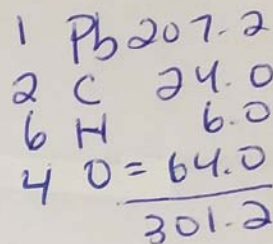


Key to #17 - #20

14. Solutions of barium nitrate and potassium sulfate were poured together. If this reaction required 6.5 mol of barium nitrate, how many grams of precipitate were formed?

15. Calcium carbonate (marble chips) is dissolved by hydrochloric acid. If 12.2 L of carbon dioxide gas forms at STP, what mass of marble chips was used?



16. When dinitrogen tetroxide decomposes into nitrogen dioxide, 56 kJ of energy is required for each mole decomposed. How much heat is absorbed if 1.25 g of product is formed?

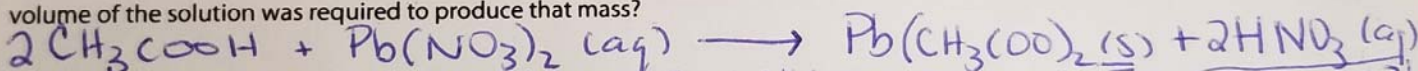
$$\begin{array}{r}
 2K = 78.2 \\
 1C = 12.0 \\
 3O = 48.0 \\
 \hline
 138.2
 \end{array}$$



17. A flask containing 450 mL of 0.500 M HBr was accidentally knocked to the floor. How many grams of K_2CO_3 would you need to put on the spill to completely neutralize the acid?

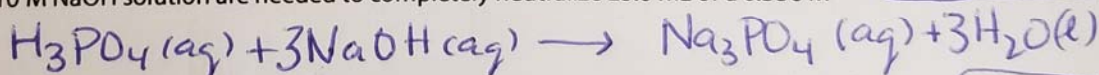
$$450 \text{ mL} \times \frac{1 \times 10^{-3} \text{ L}}{1 \text{ mL}} \cdot \frac{0.500 \text{ mol HBr}}{1 \text{ L}} \cdot \frac{1 \text{ mol K}_2\text{CO}_3}{2 \text{ mol HBr}} \cdot \frac{138.2 \text{ g}}{1 \text{ mol K}_2\text{CO}_3} = \boxed{15.5 \text{ g K}_2\text{CO}_3}$$

18. The acetic acid in a 2.5 mol/L sample of a solution of a kettle scale remover is reacted with an excess of a lead(II) nitrate solution to form a precipitate, which is then filtered and dried. The mass of the precipitate is 8.64 g. What volume of the solution was required to produce that mass?



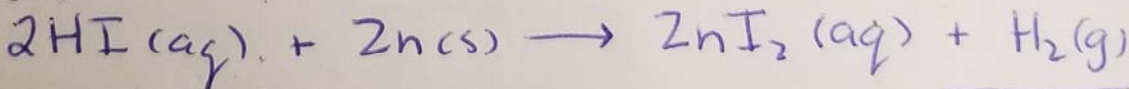
$$8.64 \text{ g Pb}(\text{CH}_3\text{COO})_2 \cdot \frac{1 \text{ mol Pb}(\text{CH}_3\text{COO})_2}{301.2 \text{ g}} \cdot \frac{2 \text{ mol CH}_3\text{COOH}}{1 \text{ mol}} \cdot \frac{1 \text{ L}}{2.5 \text{ mol}} = \boxed{2.3 \times 10^{-2} \text{ L CH}_3\text{COOH}}$$

19. How many milliliters of a 0.610 M NaOH solution are needed to completely neutralize 25.0 mL of a 0.356 M phosphoric acid solution?



$$25.0 \text{ mL} \cdot \frac{1 \times 10^{-3} \text{ L}}{1 \text{ mL}} \cdot \frac{0.356 \text{ mol H}_3\text{PO}_4}{1 \text{ L}} \cdot \frac{3 \text{ mol NaOH}}{1 \text{ mol H}_3\text{PO}_4} \cdot \frac{1 \text{ L}}{0.610 \text{ mol NaOH}} \cdot \frac{1 \text{ mL}}{1 \times 10^{-3} \text{ L}} = \boxed{438 \text{ mL NaOH}}$$

20. What volume of hydrogen gas is formed at STP by the reaction of excess zinc metal with 150 mL of 0.185 mol/L hydroiodic acid?



$$150 \text{ mL} \cdot \frac{1 \times 10^{-3} \text{ L}}{1 \text{ mL}} \cdot \frac{0.185 \text{ mol HI}}{1 \text{ L}} \cdot \frac{1 \text{ mol H}_2}{2 \text{ mol HI}} \cdot \frac{22.4 \text{ L}}{1 \text{ mol H}_2} = \boxed{0.31 \text{ L H}_2}$$