

**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<sub>2</sub> is 4.90 atm

**Question Two:**

- a) The heat of combustion of glucose, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>, is  $-2.801 \times 10^3$  kJ/mol glucose.
- b)  $\Delta H$  for the reaction given is  $-5.602 \times 10^3$  kJ

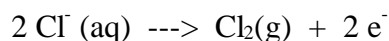
**Question Three:**

- a)  $\Delta H^\circ$  for the reaction is -312 kJ
- b)  $\Delta H^\circ$  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?

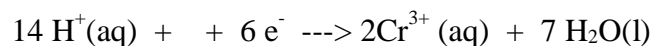
**Question Four:**

- a)
  - i) N<sub>2</sub>H<sub>4</sub>      -2
  - ii) S<sub>2</sub>O<sub>3</sub><sup>2-</sup>      ±2
  - iii) Na<sub>2</sub>O<sub>2</sub>      -1
  - iv) W<sub>2</sub>O<sub>11</sub><sup>2-</sup>      ±10

**b) i) Oxidation Half Reaction:**



**Reduction Half Reaction:**



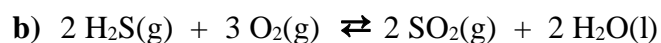
**ii)  $14 \text{H}^+ (\text{aq}) + \text{Cr}_2\text{O}_7^{2-} (\text{aq}) + 6 \text{Cl}^- (\text{aq}) \rightarrow 3 \text{Cr}^{3+} (\text{aq}) + \text{Cl}_2 (\text{g}) + 7 \text{H}_2\text{O} (\text{l})$**

**iii) The oxidizing agent is Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> (aq).**

**Question Five:**

a) i) 
$$K_c = \frac{[\text{N}_2]^2 [\text{H}_2\text{O}]^6}{[\text{NH}_3]^4 [\text{O}_2]^3}$$

ii) 
$$K_c = \frac{[\text{SO}_2]^2}{[\text{O}_2]^3}$$



c) i)  $K_c = 90$ .

ii)  $K_c = 0.11$

d) i)

<u>ACTION TAKEN:</u>	Mass of $\text{NH}_3$	$K_c$
Some $\text{N}_2$ is removed	D	NC
Some $\text{H}_2\text{O}$ 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  $\text{NO}(\text{g})$  is  $0.0318M$  and  $\text{Br}_2(\text{g})$  is  $0.0346M$ .

b)  $K_c = 107$

**Question Seven:**

The concentrations of  $\text{H}_2\text{O}$ ,  $\text{Cl}_2\text{O}$ , and  $\text{HOCl}$  at equilibrium are  $0.14M$ ,  $0.14M$  and  $0.042M$ , respectively.

