

## 25

## NUCLEAR CHEMISTRY

## Practice Problems

For your assessment, solve the following problems.

## SECTION 25.1 NUCLEAR RADIATION

1. What happens to the mass number and atomic number of an atom that undergoes beta decay?
2. A radioactive isotope of an element undergoes alpha particle decay. What are the atomic number and mass number of the particle released?
3. Give the composition of the nucleus of the following isotopes.
  - a.  $^{120}\text{Zn}$
  - b.  $^{120}\text{Ar}$
  - c.  $^{120}\text{Ar}$  alpha decay
4. Complete each of the following equations.
  - a.  $^{14}\text{C} \rightarrow \text{Ne} + \text{?}$
  - b.  $^{235}\text{U} + \text{?} \rightarrow \text{Ba} + \text{?}$
  - c.  $^{235}\text{U} \rightarrow \text{Ba} + \text{?}$

## SECTION 25.2 NUCLEAR TRANSFORMATIONS

1. Write a nuclear equation for the following radioactive processes.
  - a. alpha decay of thorium-230
  - b. electron capture by barium-57
  - c. beta emission by argon-37
  - d. proton emission by fluorine-17
2. Complete the equations for these beta decay series.
  - a.  $\text{Ra} \rightarrow \text{Sr} \rightarrow \text{Ba} \rightarrow \text{?}$
  - b.  $^{137}\text{Cs} \rightarrow \text{Ba} \rightarrow \text{?} \rightarrow \text{Ba} \rightarrow \text{Ba}$
  - c.  $\text{Ra} \rightarrow \text{Ba} \rightarrow \text{?} \rightarrow \text{Ba}$
  - d.  $^{137}\text{Cs} \rightarrow \text{Ba} \rightarrow \text{?} \rightarrow \text{Ba} \rightarrow \text{Ba}$
  - e.  $\text{Ba} \rightarrow \text{?} \rightarrow \text{Ba} \rightarrow \text{Ba} \rightarrow \text{Ba}$
3. Polonium-214 has a relatively short half-life of 1.64 s. How many atoms would it take for 1.00 g of this isotope to decay to 0.001 g?
4. If one atom loses about 0.001 g of protactinium-231 to decay to 1.0 g, the half-life of protactinium-231 is 17 days.
5. By approximately what factor would the mass of an sample of copper-63 decrease in 10 minutes? The half-life of copper-63 is 12.73 years.
6. If a 5.00 g sample, 0.001 g of copper-63 decays to 0.0005 g, what is the half-life of copper-63?

# Study Guide Nuclear Radiation Answerd

**Morton M. Sternheim**

## **Study Guide Nuclear Radiation Answer:**

Study Guide with Answers to Selected Problems H. Stephen Stoker,Danny V. White,2003-04 This supplement includes for each chapter a brief overview activities and practice problems to reinforce skills and a practice test The answers section includes answers for all odd numbered end of chapter exercises Basic Concepts of Chemistry, 9e Study Guide and Solutions Manual Leo J. Malone,Theodore O. Dolter,2012-01-03 The 9th edition of Malone s Basic Concepts of Chemistry provides many new and advanced features that continue to address general chemistry topics with an emphasis on outcomes assessment New and advanced features include an objectives grid at the end of each chapter which ties the objectives to examples within the sections assessment exercises at the end each section and relevant chapter problems at the end of each chapter A new Math Check allows quick access to the needed basic skill The first chapter now includes brief introductions to several fundamental chemical concepts and Chapter Synthesis Problems have been added to the end of each chapter to bring key concepts into one encompassing problem Every concept in the text is clearly illustrated with one or more step by step examples Making it Real essays have been updated to present timely and engaging real world applications emphasizing the relevance of the material they are learning This edition continues the end of chapter Student Workshop activities to cater to the many different learning styles and to engage users in the practical aspect of the material discussed in the chapter

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