

1) Give the molar mass for each of these compounds:

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| a) sodium hydroxide | f) $\text{C}_6\text{H}_5\text{CO}_2\text{H}$ |
| b) silver carbonate | g) $\text{C}_6\text{H}_{12}\text{O}_6$ |
| c) chromium (III) oxide | h) $\text{K}_4\text{Fe}(\text{CN})_6$ |
| d) ammonium carbonate | i) bismuth (V) arsenate |
| e) magnesium bicarbonate | |

2) How many moles are in each of the following:

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|-------------------------------|----------------------------------|
| a) 25.0 g sodium hydroxide | d) 14.8 g CH_3OH |
| b) 44.0 g Br_2 | e) 2.88 g sodium sulfate |
| c) 0.684 g magnesium chloride | f) 4.20 lb of zinc iodide |

3) How many grams are in each of the following:

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| a) 4.25×10^{-4} mol sulfuric acid | c) 0.00255 mol Ti |
| b) 4.50×10^{22} molecules carbon tetrachloride | d) 1.5×10^{16} atoms S |

4) How many **molecules** are contained in each of the following?

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|--|--------------------------|
| a) 1.75 mol Cl_2 | c) 12.0 g carbon dioxide |
| b) 0.27 mol $\text{C}_2\text{H}_6\text{O}$ | d) 1000. g CH_4 |

5) How many **atoms** are contained in each of the following?

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|---|---------------------------|
| a) 11 molecules $\text{C}_2\text{H}_5\text{OH}$ | c) 0.0986 g Xe |
| b) 25.0 g Ag | d) 72.5 g CHCl_3 |

6) Perform the following conversions:

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| a) 284 g S $\rightarrow$ mole S | c) 42.4 g Mg $\rightarrow$ atoms Mg |
| b) 2.50 kg sodium chloride $\rightarrow$ mole sodium chloride | d) 485 mL Br_2 ($d = 3.12 \text{ g/mL}$) $\rightarrow$ mol Br_2 |

7) Exactly 1 mole of ammonium nitrate contains:

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|-----------------------------|---------------------------------------|
| a) how many formula units? | d) how many oxygen atoms? |
| b) how many nitrogen atoms? | e) how many total atoms of all kinds? |
| c) how many hydrogen atoms? | |

8) How many **atoms** are contained in each of the following?

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| a) 5.0 mol of manganese (II) peroxide |
| b) 255 g magnesium carbonate |
| c) 5.0×10^{18} molecules of H_2O |

9) How many grams of:

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| a) silver are in 25.0 g silver bromide |
| b) nitrogen are in 6.34 mol of ammonium phosphate |
| c) oxygen are in 8.45×10^{22} molecules of SO_3 |

10) Perform the following conversions:

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| a) How many grams of carbon are in 67.33 mL of $\text{C}_2\text{H}_5\text{OH}$ ($d = 0.789 \text{ g/cm}^3$)? |
| b) How many liters of carbon tetrachloride ($d = 1.5842 \text{ g/mL}$) contains 3.35×10^{25} atoms of chlorine? |
| c) How many atoms of oxygen are in 9.662×10^{20} formula units of mercury (II) perbromate? |
| d) How many grams of nitrogen are in 0.04417 g of ammonium sulfate? |
| e) How many moles of mercury are in 6.77 g of mercury (I) phosphate? |
| f) How many grams of oxygen are in 34 grams of antimony (V) acetate? |