5. In the Celsius temperature scale, water freezes at (1) ____°C and boils at (2)____°C.
   A.  (1) 100   (2) 0
   B.  (1) 0   (2) 100
   C.  (1) 1.8   (2) 32
   D.  (1) 32   (2) 212
   E. the Celsius scale is not applicable to water

5. The smallest fundamental substance into which you can break down any compound using either physical or chemical means (e.g. crushing or dissolving) is:
   A. a proton
   B. a mineral
   C. a nucleus
   D. an element
   E. an electron

5. Which of the following statements about atoms is TRUE?
   A. atoms are only about 1 mm wide
   B. atoms are the smallest particles that uniquely identify an element
   C. different atoms of the same element always have the same number of neutrons
   D. the atomic number (number of protons) of an element can vary
   E. isotopes are different elements that have very similar atoms

5. Which of the following statements about atoms is FALSE?
   A. atoms are only about $10^{-10}$ m across
   B. atoms are the smallest particles that uniquely identify an element
   C. different atoms of the same element can have different numbers of neutrons
   D. the number of protons in atoms of the same element can vary
   E. isotopes are just slight variations of atoms of the same element

5. In an atom, the particles with negative, positive, and neutral charges are respectively:
   A. electrons, neutrons, protons
   B. electrons, protons, neutrons
   C. protons, electrons, neutrons
   D. neutrons, electrons, protons
   E. positrons, negatrons, morons

5. The positively charged particle in an atom is a/an (1) ______; the neutral (zero charge) particle is a/an (2) ______.
   A. (1) proton   (2) electron
   B. (1) neutron   (2) proton
   C. (1) electron   (2) neutron
   D. (1) proton   (2) neutron
   E. (1) electron   (2) moron

5. The negatively charged particle in an atom is a/an (1) ______; the positively charged particle is a/an (2)______.
   A. (1) proton   (2) electron
   B. (1) neutron   (2) proton
   C. (1) electron   (2) proton
   D. (1) negatron   (2) positron
   E. (1) muon   (2) moron

5. An atom that loses electrons forms a/an (1)______ with a (2)______ charge.
   A. (1) cation   (2) positive
   B. (1) anion   (2) positive
   C. (1) isotope   (2) positive
   D. (1) cation   (2) negative
5. An atom that gains extra electrons forms a/an (1) _______ with a (2) _______ charge.
A. (1) cation (2) positive
B. (1) anion (2) positive
C. (1) molecule (2) positive
D. (1) cation (2) negative
E. (1) anion (2) negative

5. An atom that loses electrons forms a/an (1) _______ whereas an atom that gains electrons forms a/an (2) _______.
A. (1) cation (2) anion
B. (1) anion (2) cation
C. (1) ion (2) molecule
D. (1) molecule (2) anion
E. (1) anion (2) ion

5. Whenever elements combine together in a specific ratio, a/an ___________ is formed:
A. atom
B. isotope
C. element
D. ion
E. compound

5. If “X” represents a type of cation, and “Y” represents a type of anion with an equal but opposite charge to “X”, the correct way to write out the formula of the chemical compound produced by the bonding of “X” and “Y” is:
A. YX
B. XY
C. Y:X
D. X:Y
E. dependent on which atom is bigger

5. If “X” represents a cation with a charge of +1, and “Y” represents an anion with charge of –2, the correct way to write out the formula of the chemical compound produced by the ionic bonding of “X” and “Y” is:
A. YX
B. XY
C. Y:X
D. X:Y
E. impossible to determine without more information

5. Based on the following types of anions (Cl\(^{-}\); S\(^{2-}\); (CO\(_3\))^\(^{-2}\)) and the following types of cations (Na\(^{+}\); Ca\(^{2+}\); Fe\(^{2+}\)), which of the following compounds is the only one that is written out correctly?
A. CI\(\text{Na}\)
B. S\(\text{Ca}\)
C. CaCO\(_3\)
D. CO\(_3\)Fe
E. Cl\(_2\)Fe

5. Sodium chloride is a compound that we usually refer to as (1) _______ and which forms with (2) _______ bonds.
A. (1) diamond (2) covalent
B. (1) table salt (2) ionic
C. (1) sugar (2) covalent
D. (1) mica (2) van der Waals
E. (1) graphite (2) metallic

5. The type of chemical bonding that forms the strongest bonds (e.g. in diamond) is:
A. ionic
B. van der Waals
C. metallic
D. hydrogen
E. covalent
5. Atomic bonding that involves electrons being shared between atoms is called:
   A. molecular bonding
   B. **covalent bonding**
   C. ionic bonding
   D. metallic bonding
   E. van der Waals bonding

5. In **diamond**, all C atoms are held together by (1)__________ bonding, but in **graphite**, C atoms are arranged into sheets bonded together by (2)__________ bonding.
   A. (1) ionic (2) covalent
   B. (1) van der Waals (2) covalent
   C. (1) metallic (2) ionic
   D. **(1) covalent (2) van der Waals**
   E. (1) covalent (2) ionic

5. Which of the following is **NOT** an example of a mineral that forms in covalently bonded sheets held together by weak van der Waals electrostatic bonds?
   A. salt
   B. clay
   C. graphite
   D. muscovite mica
   E. biotite mica