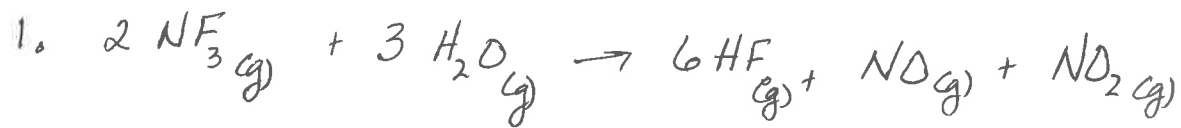
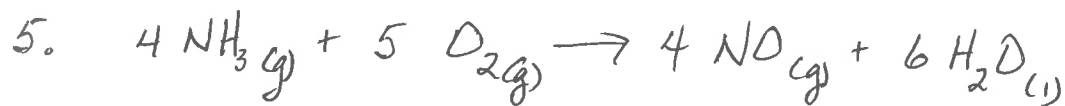
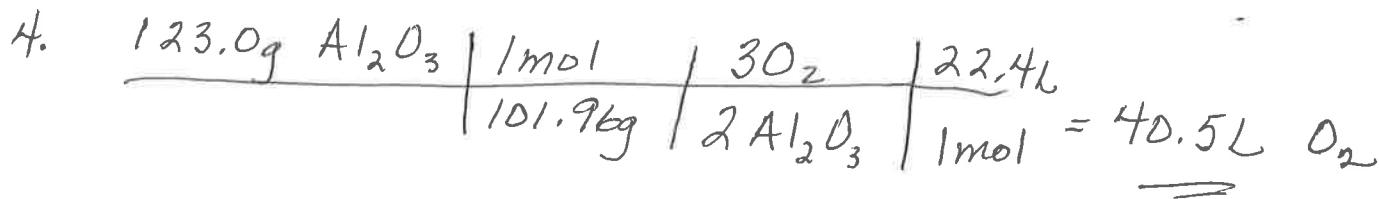
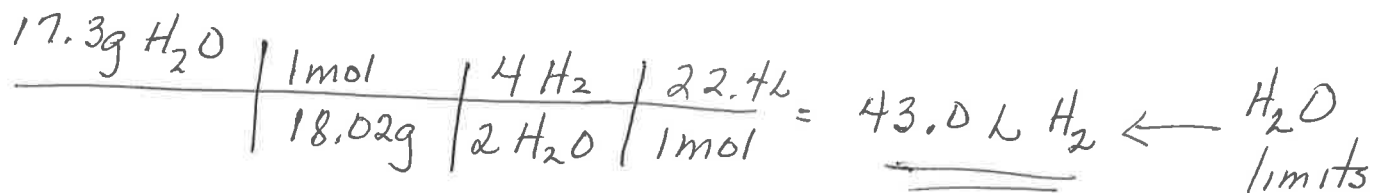
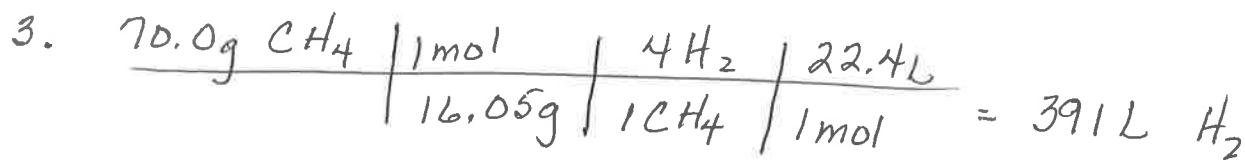
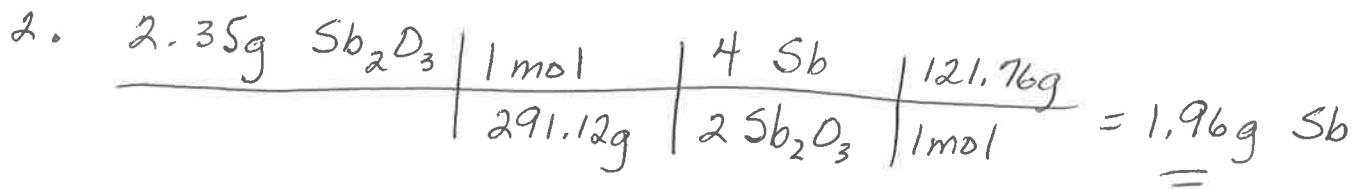


