Question 4

Question 6

a. Pressure of HI at equilibrium can be obtained from: $K_p = {}^{P_{HI}}$

Question 8

a) percent dissociation = $\frac{\text{[dissociated salt or acid]}}{\text{[initial concentration]}}$ X 100%

[dissociated] = ——————————— = ——————— = 0.13 M

pH = -log[H^+] **pH =** - log (0.13) = **0.89**

b)

	$HClO_2(aq)$ ⇌	$H^+(aq)$ +	$ClO_2^-(aq)$
I	1.58	≈ 0	0
C	-x	+x	+x
E	01.58 – x	+x	+x

$K_a = \frac{[H^+][ClO_2^-]}{[HClO_2]} = \frac{0.13 \quad 0.13}{1.5 \quad - 0.13} = \mathbf{1.1x10^{-2}}$

c) Calculate first the concentration of H^+ or ClO_2^- in solution:

$K_a = \frac{(x^2)}{4.5 \; - \; x}$ if x << 4.5 then $x = \sqrt{(4.5)x(1.1x10^{-2})} = 0.22$

The percent dissociation is $\frac{0.22}{4.5}$ x100% = **4.9%** therefore the approximation was right

pH = 14 - (-log 1.0×10^{-3}) = **11.00**

(Check: $(1.0 \times 10^{-3} / 6.31 \times 10^{-2}) \times 100\% = 1.6\%$ Therefore, the approximation was right)

Question 10

a) The system is already at equilibrium.

check: $K_a = \frac{}{} = \frac{(6.4\text{x}10^{-5})(0.042 + 6.4\text{x}10^{-5})}{(0.015 - 6.4\text{x}10^{-5})} = 1.8\text{x}10^{-4}$

therefore, the approximation was right.

Question 13

	$\Delta S < 0$	$\Delta S > 0$
a) i. A liquid that boils	☐	■
ii. Sugar that crystallized out from a supersaturated sugar solution	■	☐
iii. Iron rusts (formation of Fe_2O_3 from pure Fe and O_2)	■	☐
iv. A-B(g) + C-D(s) $\longrightarrow$ A-B-C(g) + D(s)	☐	■
v. $N_2O_4(g) \longrightarrow 2NO_2(g)$	☐	■
vi. $NaCl(s) \longrightarrow Na^+(aq) + Cl^-(aq)$ $\Delta H_{sol} = +4.0$ kJ/mol	☐	■

b) #G = #H - T#S. At T = boiling temperature, the system is at equilibrium. Therefore, #G° = 0

Question 15