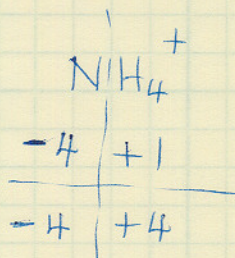
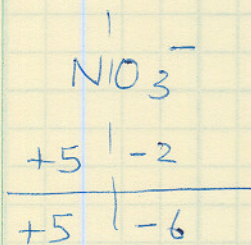
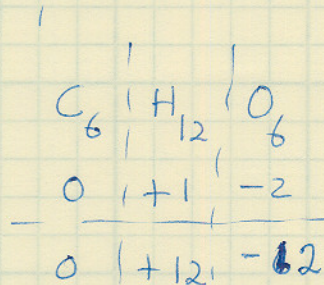
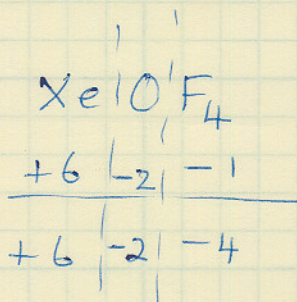
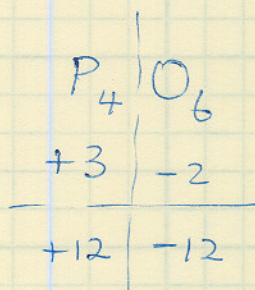
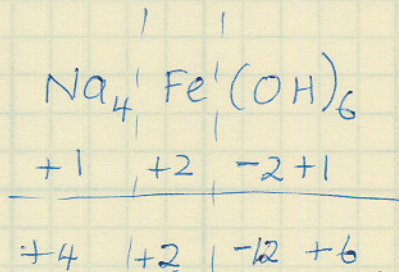
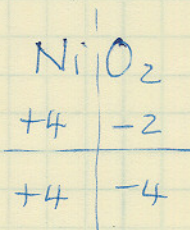
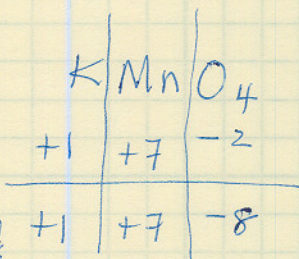


INTRODUCTION TO NATURAL SCIENCE

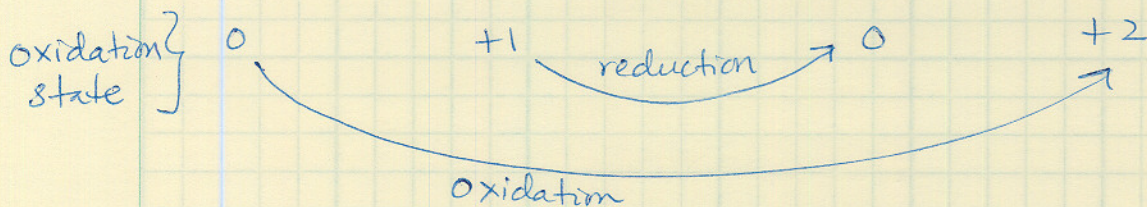
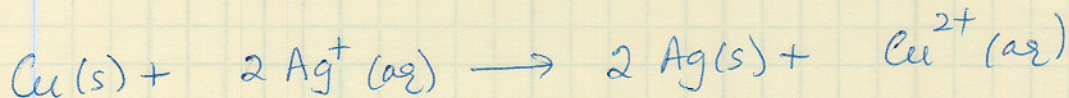
WEEK 8 CHEMISTRY WORKSHOP

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

①



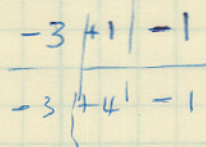
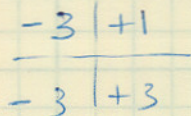
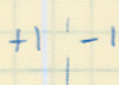
②



