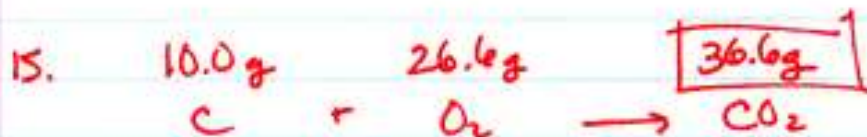


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$$13. \quad .750 \text{ g Al(OH)}_3 \times \frac{1 \text{ mol Al(OH)}_3}{78.01 \text{ g Al(OH)}_3} \times \frac{3 \text{ mol HCl}}{1 \text{ mol Al(OH)}_3} \times \frac{36.46 \text{ g HCl}}{1 \text{ mol HCl}} = \boxed{1.05 \text{ g HCl}}$$

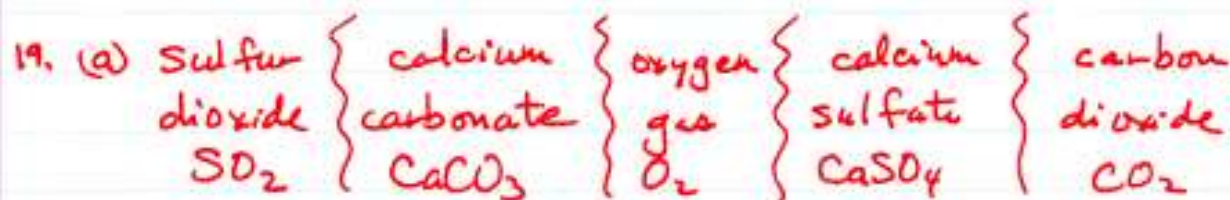
$$.750 \text{ g Al(OH)}_3 \times \frac{1 \text{ mol Al(OH)}_3}{78.01 \text{ g Al(OH)}_3} \times \frac{3 \text{ mol H}_2\text{O}}{1 \text{ mol Al(OH)}_3} \times \frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = .5197 \text{ g H}_2\text{O}$$

$$\boxed{.520 \text{ g H}_2\text{O}}$$



$$17. (a) \quad 454 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{55.85 \text{ g Fe}}{1 \text{ mol Fe}} = \boxed{318 \text{ g Fe}}$$

$$(b) \quad 454 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{3 \text{ mol CO}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{28.01 \text{ g CO}}{1 \text{ mol CO}} = \boxed{239 \text{ g CO}}$$



$$(b) \quad 155 \text{ g SO}_2 \times \frac{1 \text{ mol SO}_2}{64.07 \text{ g SO}_2} \times \frac{2 \text{ mol CaCO}_3}{2 \text{ mol SO}_2} \times \frac{100.1 \text{ g CaCO}_3}{1 \text{ mol CaCO}_3} = \boxed{242 \text{ g CaCO}_3}$$

$$(c) \quad 155 \text{ g SO}_2 \times \frac{1 \text{ mol SO}_2}{64.07 \text{ g SO}_2} \times \frac{2 \text{ mol CaSO}_4}{2 \text{ mol SO}_2} \times \frac{136.2 \text{ g CaSO}_4}{1 \text{ mol CaSO}_4} = \boxed{329 \text{ g CaSO}_4}$$

$$21. \quad 95 \text{ mg urea} \times \frac{1 \text{ g urea}}{1000 \text{ mg}} \times \frac{1 \text{ mol urea}}{60.06 \text{ g urea}} \times \frac{1 \text{ mol Arg.}}{1 \text{ mol urea}} \times \frac{174.2 \text{ g Arg.}}{1 \text{ mol Arg.}} = \boxed{.276 \text{ g Argen}}$$

$$95 \text{ mg urea} \times \frac{1 \text{ g urea}}{1000 \text{ mg}} \times \frac{1 \text{ mol urea}}{60.06 \text{ g urea}} \times \frac{1 \text{ mol orn.}}{1 \text{ mol urea}} \times \frac{132.2 \text{ g orn.}}{1 \text{ mol orn.}} = \boxed{.209 \text{ g orn.}}$$

