

PRACTICE TEST 2 Solutions

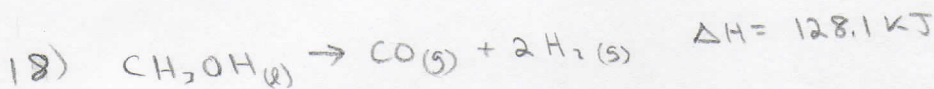
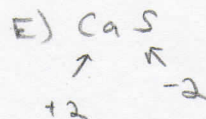
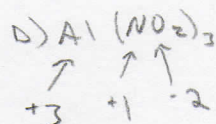
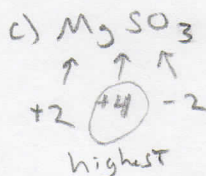
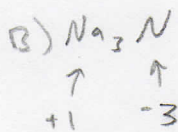
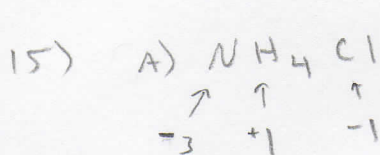
$$1) 7.1 \text{ g } N_2 \left(\frac{1 \text{ mol } N_2}{28 \text{ g } N_2} \right) \left(\frac{3 \text{ H}_2}{1 \text{ N}_2} \right) \left(\frac{2 \text{ g } \text{H}_2}{1 \text{ mol } \text{H}_2} \right) = \boxed{1.5 \text{ g } \text{H}_2}$$

$$2) 3.82 \text{ g } Mg_2N_3 \left(\frac{1 \text{ mol } Mg_2N_3}{100.9 \text{ g } Mg_2N_3} \right) \left(\frac{3 \text{ MgO}}{1 \text{ mol } Mg_2N_3} \right) = \boxed{0.113 \text{ mol - limiting}}$$

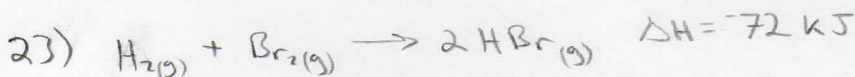
$$7.73 \text{ g } H_2O \left(\frac{1 \text{ mol } H_2O}{18 \text{ g } H_2O} \right) \left(\frac{3 \text{ MgO}}{3 \text{ mol } H_2O} \right) = 0.429 \text{ mol}$$

$$9) C_i V_i = C_f V_f$$

$$C_f = \frac{C_i V_i}{V_f} = \frac{(5.005 \text{ M})(43.72 \text{ mL})}{500 \text{ mL}} = \boxed{0.438 \text{ M}}$$

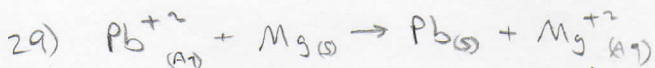


$$15.5 \text{ g } CH_3OH \left(\frac{1 \text{ mol } CH_3OH}{32 \text{ g } CH_3OH} \right) \left(\frac{+128.1 \text{ kJ}}{1 \text{ mol } CH_3OH} \right) = \boxed{62 \text{ kJ}}$$

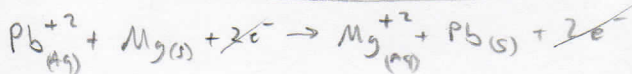


$$1 \text{ mol } HBr \left(\frac{-72 \text{ kJ}}{2HBr} \right) = \boxed{-36 \text{ kJ}}$$

26) $Li_3PO_4 \rightarrow 3Li^+ + PO_4^{3-}$, which make 4 ions in solution. The more ions, the more conductive the solution.

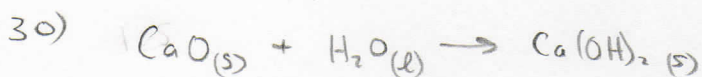
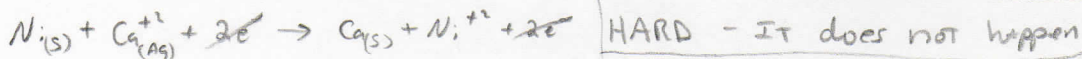
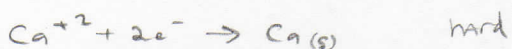
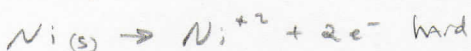
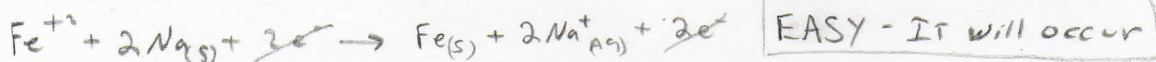
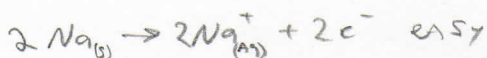
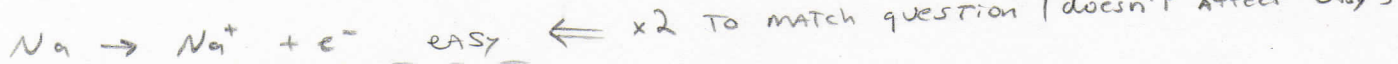
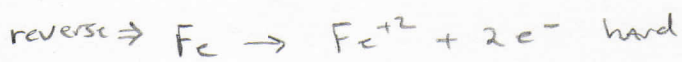
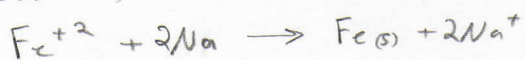


from Table (will be provided)
 $Pb(s) \rightarrow Pb^{2+} + 2e^-$ hard \Rightarrow needs to be reversed to match rxn in question
 $Mg(s) \rightarrow Mg^{2+} + 2e^-$ easy (higher than Pb on Table)
 $+ Pb^{2+} + 2e^- \rightarrow Pb(s)$ easy



