

1. Describe how electronegativity varies as a function of position on the periodic table.
2. Given the electronegativities of two elements, determine the type of bond (ionic or covalent) that is most likely to form between atoms of those elements.
3. Given the electronegativities of two different nonmetal atoms, determine whether a covalent bond between them is polar or non-polar.
4. Given the electronegativities of the atoms in a molecule and the geometry (shape) of the molecule, determine whether it is a polar or nonpolar molecule.
5. Draw the electron dot structure for molecules and polyatomic ions.
6. Know the various types of inter- and intraparticle forces, the particles they bond, and their relative strengths.
7. List and be able to discuss the major assumptions of the Kinetic Molecular Theory of Gases.
8. Specify standard conditions (STP) in the commonly used units.
9. Given the initial volume and initial and final pressures and temperatures of a fixed amount of gas, calculate the final volume. Be able to use Dalton's Law of Partial Pressures in solving the problem.
10. Given the total pressure and appropriate information, calculate the partial pressure of each component of a mixture of gases.
11. Write the equation that relates the measurable properties of an ideal gas (Ideal Gas Equation) and use it to solve for one of the variables, given the others.
12. Given the volume (or number of moles) of any gas at STP, calculate the number of moles (or the volume) of the gas.
13. Given the density of a gas at STP calculate its molar mass.
14. Be able to solve mass-volume and/or volume-volume gas law problems.
15. Use Graham's Law to calculate molar mass, density, rate of effusion, or time of effusion, given the remaining values in the law.
16. Specify the conditions under which the greatest deviations from ideal behavior for a gas are observed and explain why.
17. Explain the differences in molecular motion, interparticle forces and physical behavior between solids and liquids and gases.
18. Specify the number of atoms per unit cell for simple cubic, body centered cubic and face centered cubic structures.
19. Given the kind of cubic lattice and the atomic radius (or diameter), calculate the density of the crystalline element.
20. Given the kind of cubic lattice, the length of the edge of the unit cell, and the density, calculate Avogadro's number or calculate density given the other stated factors.
21. Given the kind of cubic lattice and the length of the edge of the unit cell, calculate the atomic radius of the metal atom.

22. Specify or match the particles which occupy the lattice points and the type of interparticle forces involved with each of the types of crystalline solids (ionic, molecular, metallic, network).
23. Given the values for all but one of the following related to the formation of an ionic compound, calculate the remaining value, making use of the Born-Haber cycle: heat of formation (reaction), electron affinity, heat of sublimation, ionization energy, bond energy (bond dissociation energy), lattice energy.
24. Explain the relationship between vapor pressure and temperature of a liquid.
25. Relate the relative strengths of intermolecular forces with the boiling points or heats of vaporization or of two or more liquids.
26. Label the regions and answer specific questions with reference to a given phase diagram.
27. Label and be able to answer specific questions with reference to a heating or cooling curve.
28. Be able to solve any of the assigned homework or laboratory problems.
29. Define the following:

valence shell
electronegativity
covalent bond
coordinate covalent bond
ionic bond
hydrogen bond
ion-dipole bond
dipole-dipole bond
dipole-induced dipole bond
London forces
partial pressure
critical temperature
critical pressure
lattice
unit cell
boiling point
normal freezing point
normal boiling point
triple point
viscosity
vapor pressure
specific heat
heat of vaporization
heat of fusion
ideal gas
diffusion
effusion
surface tension
sublimation
lattice points