

# General Chemistry - Unit 1 (Part 1) Review WS - **ANSWERS**

**Directions:** Complete the following questions on a separate piece of paper.

**LT #2: Understand the experiments and the historical theories that lead to the modern atomic theory.**

- Describe Dalton's beliefs about the atom and chemical reactions with atoms.  
*All elements are composed of atoms; all atoms of a given element are identical, that atoms of different elements are different; chemical compounds are formed when atoms combine; atoms are not created or destroyed in chemical reactions (indivisible); solid sphere.*
- Describe the atom according to Thomson's theory.  
*Thomson found that the atom consisted of a positive mass but there were negative pieces scattered throughout the positive area (Plum Pudding Model). He discovered the electron (negatively charged).*
- Describe Rutherford's gold foil experiment. How did he change the model of the atom after the experiment?  
*Rutherford discovered the nucleus contained protons by shooting alpha particles (+) through gold foil. He found that most went through but some bounced back. He found the nucleus, which is very, very small and dense is found in the center of the atom, with the electrons around the outside.*
- What did Chadwick change about the atomic model?  
*Chadwick (along with the Curies) found that the nucleus also contained the neutrons, which have approximately the same mass as the proton, but have no charge.*

**LT #3: Understand how subatomic particles determine the properties of an atom or ion.**

- List the three subatomic particles, their location, their charge and their relative mass.  
*Proton—found in nucleus, + charge, 1 amu (atomic mass unit)  
Neutron—found in nucleus, no charge, 1 amu  
Electron—cloud surrounding the nucleus, - charge, approx. no mass*
- What is a cation and how is it formed?  
*A cation is a positive ion and is formed when an atom loses one or more electrons.*
  - What is an anion and how is it formed?  
*An anion is a negative ion and is formed when an atom gains one or more electrons.*
- Complete the following charts for atoms and ions:

ATOM	ISOTOPE SYMBOL	ATOMIC #	MASS #	#PROTONS	#ELECTRONS	#NEUTRONS
Sodium - 23	<sup>23</sup> <sub>11</sub> Na	11	23	11	11	12
Aluminum - 27	<sup>27</sup> <sub>13</sub> Al	13	27	13	13	14
Chlorine - 35	<sup>35</sup> <sub>17</sub> Cl	17	35	17	17	18
Barium - 136	<sup>136</sup> <sub>56</sub> Ba	56	136	56	56	80

SYMBOL	MASS	#PROTONS	#ELECTRONS	#NEUTRONS	NET CHARGE
K <sup>+1</sup>	39	19	18	20	+1
Br <sup>-1</sup>	80	35	36	45	-1
Fe <sup>+3</sup>	56	26	23	30	+3
Se <sup>-2</sup>	79	34	36	45	-2

- Are all atoms of the same element identical? If not, how can they differ?  
*No; isotopes differ by # of neutrons. (Isotopes have the same # of protons and electrons.)*
- Which of lead's four isotopes is most abundant: lead-204, lead-206, lead-207 or lead-208? Explain how you know which isotope is more abundant. *The average atomic mass for lead is 207.2 amu; therefore, the most abundant isotope is lead-207*

**LT #4: Apply the mole concept (molar mass, mole equalities, conversions/dimensional analysis).**

- Calculate the molar mass of each of the following atoms or compounds:
  - zinc  
*65.4 g/mol*
  - barium phosphate, Ba<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>  
*3(137.3) + 2(31.0) + 8(16.0) = 601.9 g/mol*

# Modeling Chemistry Unit Review Answers

**Syed Ahmad Imtiaz**



## **Modeling Chemistry Unit Review Answers:**

**Modelling of Chemical Process Systems** Syed Ahmad Imtiaz, 2023-07-25 Models and simulations are widely being used for design optimization fault detection and diagnosis and various other decision making purposes Increasingly models are developed at different scales and levels all the way from molecular level to the large scale process systems scale Modelling of Chemical Process Systems gives readers a feel for the multiscale modelling As models have been developed for various applications a general systematic method for building model has emerged This book starts with the history of modelling and its usefulness describing modelling steps in detail Examples have been chosen carefully from both conventional chemical process systems to contemporary systems including fuel cell and bioprocesses Modelling theories are complemented with case studies that explain step by step modelling methodologies This book also introduces the application of machine learning techniques to model chemical process systems This makes the book an indispensable reference for academics and professionals working in modelling and simulation Includes case studies that explain step by step modelling methodologies Covers detailed multiscale modelling of chemical processes providing examples from traditional and novel areas Provides modelling insight at micro and macro scale levels including machine learning techniques **Prentice Hall**

**Physical Science Concepts in Action Program Planner National Chemistry Physics Earth Science**, 2003-11 Prentice Hall Physical Science Concepts in Action helps students make the important connection between the science they read and what they experience every day Relevant content lively explorations and a wealth of hands on activities take students understanding of science beyond the page and into the world around them Now includes even more technology tools and activities to support differentiated instruction **The Educational Review**, 1912 *Chemistry in the Community*, 1995

**Rainfall-Runoff Modelling** Keith J. Beven, 2012-01-30 Rainfall Runoff Modelling The Primer Second Edition is the follow up of this popular and authoritative text first published in 2001 The book provides both a primer for the novice and detailed descriptions of techniques for more advanced practitioners covering rainfall runoff models and their practical applications This new edition extends these aims to include additional chapters dealing with prediction in ungauged basins predicting residence time distributions predicting the impacts of change and the next generation of hydrological models Giving a comprehensive summary of available techniques based on established practices and recent research the book offers a thorough and accessible overview of the area Rainfall Runoff Modelling The Primer Second Edition focuses on predicting hydrographs using models based on data and on representations of hydrological process Dealing with the history of the development of rainfall runoff models uncertainty in model predictions good and bad practice and ending with a look at how to predict future catchment hydrological responses this book provides an essential underpinning of rainfall runoff modelling topics Fully revised and updated version of this highly popular text Suitable for both novices in the area and for more advanced users and developers Written by a leading expert in the field Guide to internet sources for rainfall runoff modelling

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