**CHAPTER 7: STUDY GUIDE**

**THE ATOMIC THEORY EXPLAINS RADIOACTIVITY**

**Steps for studying for the Ch. 7 Test:**

1. Re-read your notes and use your Cornell-questions to quiz yourself.
2. Re-read pages 284 – 324 of your textbook.
3. Be able to define the key vocabulary from the chapter.
4. Review your Reading Checks and Work Book, making sure all is complete.
5. Be able to answer the questions below. They are a guide for your studying.
6. Complete the online quizzes at <http://www.bcscience.com/bc10/>

**VOCAB: Be able to define the following terms. Make VOCAB cards if you need to.**

* alpha particle
* beta particle
* daughter product/isotope
* decay curve
* decay product
* fission
* fusion
* gamma
* half-life
* isotope
* mass number
* parent isotope
* radiation
* radioactive decay

**7.1 Atomic Theory, Isotopes and Radioactive Decay Questions**

1. Differentiate radiation from radioactivity.
2. Understand the electromagnetic spectrum. Figure 7.1 on p. 287
3. What are isotopes? Give examples of different isotopes for the same element, stating their name using standard atomic notation and their standard atomic symbols (nuclear symbols). Ex. What isotope has 25 protons and 29 neutrons?
4. Make sure you have completed the Practice Problems on p. 291.
5. What is radioactive decay? What are radioisotopes? Give an example.
6. Compare and contrast the three types of radiation in terms of symbol (both symbols for each), composition (alpha particle, beta particle or high-energy gamma ray), description of the radiation, charge, and relative penetrating power.
7. Understand the nuclear reactions for alpha, beta and gamma decay.
8. Make sure you have completed the Practice Problems on p. 295, 296, as well as p. 301 #11-13.
9. What element would be formed during the first decay of uranium-238 if it released an alpha particle?
10. Understand how the mass number of the starting nucleus and the atomic number of the starting nucleus changes (if it does change) for alpha, beta and gamma decay.
11. Remember that the sum of the mass numbers does not change and the sum of the charges in the nucleus does not change when writing nuclear equations.
12. Complete the Checking Concepts and Understanding Key Ideas on p. 301
13. Complete Quiz 7.1 at <http://www.bcscience.com/bc10/>

**7.2 Half-Life Questions**

1. What is radiocarbon dating? Explain how it works.
2. What is half-life? Understand Table 7.5 in terms of half-life, number of half-lives, time elapsed, percentage of the radioisotope (Strontium-90) present, and the amount of Strontium-90 present. Ex. At the 4th half-life, 116 years have elapsed, there is only 6.25% of Strontium-90 left, which is 0.625g.
3. Understand how to read a decay curve.
4. Make sure you have completed the Practice Problems on p. 306.
5. What is meant by the parent isotope? daughter isotope? Give an example of a pair using your data booklet or Table 7.6 on p. 307.
6. Complete p. 311 #10-13.
7. Understand how to read the graph for the data for the potassium-40 clock. Note how to determine the amount of time that has elapsed and how many half-lives this corresponds to, notice that the parent curve descends at the same rate the daughter curve ascends, determine the amount of each isotope present at different half-lives, etc.
8. Make sure you have completed the Practice Problems on p. 309 and p. 311 #9.
9. Complete the Checking Concepts and Understanding Key Ideas on p. 311
10. Complete Quiz 7.2 at <http://www.bcscience.com/bc10/>

**7.3 Nuclear Reactions Questions**

1. What is nuclear fission? What is it used for?
2. Compare and contrast chemical reactions and nuclear reactions.
3. Differentiate nuclear reaction and induced nuclear reaction.
4. List several ways to induce a nucleus to undergo a nuclear reaction.
5. What are two ways to write the nuclear equation for induced nuclear reactions?
6. What are the two ways that a hydrogen-1 nucleus can be represented?
7. Be able to identify the reaction that would produce a proton.
8. Know the subatomic symbols for the subatomic particles in nuclear reactions. (p. 315)
9. Review the rules for writing nuclear equations (p. 315)
10. What is the main nuclear reaction in both fission-style nuclear weapons and Canadian nuclear power plants? What subatomic particle is forced to collide with which isotopes nucleus?
11. What is the nuclear equation for the nuclear fission of uranium-235? Be able to describe it and understand that a large amount of energy is released (not shown in the equation).
12. Make sure you completed the Practice Problems on p. 317.
13. What is a chain reaction? What can it lead to? How can the energy of a chain reaction be controlled?
14. What is much of the concern about using nuclear power plants to produce electricity? What is done to help prevent this?
15. What are CANDU Reactors? What kind of nuclear reaction is used to produce heat in these reactors?
16. What is nuclear fusion? Where does it occur? How is energy produced?
17. What is the nuclear equation for fusion?
18. Be able to identify the nuclear equations for fission and fusion reactions.
19. Is fission or fusion used to generate electrical power? Which reaction continues to have research done on it and why?
20. Compare and contrast fission and fusion. See Table 7.11 on p. 321.
21. Complete the Checking Concepts and Understanding Key Ideas on p. 325
22. Complete Quiz 7.3 at <http://www.bcscience.com/bc10/>