

# CHEM 101 Worksheet, Chapter 3: Mass Relationships in Chemical Reactions

Multiple choice questions: circle the correct answer(A-E)

Show your work questions (p. 2): show all work! Use the amu for each element from the periodic table!

$N_A = 6.02 \times 10^{23}$

1. Atom X has two isotopes: 25.0 wt% is  $^{37}\text{X}$  and 75.0% is  $^{35}\text{X}$ . What is the average molar mass of X?

- A. 36.0 amu      B. 72.0 amu      C. 36.5 amu      D. 35.5 amu      E. 34.5 amu

2. The molar mass (in amu) of  $\text{ZnSO}_4 \cdot 6\text{H}_2\text{O}$  =

- A. 161.5      B. 179.5      C. 269.5      D. 53.5      E. 215.5

3. How many atoms of Na in 5.10 moles of  $\text{Na}_2\text{CO}_3$ ?

- A.  $3.07 \times 10^{23}$       B.  $6.14 \times 10^{24}$       C.  $6.14 \times 10^{23}$       D.  $1.84 \times 10^{25}$       E. 10.2

4. What is the mass in grams of  $1.00 \times 10^{12}$  atoms of lead, Pb?

- A.  $3.44 \times 10^{-10}\text{g}$       B.  $2.07 \times 10^{114}\text{g}$       C.  $1.25 \times 10^{38}\text{g}$       D.  $3.44 \times 10^{-34}\text{g}$       E.  $1.25 \times 10^{14}\text{g}$

5. 0.2 mol  $\text{Na}_2\text{CO}_3$  = 4.24 g  $\text{Na}_2\text{CO}_3$  = 0.051 mol

- A. 530g, 449 mol      B. 21.2g, 449 mol      C. 530g, 0.051 mol      D. 21.2g, 0.040 mol      E. 16.6g, 0.051 mol

6. The wt% composition in tin(IV)oxide is 88% Sn 12% O (Sn = tin, element # 50 )

- A. 21%Sn, 79%O      B. 88%Sn, 12%O      C. 12%Sn, 88%O      D. 94%Sn, 6%O      E. 79% Sn, 21%O

7. A compound has the following wt% composition: 2.1% H, 65.3% O, 32.6% S. What is its empirical formula?

- A.  $\text{H}_2\text{SO}_4$       B.  $\text{H}_4\text{S}_2\text{O}_8$       C.  $\text{S}_4\text{HO}_2$       D.  $\text{H}_2\text{SO}_2$       E.  $\text{HO}_4\text{S}$

8. How many gram Na in 5.00g  $\text{Na}_2\text{SO}_4$ ?

- A. 0.035 g      B. 1.31 g      C. 1.62 g      D. 0.97 g      E. 0.81 g

9. A compound containing only carbon and hydrogen has 85.7 wt% C and 14.3 wt% H. Its molar mass is 56 amu. What is its molecular formula?

- A.  $\text{C}_4\text{H}_8$       B.  $\text{C}_2\text{H}_4$       C.  $\text{C}_3\text{H}$       D.  $\text{CH}_2$       E. CH

10. Balance the following reactions. No fractional coefficients, coefficients must be the lowest whole numbers.



11. How many g of  $\text{CO}_2$  are formed from the combustion of 2.9 g of butane,  $\text{C}_4\text{H}_{10}$ , with excess oxygen?

The balanced reaction is:  $2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$

- A. 0.26g      B. 6.6g      C. 8.8g      D. 10.5g      E. 2.2g

12. How many g  $\text{I}_2$  will react with 20.4 g Al to form  $\text{AlI}_3$  (aluminum iodide)? As always, first balance the reaction! (Hint: this is not a limiting reagent problem)

- A. 144. g      B. 288. G      C. 192. G      D. 72 g      E. 576 g

13. For the balanced reaction:  $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$ . How many moles of  $\text{NH}_3$  will be produced when 0.50 mol  $\text{N}_2$  reacts with 1.0 mol  $\text{H}_2$ ?

- A. 0.67 mol      B. 1.0 mol      C. 0.50 mol      D. 2.0 mol      E. 3.0 mol

14. Calculate the mass of  $\text{CO}_2$  formed when 2.3 g of ethanol,  $\text{C}_2\text{H}_5\text{OH}$  reacts with 3.2 g oxygen  $\text{O}_2$  to form  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . (You balanced the reaction in 8.e)! This is a limiting reagent problem!

- A. 4.6g      B. 2.2g      C. 4.4g      D. 6.6g      E. 2.93g

# Multiple Choice Question For Chemistry 101

**Camilla Rothe**



## Multiple Choice Question For Chemistry 101:

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much they need to know The second problem arises when the book is written by authors that are not food scientists e g chemists they are not academics that are engaged with teaching or they are not sufficiently qualified to teach In this case it is difficult to find links between the chemistry of foods and its relevance to applications or quite frequently future employment prospects of the student Introduction to Food Chemistry 2nd Edition bridges this gap in the relevant literature as it employs the latest pedagogical theories in textbook writing to present the subject to students with broad range of cognitive skills This book presents specific learning objectives for each chapter and is self contained so students will not need to search for essential information outside the textbook This new edition has been expanded to include chapters on sweeteners glass transition amino acids proteins for major food commodities and food additives All of the original chapters have been updated and expanded to include new research and technologies To support learning the book has Didactic elements with information being conveyed with 3D figures color coded schemes and graphs annotations on figures that link it to the text descriptions Built in pedagogy and learning activities at the end of each chapter that are linked to the learning objectives Keywords and concepts for online search to instigate curiosity for further studies Conversational writing style without losing academic rigor To support lecturers the book has Helps focus teaching preparation on key aspects of food chemistry relevant to both industry and modern research Aids the preparation of exams assignments and other types of assessment or learning activities For lecturers in search of a singular source to aid in their introductory food chemistry courses look no further than this expanded new edition of Introduction to Food Chemistry

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