$$23. \quad 995 \text{ g CH}_4 \times \frac{1 \text{ mol CH}_4}{16.04 \text{ g CH}_4} \times \frac{3 \text{ mol H}_2}{1 \text{ mol CH}_4} \times \frac{2.02 \text{ g H}_2}{1 \text{ mol H}_2} = \boxed{375.9 \text{ g H}_2}$$

compare ↑

$$2510 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{3 \text{ mol H}_2}{1 \text{ mol H}_2\text{O}} \times \frac{2.02 \text{ g H}_2}{1 \text{ mol H}_2} = 844.1 \text{ g H}_2$$

$$25. \quad 32.0 \text{ g S}_8 \times \frac{1 \text{ mol S}_8}{256.6 \text{ g S}_8} \times \frac{4 \text{ mol S}_2\text{Cl}_2}{1 \text{ mol S}_8} \times \frac{135.0 \text{ g S}_2\text{Cl}_2}{1 \text{ mol S}_2\text{Cl}_2} = \boxed{67.3 \text{ g S}_2\text{Cl}_2}$$

compare ↓

$$71.0 \text{ g Cl}_2 \times \frac{1 \text{ mol Cl}_2}{70.91 \text{ g Cl}_2} \times \frac{4 \text{ mol S}_2\text{Cl}_2}{4 \text{ mol Cl}_2} \times \frac{135.0 \text{ g S}_2\text{Cl}_2}{1 \text{ mol S}_2\text{Cl}_2} = 135.2 \text{ g S}_2\text{Cl}_2$$

$$32.0 \text{ g S}_8 \times \frac{1 \text{ mol S}_8}{256.6 \text{ g S}_8} \times \frac{4 \text{ mol Cl}_2}{1 \text{ mol S}_8} \times \frac{70.91 \text{ g Cl}_2}{1 \text{ mol Cl}_2} = 35.4 \text{ g Cl}_2 \text{ required}$$

$$71.0 \text{ g Cl}_2 - 35.4 \text{ g Cl}_2 = \boxed{35.6 \text{ g Cl}_2 \text{ remains}}$$

$$27. \quad 100. \text{ g C}_7\text{H}_6\text{O}_3 \times \frac{1 \text{ mol C}_7\text{H}_6\text{O}_3}{138.1 \text{ g C}_7\text{H}_6\text{O}_3} \times \frac{1 \text{ mol C}_9\text{H}_8\text{O}_4}{1 \text{ mol C}_7\text{H}_6\text{O}_3} \times \frac{180.1 \text{ g C}_9\text{H}_8\text{O}_4}{1 \text{ mol C}_9\text{H}_8\text{O}_4} = \boxed{130.4 \text{ g}}$$

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$$100. \text{ g C}_7\text{H}_6\text{O}_3 \times \frac{1 \text{ mol C}_7\text{H}_6\text{O}_3}{102.1 \text{ g C}_7\text{H}_6\text{O}_3} \times \frac{1 \text{ mol C}_9\text{H}_8\text{O}_4}{1 \text{ mol C}_7\text{H}_6\text{O}_3} \times \frac{180.1 \text{ g C}_9\text{H}_8\text{O}_4}{1 \text{ mol C}_9\text{H}_8\text{O}_4} = 176.4$$

$$29. \quad 1.203 \text{ g NaBH}_4 \times \frac{1 \text{ mol NaBH}_4}{37.84 \text{ g NaBH}_4} \times \frac{1 \text{ mol B}_2\text{H}_6}{2 \text{ mol NaBH}_4} \times \frac{27.67 \text{ g B}_2\text{H}_6}{1 \text{ mol B}_2\text{H}_6} = 0.4398 \text{ g B}_2\text{H}_6$$

$$\% \quad \frac{0.295}{0.4398} \times 100 = \boxed{67.1 \%}$$

$$31. \quad 5.23 \text{ g SCl}_2 \times \frac{1 \text{ mol SCl}_2}{103.0 \text{ g SCl}_2} \times \frac{1 \text{ mol S}_2\text{Cl}_2}{3 \text{ mol SCl}_2} \times \frac{135.0 \text{ g S}_2\text{Cl}_2}{1 \text{ mol S}_2\text{Cl}_2} = 2.28 \text{ g S}_2\text{Cl}_2$$

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$$\frac{1.19 \text{ g S}_2\text{Cl}_2}{2.28 \text{ g S}_2\text{Cl}_2} \times 100 = \boxed{52.1\%}$$