Molarity: (1)

1) What is the molarity of a solution that has 333g potassium hydrogen carbonate dissolved in 10.0L water?

$KHCO_3 = K + H + C + 3(O) = 100.1 g/mol$

$M = \frac{mol}{L}$

$M = \frac{333g \times \frac{1 mol}{100.1g}}{10.0L}$

$333g\ KHCO_3 \times \frac{1 mol}{100.1g} = 3.327 mol$

$M = \frac{3.327 mol}{10.0L} = \boxed{0.333M\ KHCO_3}$

2) Calculate the molarity of 0.552g HCl in 0.592L solution.

$HCl = H + Cl = 36.45 g/mol$

$M = \frac{mol}{L} = \frac{\left(0.552g \times \frac{1 mol}{36.45g}\right)}{0.592L} = \frac{0.01514 mol}{0.592L}$

$= \boxed{0.0256M\ HCl}$

3) How would you prepare 0.500L of a 6.68M NaOH solution?

$M = \frac{mol}{L}$ Strategy - find mols ⟶ g NaOH.

$mol = M \times L = 6.68 \frac{mol}{L} \times 0.500L = 3.34 mol$

$3.34 mol\ NaOH \times \frac{39.98 g}{1 mol\ NaOH} = 133.5$

$\boxed{134g\ NaOH}$

4) How would you make 10.0mL of a 0.100M KOH solution?

$M = \frac{mol}{L}$ $mol = M \times L = 0.100 \frac{mol}{L} \times 0.010L$

$= 0.001 mol$

$0.001 mol\ KOH \times \frac{56.09 g\ KOH}{1 mol} = \boxed{0.0561g\ KOH}$

Dissolve 0.0561g of KOH in 10mL H_2O.