Second Semester Final Review

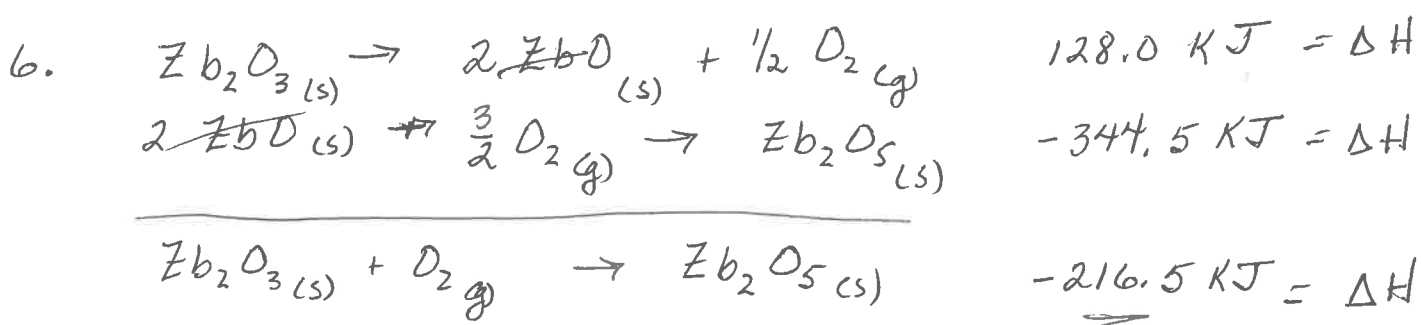


$$\frac{34.6 \text{ L NF}_3}{2 \text{ NF}_3} \left| \frac{1 \text{ NO}_2}{2 \text{ NF}_3} \right. = \underline{17.3 \text{ L NO}_2}$$



$$\Delta H = 6(-68.3 \text{ Kcal/mol}) + 4(21.6 \text{ Kcal/mol}) - [5(0 \text{ Kcal/mol}) + 4(-11.0 \text{ Kcal/mol})]$$

$$= -279.4 \text{ Kcal}$$



$$\begin{aligned}
 7. & \quad q = m \Delta T c \\
 & \quad \Delta T = 32.75^\circ\text{C} - 25.88^\circ\text{C} \\
 & \quad \quad = 6.87^\circ\text{C} \\
 & \quad 843 \text{ J} = (254 \text{ g})(6.87^\circ\text{C})(c) \\
 & \quad \underline{\underline{c = .483 \text{ J/g}^\circ\text{C}}}
 \end{aligned}$$

$$\begin{aligned}
 8. & \quad \frac{75.0 \text{ g N}_2}{28.02 \text{ g}} \left| \frac{1 \text{ mol}}{28.02 \text{ g}} \right. = 2.68 \text{ mol} & PV = nRT \\
 & \quad T = 25^\circ\text{C} + 273 & V = 1.5 \text{ L} \\
 & \quad \quad = 298 \text{ K}
 \end{aligned}$$

$$\begin{aligned}
 P &= \frac{nRT}{V} \\
 &= \frac{(2.68 \text{ mol})(.0821 \frac{\text{atmL}}{\text{molK}})(298 \text{ K})}{1.5 \text{ L}} \\
 &= \underline{\underline{43.7 \text{ atm}}}
 \end{aligned}$$

$$\begin{aligned}
 9. & \quad 925 \text{ mm Hg} = 265 \text{ mm Hg} + 250 \text{ mm Hg} + 225 \text{ mm Hg} + P_{\text{N}_2} \\
 & \quad \underline{\underline{P_{\text{N}_2} = 185 \text{ mm Hg}}}
 \end{aligned}$$

$$\begin{aligned}
 10. & \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} & T_1 = 10.5^\circ\text{C} + 273 & T_2 = 15.0^\circ\text{C} + 273 \\
 & & \quad = 283.5 \text{ K} & \quad = 288 \text{ K}
 \end{aligned}$$

