

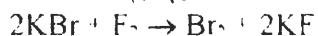
CHM151 Quiz 3 25 Pts Spring 2013 Name: Key
 Due Monday February 25th at the beginning of class. Show all work to receive credit.

1. Name and give the formulas for six *strong acids*

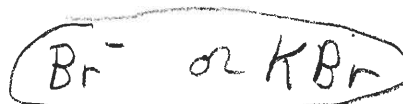
2. Determine the oxidation number of each of the elements in $\text{Cs}_2\text{Cr}_2\text{O}_7$?



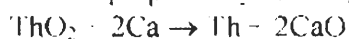
3. Identify the *reducing agent* in the following reaction



Reducing agent loses e^- s



4. Thorium metal is prepared by reacting thorium oxide with calcium as depicted below.



What is the *reducing agent* in this process? Ca

What is oxidized in the process? Ca

5. How many grams of potassium chloride are needed to make 3.0 liters of a 2.0 M KCl solution?

$$\frac{3.0 \text{ L}}{\text{L}} \times \frac{2.0 \text{ mol KCl}}{\text{mol}} \times \frac{74.55 \text{ g}}{\text{mol}} = 447.3 \text{ g}$$

450g

6. What volume of concentrated nitric acid (15.0 M) is required to make 100. mL of a 3.0 M nitric acid solution?

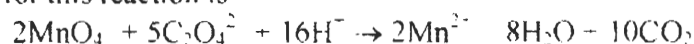
$$M_1 V_1 = M_2 V_2$$

$$(15.0 \text{ M}) V = (3.0 \text{ M})(100 \text{ mL})$$

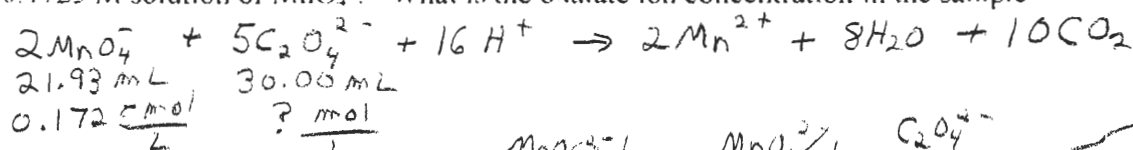
$$V_1 = 20 \text{ mL}$$

Key

7. The concentration of oxalate ion ($C_2O_4^{2-}$) in a sample can be determined by titration with a solution of permanganate ion (MnO_4^-) of known concentration. The net ionic equation for this reaction is

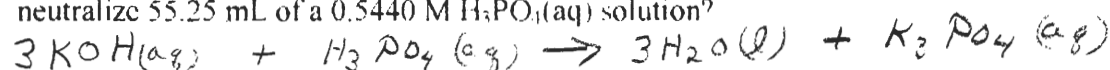


A 30.00 mL sample of an oxalate solution is found to react completely with 21.93 mL of a 0.1725 M solution of MnO_4^- . What is the oxalate ion concentration in the sample?



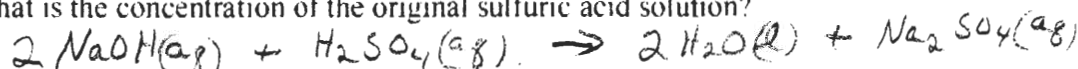
21.93 mL $0.1725 \frac{\text{mol}}{\text{L}}$	30.00 mL $? \frac{\text{mol}}{\text{L}}$	$21.93 \times 10^{-3} \text{ L}$ $C_2O_4^{2-}$	0.1725 mol MnO_4^-	5 mol $C_2O_4^{2-}$	2 mol MnO_4^-	$= 0.3152 \frac{\text{mol } C_2O_4^{2-}}{\text{L } C_2O_4^{2-}}$
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8. What volume (mL) of a 0.2450 M KOH(aq) solution is required to completely neutralize 55.25 mL of a 0.5440 M H_3PO_4 (aq) solution?



55.25 mL $0.5440 \frac{\text{mol}}{\text{L}}$	0.5440 mol H_3PO_4	3 mol KOH	1000 mL KOH	$= 368.0 \text{ mL KOH}$
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9. 34.62 mL of 0.1510 M NaOH was needed to neutralize 50.0 mL of an H_2SO_4 solution. What is the concentration of the original sulfuric acid solution?



34.62 mL $0.1510 \frac{\text{mol}}{\text{L}}$	50.0 mL $? \frac{\text{mol}}{\text{L}}$	34.62 mL $NaOH$	0.1510 mol $NaOH$	1 mol H_2SO_4	$= 0.0523 \frac{\text{mol } H_2SO_4}{\text{L } H_2SO_4}$
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10. A 110. mL solution of 0.340 M HCl(aq) is mixed with a solution of 330. mL of 0.150 M HNO_3 (aq). The solution is then diluted to a final volume of 1.00 L. How many moles of H^+ are present in the final solution?

Both are strong acids so they are 100% ionized.

Find moles of H^+ from each and add values.

110 mL 0.340 mol	0.340 mol HCl	$1 \text{ mol } H^+$ 1 mol HCl	$= 0.0374 \text{ mol } H^+$
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330 mL 0.150 mol	0.150 mol HNO_3	$1 \text{ mol } H^+$ 1 mol HNO_3	$= 0.0495 \text{ mol } H^+$
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