10. $3\ Na_2CO_{3(aq)} + 2\ AlCl_{3(aq)} \rightarrow 6\ NaCl_{(aq)} + Al_2(CO_3)_{3(s)}$ How many grams of $Al_2(CO_3)_3$ can be produced from 75.0 mL of 2.50 M Na_2CO_3?

$$.075\ L \left| \frac{2.5\ mol\ Na_2CO_3}{L} \right| \frac{1\ mol\ Al_2(CO_3)_3}{3\ mol\ Na_2CO_3} \left| \frac{234\ g\ Al_2(CO_3)_3}{1\ mol\ Al_2(CO_3)_3} \right. = 14.6\ g$$

11. For the reaction: $K_2S(aq) + 2\ HNO_3(aq) \rightarrow 2\ KNO_3(aq) + H_2S(g)$
What mass of H_2S can be produced from 25.0 mL of 10.0 M HNO_3?

$$.025\ L \left| \frac{10\ mol\ HNO_3}{L} \right| \frac{1\ H_2S}{2\ HNO_3} \left| \frac{34.09\ g}{1\ mol\ H_2S} \right. = 4.26\ g$$

12. For the rxn: $KCl(aq) + AgNO_3(aq) \rightarrow AgCl(s) + KNO_3(aq)$, how many grams of AgCl can be produced from 0.50 L of 4.0 M KCl(aq)? a) 1144; b) 286; c) 17.9; d) 358

$$.5\ L \left| \frac{4\ mol\ KCl}{L} \right| \frac{1\ AgCl}{1\ KCl} \left| \frac{143.4\ g}{1\ mol\ AgCl} \right. \quad 287 = 290\ g$$

13. What is the molality of a solution made by dissolving 12.5 g of HCl in 225 g of water?

$$12.5\ g\ HCl \left| \frac{1\ mol\ HCl}{36.46\ g} \right| \frac{}{.225\ kg} = 1.52\ m$$

14. 25.0 grams of NaCl is dissolved in 125 grams of water. What is the molality of the solution?

$$25\ g\ NaCl \left| \frac{1\ mol\ NaCl}{58.44\ g} \right| \frac{}{.125\ kg} = 3.42\ m$$

15. A solution is made by dissolving 625 g of $C_2H_6O_2$ (a nonelectrolyte) in 425 g of water. The molal freezing point constant (K_f) for water is –1.86 °C/m. Calculate the freezing point of the solution.

$$m = 625\ g\ C_2H_6O_2 \left| \frac{1\ mol}{62.07\ g} \right| \frac{}{.425\ kg} = 23.69\ m$$

$$\Delta T_f = \left(-1.86\ ^\circ C/m\right)(23.69\ m) = -44.1\ ^\circ C \qquad 0 - 44.1^\circ C =$$

$$\boxed{-44.1\ ^\circ C}$$

16. A solution is made by dissolving 800. g of $C_2H_6O_2$ in 1.00 kg of water. The molal boiling point constant (K_b) for water is 0.51 °C/m. Calculate the boiling point of the solution.

$$m = 800\ g\ C_2H_6O_2 \left| \frac{1\ mol}{62.07\ g} \right| \frac{}{1\ kg} = 12.89\ m$$

$$\Delta T_b = \left(.51\ \frac{^\circ C}{m}\right)(12.89\ m) = 6.57^\circ \qquad 100 + 6.57 =$$

$$\boxed{106.6^\circ}$$