it has more moles of gas phase molecules.
d. B has greater entropy. At the lower pressure, the volume is larger and there is more positional disorder in the sample.
e. A has greater entropy. A substance has a greater entropy in the gas phase than in solution.
f. B has the greater entropy. When a solid or liquid dissolves, it has a greater volume available to it, and is thus more disordered.

7.
$\Delta H° = $ -3271 kJ
$\Delta S° = $ -217 J/K
$\Delta G° = $ -3206 kJ

8. $K_p = 7.50$

9. $T = 463$ K. The calculation is based on the assumption that $\Delta H°$ and $\Delta S°$ do not change significantly with change in temperature.

10. E. -41 kJ