

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

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| a) potassium bromide | f) iron (III) oxide |
| b) sodium sulfate | g) $C_{12}H_{22}O_{11}$ |
| c) lead (II) nitrate | h) aluminum sulfate |
| d) C_2H_5OH | i) ammonium hydrogen phosphate |
| e) acetic acid | |

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

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| a) 22.5 g Zn | d) 382 g Co |
| b) 0.688 g Mg | e) 0.055 g Sn |
| c) 4.5×10^{22} atoms Cu | f) 8.5×10^{24} molecules of N_2 |

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

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|--------------------|------------------------------|
| a) 0.550 mol Au | c) 12.5 mol Cl_2 |
| b) 15.8 mol H_2O | d) 3.15 mol ammonium nitrate |

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

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|----------------------|------------------------------|
| a) 1.26 mol O_2 | c) 16.0 g CH_4 |
| b) 0.56 mol C_6H_6 | d) 1000. g hydrogen chloride |

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

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| a) 18 molecules dinitrogen pentoxide | c) 75.2 g BF_3 |
| b) 10.0 mol Au | d) 15.2 g U |

6) Perform the following conversions:

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|-----------------------------------|---|
| a) 8.66 mol Cu $\rightarrow$ g Cu | c) 10. atoms C $\rightarrow$ mol C |
| b) 125 mol Au $\rightarrow$ kg Au | d) 5000 molecules $CO_2 \rightarrow$ mol CO_2 |

7) Exactly 1 mole of carbon disulfide contains:

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|---|---------------------------------------|
| a) how many carbon disulfide molecules? | c) how many sulfur atoms? |
| b) how many carbon atoms? | d) how many total atoms of all kinds? |

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

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| a) 16.0 g of O_2 |
| b) 0.622 mol magnesium oxide |
| c) 6.00×10^{22} molecules of $C_6H_{12}O_6$ |

9) How many grams of:

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| a) chlorine are in 5.0 g of lead (II) chloride |
| b) hydrogen are in 4.50 mol of hydrogen sulfate |
| c) hydrogen are in 5.45×10^{22} molecules of ammonia – NH_3 |

10) Perform the following conversions:

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| a) How many grams of manganese are in a pile of strontium permanganate which contains 2.45 g of oxygen? |
| b) What is the mass (in grams) of chlorine in a pile of diphosphorous pentachloride containing 62.13 g of phosphorous? |
| c) How many atoms of chromium are in a sample of chromium (III) carbonate containing 0.098 g of carbon? |
| d) A sample of nickel (II) arsenate has 371.02 grams of nickel in it. How many grams of arsenic are present? |