

Review Topics Test 3:

Module 4:

1. Know that one mole of any substance has 6.02×10^{23} particles (Avogadro's number)
2. Know how to convert from grams to and from moles by using molar mass (g/mol) as a conversion factor
3. Know how to calculate formula weight by adding up the masses of the individual elements in the formula
4. Know that molar mass is numerically equal to formula weight but the units are g/mol instead of amu.
5. Balancing chemical reactions.

Module 5:

6. Know what a saturated and unsaturated solution is. If there is solid in the bottom of a solution the solution is saturated.
7. Be able to calculate %m/v and %v/v given amounts of solute/solution and/or solvent.
8. Know how to calculate volume of solution or mass or volume of solute given the %m/v or %v/v and the mass or volume of solute or of volume of the solution. For this you have to assume you have 100 mL of solution. The % becomes the amount of solute in either grams or mL.
9. Know how to calculate molarity.
10. Know how to calculate moles or grams of solute or volume of solution given the volume of solution or the moles or grams of solute and molarity. For this you need to use the molarity as a conversion factor. You assume you have 1 L of solution and the molarity becomes the moles of solute. You make a fraction with the moles and 1L.
11. Know what osmosis is and that if two solutions are separated by a semipermeable membrane the net effect is that the solvent moves from the solution of lower concentration to the solution of higher concentration.
12. Know what dialysis is and that when separated by a semipermeable membrane only relatively small particles (not super molecules like starch or proteins) can move through the membrane.
13. Know that red blood cells contain .9% NaCl and 5% glucose and that if placed in solutions of higher concentrations of either of these crenation occurs and the solution will be hypertonic with respect to the red blood cells. If exposed to lower concentrations of either of these hemolysis occurs and the solution is hypotonic with respect to the red blood cells. If the same concentration no change occurs and the solution is isotonic to the red blood cells.

Module 6:

14. Know how to recognize acids and bases and salts.
15. Know which are the strong acids and the strong bases. The rest are weak acids and weak bases.
16. Know that strong acids and strong bases and soluble salts are strong electrolytes and they ionize 100% in aqueous solution. Only ions result.
17. Know that weak acids and weak bases are weak electrolytes and they ionize very little in aqueous solution and both ions and molecules (more molecules than ions) result.
18. Know that soluble in water covalent compounds other than acids are non electrolytes and only molecules result when placed in water.

19. Know that an acid reacts with a base in a neutralization reaction to form a salt and water. Know how to predict the products and balance these equations.
20. Know how to determine pH from $[H^+]$ and also vice versa.
21. