**Quiz 4**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Write one of the net ionic equations performed in Part B of the Calorimetry experiment (2 points).

Mg (s) + 2 H+ (aq) → H2 (g) + Mg2+ (aq)

MgO (s) + 2 H+ (aq) → H2O (l) + Mg2+ (aq)

1. What is the difference between heat and temperature (3 points)?

Heat is the energy transferred from one object to another as the result of a temperature difference between them. Temperature is a measure of the kinetic energy of molecular motion.

1. Give the oxidation number of chlorine in each of the following (3 points):
	1. hypochlorous acid HClO (aq) +1
	2. chloric acid HClO3 (aq) +5
	3. perchlorate ion ClO4- +7
2. If 10.00 mL of a ferrous chloride solution of unknown molarity is diluted with 90.00 mL of 1.0 M hydrochloric acid and 5 drops of barium diphenylaminesulfonate is added and it takes 27.30 mL of 0.01552 M potassium dichromate to reach the end point (12 points).
	1. What is the balanced redox reaction? Given the unbalanced equation:

$$Fe\_{(aq)}^{2+}+Cr\_{2}O\_{7 (aq)}^{2-}→Fe\_{(aq)}^{3+}+Cr\_{(aq)}^{3+}$$

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

$$Oxidation: \left(Fe\_{(aq)}^{2+}\rightarrow Fe\_{(aq)}^{3+}+e^{-}\right) 6$$

$$Overall: Cr\_{2}O\_{7 (aq)}^{2-}+14 H\_{(aq)}^{+}+6 e^{-}+6 Fe\_{(aq)}^{2+}\rightarrow 2 Cr\_{(aq)}^{3+}+7 H\_{2}O\_{(l)}+6 Fe\_{(aq)}^{3+}$$

$$Overall: Cr\_{2}O\_{7 (aq)}^{2-}+14 H\_{(aq)}^{+}+6 Fe\_{(aq)}^{2+}\rightarrow 2 Cr\_{(aq)}^{3+}+7 H\_{2}O\_{(l)}+6 Fe\_{(aq)}^{3+}$$

$$K\_{2}Cr\_{2}O\_{7 (aq)}+14 HCl\_{ (aq)}+6 FeCl\_{2}\rightarrow 2 CrCl\_{3 (aq)}+7 H\_{2}O\_{(l)}+6 FeCl\_{3 (aq)}+2 KCl\_{ (aq)}$$

* 1. What is the concentration of the ferrous chloride? Given the unbalanced equation:

$$27.30 mL K\_{2}Cr\_{2}O\_{7} soln×\frac{0.01552 mmol K\_{2}Cr\_{2}O\_{7}}{1 mL}×\frac{1 mmol Cr\_{2}O\_{7}^{2-}}{1 mmol K\_{2}Cr\_{2}O\_{7}}×\frac{6 mmol Fe^{2+}}{1 mmol Cr\_{2}O\_{7}^{2-}}×\frac{1 mmol FeCl\_{2}}{1 mmol Fe^{2+}}×\frac{1}{10.00 mL FeCl\_{2} soln}=0.2542 M FeCl\_{2} $$