KWANTLEN COLLEGE
CHEMISTRY 1105 R-10
EXAM No. 2
August 11, 1994

Answer Key:

Question One:

The partial pressure of Ar is 2.10 atm and the partial pressure of CO_2 is 4.90 atm

Question Two:

a) The heat of combustion of glucose, $C_6H_{12}O_6$, is -2.801×10^3 kj/mol glucose.

b) ΔH for the reaction given is -5.602×10^3 kJ

Question Three:

a) ΔH^o for the reaction is -312 kJ

b) ΔH^o for the reaction is $+ 1.01 \times 10^3$ kJ.

i) The reaction is endothermic.

ii) Heat is absorbed during the course of this reaction?

Question Four:

a)

i) $\underline{N}_2H_4$ $\underline{-2}$ **ii)** $\underline{S}_2O_3^{2-}$ $\underline{+2}$

iii) $Na_2\underline{O}_2$ $\underline{-1}$ **iv)** $\underline{W}_2O_{11}^{2-}$ $\underline{+10}$

b) i) Oxidation Half Reaction:

$2\ Cl^-(aq) \rightarrow Cl_2(g) + 2\ e^-$

Reduction Half Reaction:

$14\ H^+(aq) + + 6\ e^- \rightarrow 2Cr^{3+}(aq) + 7\ H_2O(l)$

ii) $14\ H^+(aq) + Cr_2O_7^{2-}(aq) + 6\ Cl^-(aq) \rightarrow 3\ Cr^{3+}(aq) + Cl_2(g) + 7\ H_2O(l)$

iii) The oxidizing agent is $Cr_2O_7^{2-}(aq)$.

Question Five:

a) i)

$$K_c = \frac{[N_2]^2\ [H_2O]^6}{[NH_3]^4\ [O_2]^3}$$

ii)

$$K_c = \frac{[SO2]^2}{[O_2]^3}$$

b) $2\ H_2S(g)\ +\ 3\ O_2(g)\ \rightleftarrows\ 2\ SO_2(g)\ +\ 2\ H_2O(l)$

c) i) $K_c = 90.$

ii) $K_c = 0.11$

d) i)

ACTION TAKEN:	Mass of NH_3	K_c
Some N_2 is removed	D	NC
Some H_2O is added	NC	NC
Volume of Container is increased	I	NC
Temperature is decreased	D	D

ii) The reactants.

Question Six:

a) the equilibrium concentration of NO(g) is 0.0318*M* and Br_2(g) is 0.0346*M*.

b) $K_c = 107$

Question Seven:

The concentrations of H_2O, Cl_2O, and HOCl at equilibrium are 0.14*M*, 0.14*M* and 0.042*M*, respectively.

Question Eight:

a) i) NH_4^+ ii) HCO_3^-

b) i) NH_2^- ii) O^{2-}

c) i) Stronger acid: HSO_4- ii) Stronger base: CN^-

iii) Weaker acid: HCN iv) Weaker base: SO_4^{2-}

d)	$[H_3O^+]$	$[OH^-]$	pH	pOH
	3.3×10^{-4}	3.0×10^{-11}	3.78	10.52
	2.7×10^{-9}	3.7×10^{-6}	8.57	5.43

Bonus:

pH = 1.307