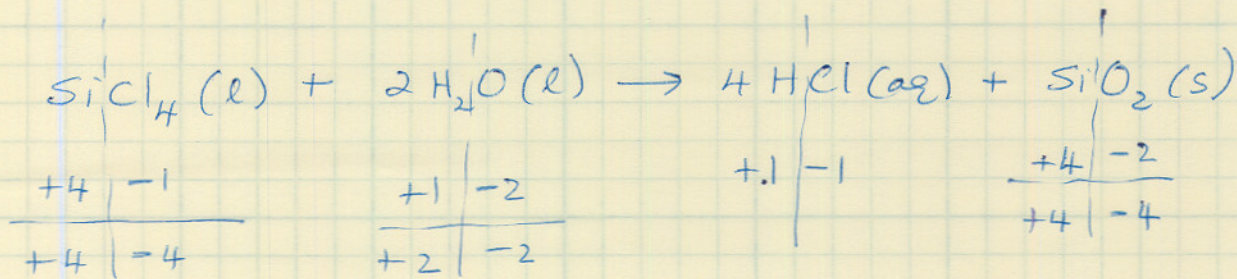
Ag is reduced from +1 to zero oxidation state

Cu is oxidized from 0 to +2 oxidation state

Cu is the reducing agent, Ag^+ is the oxidizing agent.



This is not a redox reaction.



Not a redox reaction.

$$\textcircled{3} \quad \text{Molar mass of NaHCO}_3 = [22.9898 + 1.008 + 12.011 + 3(15.99)] \frac{\text{g}}{\text{mol}}$$

$$= 83.9788 \text{ g/mol}$$

$$5.623 \text{ g NaHCO}_3 \times \frac{\text{mol}}{83.9788 \text{ g}} = 6.696 \times 10^{-2} \text{ mol NaHCO}_3$$

$$\text{molarity} = \frac{\# \text{ of moles of solute}}{\text{volume of solution}} = \frac{6.696 \times 10^{-3} \text{ mol}}{250.00 \times 10^{-3} \text{ L}}$$

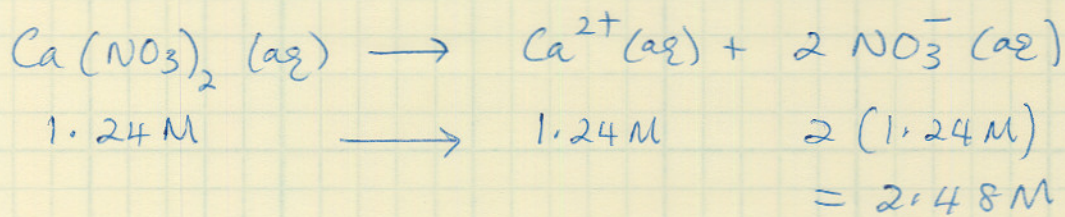
$$= \underline{\underline{0.2678 \text{ M}}}$$

$$\text{Molar mass of K}_2\text{Cr}_2\text{O}_7 = 294.1188 \text{ g/mol}$$

$$184.56 \text{ mg K}_2\text{Cr}_2\text{O}_7 \times \frac{1 \text{ g}}{10^3 \text{ mg}} \times \frac{1 \text{ mol}}{294.1188 \text{ g}} = 6.2750 \times 10^{-4} \text{ mol}$$

$$\text{molarity} = \frac{\text{moles of solute}}{\text{volume of solution}} = \frac{6.2750 \times 10^{-4} \text{ mol}}{500.00 \times 10^{-3} \text{ L}} = \underline{\underline{1.2550 \times 10^{-3} \text{ M}}}$$

$$\textcircled{4} \quad \frac{0.124 \text{ mol Ca(NO}_3)_2}{100.00 \times 10^{-3} \text{ L of solution}} = 1.24 \text{ M Ca(NO}_3)_2 \text{ solution}$$

