

CHE 101 - Extra Practice - Ch 7a
Molecular Weight and Conversions

Name: _____

Date: _____

1. Calculate the molecular weights in (g/mol) for the following compounds. Show work to receive credit.

(a) B_2O_3 1(a) _____

(b) $FeCl_3$ 1(b) _____

(c) $Al(NO_3)_3$ 1(c) _____

(d) $(NH_4)_3PO_4$ 1(d) _____

(e) $Sb_2(CO_3)_5$ 1(e) _____

Solution: $B_2O_3 = 69.62$ g/mol, $FeCl_3 = 162.2$ g/mol, $Al(NO_3)_3 = 212.98$ g/mol, $(NH_4)_2PO_4 = 149.09$ g/mol, $Sb_2(CO_3)_5 = 643.57$ g/mol

2. Moles of Kr in 12.4 grams of Kr. 2. _____

Solution: $\frac{12.4 \text{ g Kr}}{83.80 \text{ g Kr}} \times \frac{1 \text{ mol Kr}}{1 \text{ mol Kr}} = 0.148 \text{ mol Kr}$

3. How many atoms of S are in 23.25 grams of $Na_2S_2O_3$ 3. _____

Solution: $\frac{23.25 \text{ g } Na_2SO_3}{158.12 \text{ g } Na_2SO_3} \times \frac{1 \text{ mol } Na_2SO_3}{1 \text{ mol } Na_2SO_3} \times \frac{2 \text{ mol S}}{1 \text{ mol } Na_2SO_3} \times \frac{6.02 \times 10^{23} \text{ atom S}}{1 \text{ mol S}} = 1.770 \times 10^{23} \text{ atoms S}$

4. How many molecules of NaCl are in 5.00 moles of NaCl 4. _____

Solution: $\frac{5.00 \text{ mol NaCl}}{1 \text{ mol NaCl}} \times \frac{6.02 \times 10^{23} \text{ molec NaCl}}{1 \text{ mol NaCl}} = 3.01 \times 10^{24} \text{ molecules NaCl}$

5. Convert 2.50×10^{24} molecules of $BaCl_2$ to grams of $BaCl_2$ 5. _____

Solution: $\frac{2.50 \times 10^{24} \text{ molec. } BaCl_2}{6.02 \times 10^{23} \text{ molec } BaCl_2} \times \frac{1 \text{ mol } BaCl_2}{1 \text{ mol } BaCl_2} \times \frac{208.23 \text{ g } BaCl_2}{1 \text{ mol } BaCl_2} = 865 \text{ g } BaCl_2$

6. Convert 45.0 grams of $NaNO_3$ to molecules of $NaNO_3$ 6. _____

Solution: $\frac{45.0 \text{ g } NaNO_3}{85.00 \text{ g } NaNO_3} \times \frac{1 \text{ mol } NaNO_3}{1 \text{ mol } NaNO_3} \times \frac{6.02 \times 10^{23} \text{ molecule } NaNO_3}{1 \text{ mol } NaNO_3} = 3.19 \times 10^{23} \text{ molecules } NaNO_3$

7. How many moles of H_2SO_4 are in 250.0 mL of H_2SO_4 7. _____

Solution: $\frac{250.0 \text{ mL } H_2SO_4}{1 \text{ mL } H_2SO_4} \times \frac{1.84 \text{ g } H_2SO_4}{1 \text{ mL } H_2SO_4} \times \frac{1 \text{ mol } H_2SO_4}{98.09 \text{ g } H_2SO_4} = 4.690 \text{ mol } H_2SO_4$

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8. How many atoms of N are in one molecule of $(\text{NH}_4)_2\text{SO}_4$ 8. _____

Solution: $\frac{1 \text{ molecule } (\text{NH}_4)_2\text{SO}_4}{1 \text{ molecule } (\text{NH}_4)_2\text{SO}_4} \times \frac{2 \text{ atoms N}}{1 \text{ molecule } (\text{NH}_4)_2\text{SO}_4} = 2 \text{ atoms N}$

