

Honors Chemistry Exam #1: STUDY GUIDE (SC1c, SC3a-d, SCSH 4,5)**Test Date: September 1/2, 2015**

This test will cover content from Introductory Chemistry Podcast 1-5, Atomic Theory Podcast 1-5, Atomic Theory Podcast 6.3 on nuclear chemistry and flashcards from the summer assignment. Students will receive an "exam packet" with the conversion sheet, official periodic table, and the sig. fig. sheet.

1. Differentiate between intensive and extensive properties of matter and give multiple examples for each.
2. List at least three techniques that can be used to separate mixtures. Explain how each works.
3. Dimensional Analysis will be used on most tests. Here are a few practice problems:
 - a. In Raiders of the Lost Ark, Indiana Jones tried to remove a gold idol from a booby-trapped pedestal. He replaces the idol with a bag of sand. If the idol has a mass of 2.00 kg, how many litres of sand must he place on the pedestal to keep the mass sensitive booby-trap from activating? (Density of sand is 3.00 g/cm³)
 - b. One sphere has a radius of 5.10 cm; another has a radius of 5.00 cm. What is the difference in volume (in cubic centimeters) between the two spheres? Give the answer to the correct number of significant figures. The volume of a sphere is $(4/3)\pi r^3$, where $\pi = 3.1416$ and r is the radius.
 - c. A chemistry teacher spends 5 minutes grading 1 student's lab. He has 150 students who turn in lab papers for each lab. If we do 25 labs in class, how many minutes will he spend grading lab papers?
 - d. Polonium is uncommon in the earth's crust. There is only about 2.4 mg/metric ton. A metric ton is 1000 kg. What mass (in grams) of polonium is present in a 3.8 gram sample of the earth's crust?
4. How did each of the following scientists contribute to modern atomic theory: Ernest Rutherford, J.J. Thomson, Niels Bohr, Robert Millikan and John Dalton?
5. What is the difference between precision and accuracy? Give some examples from our labs.
6. What factors could influence the degree of uncertainty in a measured quantity?
7. A graduated cylinder contains 30.0 mL of water. An object is placed in the cylinder and the water level moves to 46.7 mL. Find the density if the mass of the object is 121.3 grams.
8. What are the differences between Celsius and Kelvin?
9. Convert the following: -10C to ____K, 10C to ____ K, 370K to ____C
10. What are the differences between a physical change and a chemical change? List three examples for each and draw a schematic diagram that shows a physical vs. a chemical change.
11. Explain the concept of weighted average mass, as they appear on the periodic table of elements. Describe how this value is calculated from naturally occurring isotopes.
12. Give the number of protons, electrons and neutrons in the following:
 - a. $^{57}_{26}\text{Fe}$
 - b. $^{64}_{30}\text{Zn}$
 - c. $^{204}_{80}\text{Hg}$
 - d. $^{17}_7\text{N}$

How would your answer to #12 change if you were dealing with cations or anions? Explain.

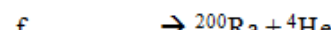
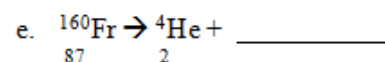
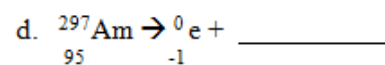
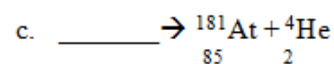
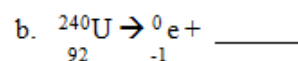
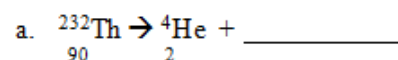
13. Given the data in the following table, please calculate the weighted average atomic mass for chromium, Cr

<i>Isotope</i>	<i>Percent Abundance</i>	<i>Mass (amu)</i>
Cr-50	4.35%	49.946
Cr-52	83.79%	51.941
Cr-53	9.5%	52.941
Cr-54	2.36%	53.939

14. Identify the location on the periodic table for alkali metals, metalloids, alkaline earth metals, transition metals, halogens and noble gasses. Be sure you can distinguish between a group/family and a period.

15. List the characteristics of nonmetals and compare them to those of metals.

16. Provide the missing daughter nuclides or missing elements for a-g. Label each radioactive particle that is emitted. Compare and contrast the deleterious effects of each form of radiation.



19. Rubidium has two naturally occurring isotopes. Rubidium-85 has an atomic mass of 84.9118 amu and Rubidium-87 has an atomic mass of 86.9092 amu. If rubidium has an average atomic mass of 85.47, what is the percentage of naturally occurring Rubidium-87?

20. Compare and contrast the masses of the sub-atomic particles.

21. Explain the concept of half-life and explain why isotopes exhibit this type of radioactive decay. Use the graph to calculate the half-life of element X

22. Iodine-131 has a half-life of 8 days. After 4 half-lives, what fraction of the sample is still radioactive?

23. A bone is found to have only 1/128th of its Carbon-14 remaining. The half-life of Carbon 14 is 5,370 years. How old is that bone?

24. Draw a diagram of Boron-11. Label the sub-atomic particles and attempt to accurately portray their locations within and around the atom.

