(#7-2)
STOICHIOMETRY
Mass, Limiting and Excess #2

1. $NaOH$ + H_3PO_4 → NaH_2PO_4 + H_2O

40.0 g/mol 98 g/mol 120 g/mol 18 g/mol

5g 15g ? Liters

5.0 15.

$5g \cdot \frac{1\ mol}{40g} = 0.13\ mol$

$15g \cdot \frac{1\ mol}{98g} = 0.15$

I.	0.13	0.15		
S.	-.13	-.13	+.13	+.13
E.	0	0.02		

2 sig figs

$0.13\ mol \cdot \frac{22.4}{1\ mol} = \boxed{2.9L}$

2. F_2 + H_2 → 2 HF

38 g/mol 2.0 g/mol 20 g/mol

10g 50g ? (grams)

10.0 50.0

$10.0g \cdot \frac{1\ mol}{38.0g} = 0.26\ mol$

$50.0g \cdot \frac{1\ mol}{2.00g} = 25.0\ mol$

I.	0.26	25	0
S.	-0.26	-.026	+0.52
E.	0	24.94	+0.52

3 sig fig

$0.52\ mol \cdot \frac{20.0g}{1\ mol} = \boxed{10.4g\ HF}$

3. CO_2 + $2NaOH$ → CO_3^{2-} + $H_2O_{(g)}$ + $2Na^+$

44 g/mol 40 g/mol

10g 10g ? ? Liters ? # of ions

10.0 10.0

$10g \cdot \frac{1\ mol}{44g} = 0.227$

$10g \cdot \frac{1\ mol}{40g} = 0.250$

I.	0.227	0.250			
S.	0.125	-.250	+0.125	+0.125	+0.25
E.	0.105	0			

3 sig fig

$0.125 \cdot \frac{22.4L}{1\ mol} = \boxed{2.8L}$

$0.25 \cdot \frac{6.022E23}{1\ mol}$

$= 1.50E23$

4. $NaHCO_3$ + HCl → $NaCl$ + $CO_{2(g)}$ + H_2O

84 g/mol 36.5

289.g 300g ? Grams ? Liters

I.	3.4 mol	8.219 mol			
S.	-3.440	-3.440	+3.440	+3.440	+3.440
E.	0	4.78			

4 sig fig

$289.g \cdot \frac{1\ mol}{84g} = 3.4\ mol$

$300g \cdot \frac{1\ mol}{36.5g} = 8.219\ mol$

$3.44\ mol \cdot \frac{58.5g}{1\ mol} = 201.2g\ NaCl$

$3.44 \cdot \frac{22.4L}{1\ mol} = 77.05L$