EASY (easy + easy) \therefore IT HAPPENS \checkmark

29) cont'd)



$$1.5 \text{ g CaO} \left(\frac{1 \text{ mol CaO}}{56.1 \text{ g CaO}} \right) = 0.0267 \text{ mol CaO} \left(\frac{1 \text{ mol H}_2\text{O}}{1 \text{ mol CaO}} \right) = 0.0267 \text{ mol H}_2\text{O}$$

$$1.45 \text{ g H}_2\text{O} \left(\frac{1 \text{ mol H}_2\text{O}}{18 \text{ g H}_2\text{O}} \right) = 0.0806 \text{ mol H}_2\text{O}$$

$$0.0806 \text{ mol H}_2\text{O} - 0.0267 \text{ mol H}_2\text{O} = 0.0539 \text{ mol H}_2\text{O} \rightarrow \text{amount of H}_2\text{O not used.}$$

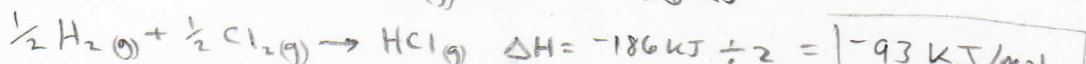
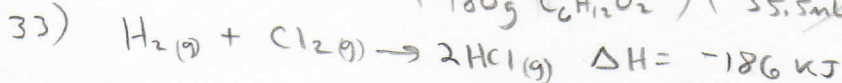
$$0.0539 \text{ mol} \left(\frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right) = \boxed{0.970 \text{ g H}_2\text{O}}$$

if our 0.0267 mol of CaO were to be used, it would require 0.0267 mol of H₂O. We have 0.0867 mol H₂O, so there'll be plenty of H₂O, and CaO is limiting.

31) $C_s V_s = C_d V_d$

$$\frac{C_s V_s}{V_d} = C_d = \frac{(13.5 \text{ M HNO}_3)(25.0 \text{ mL}) \left(\frac{10^{-3} \text{ L}}{1 \text{ mL}} \right)}{(1,500 \text{ L})} = \boxed{0.675 \text{ M HNO}_3}$$

32) $22.5 \text{ g C}_6\text{H}_{12}\text{O}_6 \left(\frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{180 \text{ g C}_6\text{H}_{12}\text{O}_6} \right) \left(\frac{1}{35.5 \text{ mL}} \right) \left(\frac{1 \text{ mL}}{10^{-3} \text{ L}} \right) = 3.52 \text{ M C}_6\text{H}_{12}\text{O}_6$

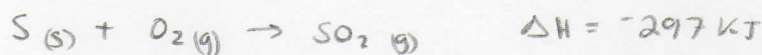
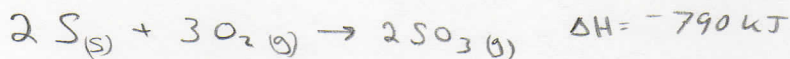
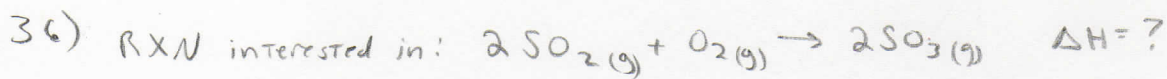




$12 \text{ g CO} \left(\frac{1 \text{ mol CO}}{28 \text{ g CO}} \right) \left(\frac{-482 \text{ kJ}}{2 \text{ mol CO}} \right) = -103 \text{ kJ}$, The negative sign means
The energy of the system is less
or that it was released. Therefore,
The amount of energy released = $\boxed{+103 \text{ kJ}}$

35) $S = \frac{q}{m \cdot \Delta T}$

$\frac{q}{S \cdot \Delta T} = m = \frac{(9.86 \text{ J})}{\left(0.90 \frac{\text{J}}{\text{g} \cdot \text{K}} \right) (30.5^\circ\text{C} - 23.2^\circ\text{C})} = \frac{9.86 \text{ J}}{\left(0.90 \frac{\text{J}}{\text{g} \cdot \text{K}} \right) (7.3^\circ\text{C})} = \boxed{1.5 \text{ g Al}}$



↑ since no $\text{S}(s)$ in final eqn. it must cancel, if we reverse
this rxn the $\text{S}(s)$ can cancel, but we should also $\times 2$ to
completely cancel the $\text{S}(s)$

