2.25 given 28.62 g NaOH,

~~grams~~ # mole Na:

$$28.62\text{ g NaOH} \times \frac{1\text{ mol NaOH}}{39.997\text{ g NaOH}} \times \frac{1\text{ mol Na}}{\text{mole NaOH}} = 0.7156\text{ mol Na}$$

grams Na:

$$0.7156\text{ mol Na} \times \frac{22.9898\text{ g Na}}{\text{mol Na}} = 16.45\text{ g Na}$$

atoms Na:

$$0.7156\text{ mol Na} \times \frac{6.022\times10^{23}\text{ atoms Na}}{\text{mole Na}} = 4.309\times10^{23}\text{ atoms Na}$$

2.30 assume that you have 100 g:

C: $40.0\text{ g C} \times \frac{1\text{ mol C}}{12.011\text{ g C}} = 3.33\text{ mol C}$

H: $6.7\text{ g H} \times \frac{1\text{ mol H}}{1.008\text{ g H}} = 6.65\text{ mol H}$

O: $53.3\text{ g O} \times \frac{1\text{ mol O}}{16.00\text{ g O}} = 3.33\text{ mol O}$

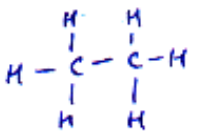
reduce to lowest terms: C: $\frac{3.33}{3.33} = 1.00$ H: $\frac{6.66}{3.33} = 2.0$ O: $\frac{3.33}{3.33} =$

the empirical formula is $\boxed{CH_2O}$

2.31 a the molecular weight of $CH_2O = 30.025/\text{mol}$

so $\boxed{CH_2O}$ is the molecular formula.

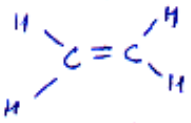
2.32



ethane

⇓

tetrahedral



ethylene

⇓

trigonal planar

3.33

3.34 $H{:}\ddot{F}{:}$, $H{:}\ddot{Cl}{:}$, $H{:}\ddot{Br}{:}$, $H{:}\ddot{I}{:}$ these molecules are "isoelectric" (i.e. they use the same valence e⁻ bonding) arrangement of