$$\begin{aligned}
 \frac{(2 \text{ atm})(2.50 \text{ mL})}{283.5 \text{ K}} &= \frac{(1.2 \text{ atm})(V_2)}{288 \text{ K}} & V_2 &= \underline{\underline{4.23 \text{ mL}}}
 \end{aligned}$$

$$11. P_1 V_1 = P_2 V_2$$

$$(735 \text{ mm Hg})(285.0 \text{ mL}) = (P_2)(725 \text{ mL})$$

$$P_2 = \underline{\underline{289 \text{ mm Hg}}}$$

$$12. \frac{P_1}{T_1} = \frac{P_2}{T_2} \quad T_1 = 23.0^\circ\text{C} + 273 \quad T_2 = 85.0^\circ\text{C} + 273$$
$$= 296 \text{ K} \quad = 358 \text{ K}$$

$$\frac{2.1 \text{ atm}}{296 \text{ K}} = \frac{P_2}{358 \text{ K}}$$

$$P_2 = \underline{\underline{2.5 \text{ atm}}}$$

$$13. \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad T_1 = 15.0^\circ\text{C} + 273 \quad T_2 = ?$$
$$= 288 \text{ K}$$

$$\frac{120 \text{ mL}}{288 \text{ K}} = \frac{75 \text{ mL}}{T_2}$$

$$T_2 = 180 \text{ K}$$
$$= -93^\circ\text{C}$$

$$14. q = m \Delta T c \quad \Delta T = 725^\circ - 100^\circ$$
$$= 625^\circ\text{C}$$

$$q = (25.0 \text{ g})(625^\circ\text{C})(0.25 \text{ cal/g}^\circ\text{C})$$
$$= \underline{\underline{19500 \text{ cal}}}$$

$$15. q = m (\text{heat of phase change})$$
$$q = (14.5 \text{ mol})(4.88 \text{ Kcal/mol})$$
$$= \underline{\underline{70.8 \text{ Kcal}}}$$

$$16. \frac{75.0g}{101.11g} \cdot 1 \text{ mol} = .742 \text{ mol}$$

$$M = \frac{\text{mol solute}}{\text{L solution}}$$

$$= \frac{.742 \text{ mol}}{.750 \text{ L}}$$

$$= \underline{\underline{.989 \text{ M}}}$$

$$17. M_1 V_1 = M_2 V_2 \quad V_2 = V_1 + \text{some more}$$

$$(4 \text{ M})(825 \text{ mL}) = (12 \text{ M})(V_2)$$

$$V_2 = 275 \text{ mL}$$

add 275 mL HCl to 550 mL H₂O

$$18. m = \frac{\text{mol solute}}{\text{Kg solvent}}$$

$$3.50 \text{ m} = \frac{\text{mol}}{4.5 \text{ Kg}}$$

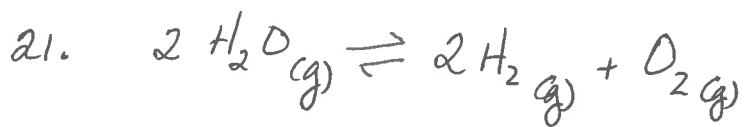
$$\text{mol} = 16 \text{ mol}$$

$$\frac{16 \text{ mol} \cdot 90.04 \text{ g}}{1 \text{ mol}} = \underline{\underline{1440 \text{ g H}_2\text{C}_2\text{O}_4}}$$

$$20. K_{eq} = \frac{[\text{NO}]^2}{[\text{N}_2][\text{O}_2]}$$

$$= \frac{[4.7 \times 10^{-4} \text{ M}]^2}{[.041 \text{ M}][.0078 \text{ M}]}$$

$$= \underline{\underline{6.9 \times 10^{-4}}}$$



$$K_{eq} = 2.4 \times 10^{-3}$$

$$K_{eq} = \frac{[\text{H}_2]^2 [\text{O}_2]}{[\text{H}_2\text{O}]^2}$$

$$2.4 \times 10^{-3} = \frac{[1.9 \times 10^{-2} \text{M}]^2 [\text{O}_2]}{[1.1 \times 10^{-1} \text{M}]^2}$$

$$[\text{O}_2] = \underline{\underline{.080 \text{M}}}$$

22. a. towards products
b. towards reactants
c. towards reactants
d. towards products
e. towards products