9. How many atoms of O are in 5.00 moles of $\text{Ca}(\text{CO}_3)_2$ 9. _____

Solution: $\frac{5.00 \text{ mol Ca}(\text{CO}_3)_2}{1 \text{ mol Ca}(\text{CO}_3)_2} \times \frac{6 \text{ mol O}}{1 \text{ mol Ca}(\text{CO}_3)_2} \times \frac{6.02 \times 10^{23} \text{ atoms O}}{1 \text{ mol O}} = 1.81 \times 10^{25} \text{ atoms O}$

10. Convert 5.35×10^{26} molecules of H_2SO_4 to moles of H_2SO_4 10. _____

Solution: $\frac{5.35 \times 10^{26} \text{ molecules H}_2\text{SO}_4}{6.02 \times 10^{23} \text{ molecules H}_2\text{SO}_4} \times \frac{1 \text{ mol H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} = 889 \text{ mol H}_2\text{SO}_4$

11. How many grams of Al in 25.0 mL of Al 11. _____

Solution: $\frac{25.0 \text{ mL Al}}{1 \text{ mL Al}} \times \frac{2.70 \text{ g Al}}{1 \text{ mL Al}} = 67.5 \text{ g Al}$

12. Convert 2.50 moles of Pb to grams of Pb 12. _____

Solution: $\frac{2.50 \text{ mol Pb}}{1 \text{ mol Pb}} \times \frac{207.21 \text{ g Pb}}{1 \text{ mol Pb}} = 518 \text{ g Pb}$

13. Convert 350.0 grams of B_2O_3 to moles B_2O_3 13. _____

Solution: $\frac{350.0 \text{ g B}_2\text{O}_3}{69.62 \text{ g B}_2\text{O}_3} \times \frac{1 \text{ mol B}_2\text{O}_3}{1 \text{ mol B}_2\text{O}_3} = 5.027 \text{ mol B}_2\text{O}_3$

14. How many molecules of $(\text{NH}_4)_3\text{PO}_4$ are in 35.25 grams of $(\text{NH}_4)_3\text{PO}_4$ 14. _____

Solution: $\frac{35.25 \text{ g } (\text{NH}_4)_3\text{PO}_4}{149.09 \text{ g } (\text{NH}_4)_3\text{PO}_4} \times \frac{1 \text{ mol } (\text{NH}_4)_3\text{PO}_4}{1 \text{ mol } (\text{NH}_4)_3\text{PO}_4} \times \frac{6.02 \times 10^{23} \text{ molecules } (\text{NH}_4)_3\text{PO}_4}{1 \text{ mol } (\text{NH}_4)_3\text{PO}_4} = 1.423 \times 10^{23} \text{ molecules (N)}$

15. Convert 2.525 moles of $\text{Al}(\text{NO}_3)_3$ to grams of $\text{Al}(\text{NO}_3)_3$ 15. _____

Solution: $\frac{2.525 \text{ mol Al}(\text{NO}_3)_3}{1 \text{ mol Al}(\text{NO}_3)_3} \times \frac{212.98 \text{ g Al}(\text{NO}_3)_3}{1 \text{ mol Al}(\text{NO}_3)_3} = 537.8 \text{ g Al}(\text{NO}_3)_3$

16. Convert 2.00 grams of FeCl_3 to moles of FeCl_3 16. _____

Solution: $\frac{2.00 \text{ g FeCl}_3}{162.2 \text{ g FeCl}_3} \times \frac{1 \text{ mol FeCl}_3}{1 \text{ mol FeCl}_3} = 0.0123 \text{ mol FeCl}_3$

17. How many atoms of Mg are in 15.0 mL of Mg 17. _____

Solution: $\frac{15.0 \text{ mL Mg}}{1 \text{ mL Mg}} \times \frac{1.74 \text{ g Mg}}{24.305 \text{ g Mg}} \times \frac{1 \text{ mol Mg}}{1 \text{ mol Mg}} \times \frac{6.02 \times 10^{23} \text{ atoms Mg}}{1 \text{ mol Mg}} = 6.46 \times 10^{23} \text{ atoms Mg}$