

STUDY GUIDE: BASIC CHEMISTRY

KEY TERMS

matter	dissociation	anion
inorganic	ionic bond	cation
atom	valence	hydrogen bond
element	ionization	hydrophobic
atomic nucleus	molecule	hydrophobic interactions
proton	molecular formula	hydration
neutron	structural formula	hydrophilic
atomic number	compound	bound water
mass number	acid	surface tension
isotope	base	capillary action
electron	hydrogen ion	specific heat
valence electrons	hydroxide ion	freezing point of water
orbital	pH	heat of vaporization
octet rule	buffer	solvent
half-life	nonpolar covalent bond	solute
radioactive tracer	polar covalent bond	aqueous solution
ion	ionic bond	

QUESTIONS

1. Describe atomic structure, using the terms proton, neutron, electron, mass number and orbital. Indicate what is meant by electrons in an "excited state" and those in a "ground state"
2. Explain what an isotope is and give two important physical properties of isotopes that make them useful in biological research. Define half-life.
3. Using diagrams, explain what an ion is, and how it forms. Describe an ionic bond.
4. Explain what is meant by pH. Give the name of materials that resist a change in pH.
5. Describe a covalent bond and tell how it differs from an ionic bond. Relate the structure of an atom to its chemical properties and to the type of chemical bond it forms.
6. Explain the important role of weak chemical bonds in the organization of living things.
7. Describe the special physical properties of water. Draw two water molecules in a way that illustrates a hydrogen bond, explain why water is a good solvent and show the basis for the high surface tension of water.

How do the unique chemical and physical properties of water make life on earth possible?

8. Indicate why oxygen and carbon dioxide are basic to life, and name the principle source of each of these molecules.
9. What is the difference between a mixture, compound and a molecule?

10. What is the difference between a polar and nonpolar covalent bond?
11. What properties of water make it an essential component of living material?
12. Why are buffers important to living things? Explain how a buffer system works.
13. Explain why isotopes are important in biochemical research?