

## Review for Final CP/Honors Chemistry Calculations

1.  $[\text{OH}^-] = 4.7 \times 10^{-4} \text{ M}$

$$\text{pOH} = -\log[\text{OH}^-] = 3.33$$

$$\text{pH} = 14 - \text{pOH} = 10.67$$

$$\text{pH} = -\log[\text{H}^+]; [\text{H}^+] = 2.1 \times 10^{-11} \text{ M}$$

2.  $q = mH_f$

$$= 40.0 \text{ g} (334 \text{ J/g}) = 13360 \text{ J} = 13,400 \text{ J}$$

3.  $q = mc\Delta T$

$$= (5.00 \text{ g}) (4.18 \text{ J/g}^\circ\text{C}) (30.3^\circ\text{C}) = 633.27 \text{ J} = 633 \text{ J}$$

4.  $D = \frac{m}{V}$

$$3.87 \text{ g/cm}^3 = \frac{68.5 \text{ g}}{V} \quad V = 17.7 \text{ cm}^3$$

5.  $(106 \text{ amu})(0.150) + 108(0.500) + 109(0.350) = 108.05 \text{ amu}$

6.  $\% \text{ Cl} = \frac{\text{mass Chlorine}}{\text{total mass}} \times 100$

$$= \frac{35.5}{106.6} \times 100 = 33.3\% \text{ Cl}$$

7.  $\% \text{ H}_2\text{O} = \frac{5(18.0)}{249.6} \times 100 = 36.1\% \text{ H}_2\text{O}$

8. a)  $3.50 \text{ g} + 8.4 \text{ g} = 11.9 \text{ g}$

b)  $2.05 \text{ g} / 7.3 \text{ mL} = 0.28 \text{ g/mL}$

9.  $M_A V_A = M_B V_B$

$$M_A (25.0 \text{ mL}) = (0.500 \text{ M}) (59.1 \text{ mL})$$

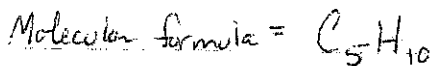
$$M_A = 1.18 \text{ M}$$

10.  $Al(OH)_3$  molar mass = 78.0 g/mol

11.  $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$   $\frac{(575.0 \text{ kPa})(500.0 \text{ mL})}{(313 \text{ K})} = \frac{P_2 (400.0 \text{ mL})}{(318 \text{ K})}$

$P_2 = 730.2 \text{ kPa}$

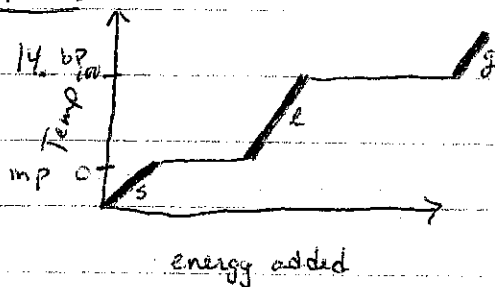
12.  $\frac{70 \text{ amu}}{14 \text{ amu}} = 5$   
 (mass of empirical formula)



13.  $PV = nRT$   $50.0 \text{ g } N_2 \times \frac{1 \text{ mol } N_2}{28.0 \text{ g } N_2} = 1.79 \text{ mol } N_2$

$(1 \text{ atm})(V) = (1.79 \text{ mol})(0.0821 \frac{\text{L}\cdot\text{atm}}{\text{K}\cdot\text{mol}})(273 \text{ K})$   
 $V = 40.1 \text{ L}$

Diagrams



bold areas are where PE remains the same, but KE increases

non-bold areas are where KE remains the same and PE increases

