

Things to Know for Quiz 3

Chem 30A, Fall 2019

Chapter 3

1. Define matter. What is matter composed of?
2. Explain the similarities and differences between solids, liquids, and gases. Include both the observable properties and the molecular level. Be able to sketch a picture showing the arrangement of particles in each state.
3. Explain why each state of matter has the observable properties that it does. (To explain why, you need to refer to how the molecules are arranged and the type of motion possible for the molecules.)
4. For the following categories: pure substances, mixtures, elements, compounds, homogeneous mixtures, and heterogeneous mixtures: be able to define them. Compare any two of these and be able to explain the similarities and differences, both observable and at the molecular level. Give an example of each.
5. Given an example object or substance, be able to classify what type of matter it is (of the above categories).
6. Which of the above categories of matter can be separated, which cannot, and why?
7. Given a property, classify it as a physical or a chemical property and explain your reasoning.
8. Given a change, classify it as a physical or a chemical change and explain your reasoning.
9. Mass is conserved in chemical reactions. (Total mass before the reaction = total mass after the reaction.)
10. What is the law of conservation of energy?
11. What is kinetic energy? What does it depend on?
12. What is chemical potential energy?
13. Convert between various energy units. You will be given the following:
 $1 \text{ cal} = 4.184 \text{ J}$ and $1 \text{ kWh} = 3.60 \times 10^6 \text{ J}$
14. Possible energy units: calories (cal), joules (J), kilocalories (kcal), kilojoules (kJ) kilowatt-hours (kWh), Calories (Cal)
15. A “nutritional calorie” is a Calorie (capitalized) and it is actually equal to 1000 calories. A nutritional calorie is the same as a kilocalorie.
16. For exothermic vs. endothermic reactions: is heat given off or absorbed? Be able to draw a sketch of an energy diagram. Which is more stable, reactants or products? (In general, things that have higher energy are less stable, and if they have lower energy they are more stable.)