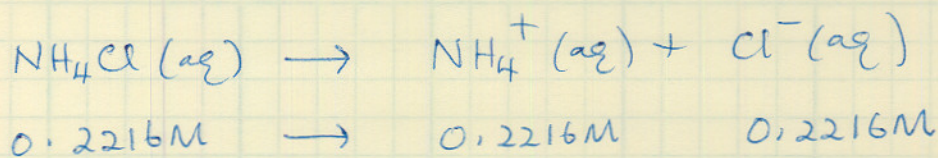


$$\text{Ca}^{2+} \text{ ions} = \underline{\underline{1.24 \text{ M}}} \qquad \text{NO}_3^- \text{ ions} = \underline{\underline{2.48 \text{ M}}}$$

$$\text{Molar mass of NH}_4\text{Cl} = 53.5387 \text{ g/mol}$$

$$5.34 \text{ g NH}_4\text{Cl} \times \boxed{\frac{\text{mol}}{53.5387 \text{ g}}} = 9.9741 \times 10^{-2} \text{ mol NH}_4\text{Cl}$$

$$\frac{9.9741 \times 10^{-2} \text{ mol NH}_4\text{Cl}}{450.00 \times 10^{-3} \text{ L solution}} = 0.2216 \text{ M NH}_4\text{Cl}$$



$$\text{NH}_4^+ \text{ ions} = \underline{\underline{0.2216 \text{ M}}} \qquad \text{Cl}^- \text{ ions} = \underline{\underline{0.2216 \text{ M}}}$$

$$\textcircled{5} \quad \text{molarity} = \frac{\# \text{ moles of solute}}{\text{Volume of solution}}$$

$$0.400 \text{ M} = \frac{\# \text{ moles NaOH}}{250.00 \times 10^{-3} \text{ L}}$$

$$\# \text{ moles of NaOH} = (0.400 \text{ M})(250.00 \times 10^{-3} \text{ L}) = 0.100 \text{ mol}$$

$$0.100 \text{ mol NaOH} \times \frac{39.9878 \text{ g}}{1 \text{ mol}} = 3.99878 \text{ g NaOH}$$

$$= \underline{\underline{3.99 \text{ g NaOH} \text{ or } 4.00 \text{ g}}}$$

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$$\text{Molarity} = \frac{\# \text{ moles KOH}}{\text{Volume of solution}}$$

$$0.250 \text{ M} = \frac{\# \text{ of moles of KOH}}{2.00 \text{ L}}$$

$$\# \text{ moles KOH} = (0.250 \text{ M})(2.00 \text{ L}) = 0.500 \text{ mol}$$

$$\text{molar mass of KOH} = 56.0963 \text{ g/mol}$$

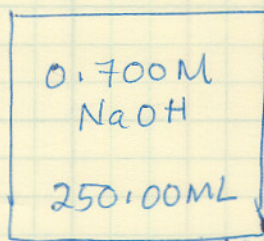
$$0.500 \text{ mol KOH} \times \frac{56.0963 \text{ g}}{1 \text{ mol}} = 28.0482 \text{ g KOH}$$

∴ weigh out 28.0482 g of KOH using the analytical balance. Transfer this solid quantitatively into a 2.00 L volumetric flask. Add ^{a little DI} ~~enough~~ water to dissolve KOH completely. ~~then~~ ^{then} ~~you~~ ^{you} ~~up~~ ^{up} to the mark. Mark with DI water. Cap and invert the volumetric flask a few times to mix the contents.

7



Stock solution



dilute solution

Since matter is conserved

of moles of NaOH
taken from stock solution } = # of moles of NaOH
in dilute solution

$$\left(\text{molarity of stock} \right) \times \left(\text{volume of stock} \right) = \left(\text{molarity of dilute sol}^n \right) \left(\text{volume of dilute sol}^n \right)$$

$$(2.00M) \left(\text{volume of stock sol}^n \right) = (0.700M) (250.00mL)$$

$$\left. \begin{array}{l} \text{volume of stock} \\ \text{solution} \end{array} \right\} = \frac{(0.700M) (250.00mL)}{(2.00M)} = 87.5 \text{ mL}$$

∴ Using a burette, carefully transfer 87.5 mL of the stock solution into a 250.00 mL volumetric flask. Add enough DI water to make up to the 250.00 mL mark. Invert the flask a few times to mix the contents.