

|    |           |          |
|----|-----------|----------|
| H  | Hydrogen  | 1 g/mol  |
| C  | Carbon    | 12 g/mol |
| N  | Nitrogen  | 14 g/mol |
| O  | Oxygen    | 16 g/mol |
| F  | Fluorine  | 19 g/mol |
| Na | Sodium    | 23 g/mol |
| Mg | Magnesium | 24 g/mol |
| Al | Aluminum  | 27 g/mol |

|    |            |          |
|----|------------|----------|
| Si | Silicon    | 28 g/mol |
| P  | Phosphorus | 31 g/mol |
| S  | Sulfur     | 32 g/mol |
| Cl | Chlorine   | 35 g/mol |
| K  | Potassium  | 39 g/mol |
| Ca | Calcium    | 40 g/mol |
| Fe | Iron       | 56 g/mol |
| Zn | Zinc       | 65 g/mol |

Balance the following chemical formulas

- $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_3\text{O}_4$
- $\text{Cl}_2\text{O}_7 + \text{H}_2\text{O} \rightarrow \text{HClO}_4$
- $\text{C}_5\text{H}_{12} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
- $\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow \text{Al}(\text{OH})_3 + \text{CH}_4$
- $\text{Al}_2(\text{SO}_4)_3 + \text{NaOH} \rightarrow \text{Al}(\text{OH})_3 + \text{Na}_2\text{SO}_4$

Calculate the formula mass of these compounds

- $\text{CH}_4$
- $\text{AlF}_3$
- $\text{C}_2\text{H}_5\text{NO}_2$
- $\text{MgS}_2\text{O}_3$
- $(\text{NH}_4)_3\text{PO}_4$
- $\text{Fe}(\text{NO}_3)_3$

Determine the number of moles of this mass of these compounds

13. 64 g of CH<sub>4</sub>
14. 22 g of CO<sub>2</sub>
15. 150 g of C<sub>2</sub>H<sub>5</sub>NO<sub>2</sub>
16. 340 g of MgS<sub>2</sub>O<sub>3</sub>
17. 240 g of FeS<sub>2</sub>
18. 500 g of ZnCO<sub>3</sub>

What is the mass (in grams) of these molar quantities of the compounds listed?

19. 0.5 moles MgO<sub>2</sub>
20. 1.25 moles CaH<sub>2</sub>
21. 0.25 moles C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
22. 1.5 moles Fe<sub>2</sub>O<sub>3</sub>
23. 2 moles of SiO<sub>2</sub>
24. 1 mole of AlF<sub>3</sub>

Note the balanced equations below.

Calculate grams of the product starting with the specified grams of reactant.

|     | Balanced equation  | grams of reactant       | product to calculate grams     |
|-----|--|-------------------------|--------------------------------|
| 25. | $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$                              | 48 g O <sub>2</sub>     | Fe <sub>2</sub> O <sub>3</sub> |
| 26. | $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$                  | 16 g CH <sub>4</sub>    | H <sub>2</sub> O               |
| 27. | $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$        | 160 g O <sub>2</sub>    | H <sub>2</sub> O               |
| 28. | $\text{Na}_2\text{SO}_4 + \text{ZnCl}_2 \rightarrow 2\text{NaCl} + \text{ZnSO}_4$          | 270 g ZnCl <sub>2</sub> | NaCl                           |
| 29. | $\text{AlCl}_3 + \text{Na}_3\text{PO}_4 \rightarrow \text{AlPO}_4 + 3\text{NaCl}$          | 44 g AlCl <sub>3</sub>  | NaCl                           |
| 30. | $\text{ZnCO}_3 + 2\text{HCl} \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{ZnCl}_2$ | 72 g HCl                | CO <sub>2</sub>                |