

Chemistry 101- Dr. Macintosh Exam 3 Study Guide

- 1) Be able to define all terms from the reading schedule.
- 2) Using a nanoscopic viewpoint, be able to explain why water expands when it freezes and why ice floats.
- 3) Be able to explain surface tension from a nanoscopic viewpoint. Be able to explain why water has a high surface tension.
- 4) Using intermolecular forces, be able to explain capillary action.
- 5) Know that the rate of evaporation increases with increasing surface area and increasing temperature and be able to explain why.
- 6) Be able to explain how boiling and evaporation are different.
- 7) Know what changes in states of matter occur during evaporation, condensation, melting, freezing, sublimation and deposition. Be able to classify these changes in state as (a) absorbing or releasing heat and as (b) endothermic or exothermic.
- 8) Be able to identify a Bronstead acid and a Bronstead base from its formula and write the equation for its reaction with water.
- 9) Be able to identify a neutral compound from its formula.
- 10) Given the formulas of an acid and a base, be able to write the reaction equation for an acid-base (neutralization) reaction.
- 11) Be able to calculate the OH^- molarity of a solution given its H_3O^+ molarity and vice versa.
- 12) Know that for each change in pH unit, the H_3O^+ concentration changes by a factor of 10.
- 13) Be able to calculate the pH from H_3O^+ molarity and vice versa. Be able to calculate the pH from OH^- molarity.
- 14) Be able to predict if a two solute solution will be a buffer. If it is a buffer, be able to write the reaction equations for what happens when an acid or base is added to it.
- 15) Be able illustrate, using Lewis dot symbols, how an ionic bond forms between atoms of two given elements.
- 16) Know that light behaves as both a wave and a particle.
- 17) Be able to use the Bohr model of the atom to explain why only certain colors of light are given off during: flame tests, some fireworks explosions and some types of lighting. (see supplement 11).
- 18) Be able to explain, using the Bohr model of the atom, what happens when an atom absorbs a photon or emits a photon.
- 19) Be able to describe what happens during covalent bond formation.
- 20) Be able to draw Lewis structures.
- 21) Be able to predict the shapes of small molecules. Be able to provide the correct name for the molecular shape. (see p. 48 of lab manual)
- 22) Be able to explain the basic principle behind VSEPR theory.
- 23) Be able to tell which of two elements is more electronegative.
- 24) Be able to predict if a bond is polar or nonpolar; if it is polar be able to identify the positive and negative ends.
- 25) Be able to predict if a molecule is polar or nonpolar.
- 26) Be able to explain how the pressure of a gas above a solution and temperature affect solubility of a gas.
- 27) Be able to explain how the temperature affects the solubility of a solid.

- 28) Be able to predict if a molecular substance is likely to be soluble given its formula.
- 29) Be able to describe what happens at a nanoscopic level when a solute dissolves in a solvent. Know which processes require energy and which release energy.
- 30) Be able to explain what is meant by the statement “likes dissolve likes”.
- 31) Be able identify all of the intermolecular forces present in a substance given its formula.
- 32) Given their formulas, be able to arrange substances in order of increasing boiling point, vapor pressure, surface tension or viscosity.
- 33) Be able to explain how osmosis works.
- 34) Given the mass of a substance, its specific heat, the initial and final temperatures, be able to calculate the amount of heat absorbed or released.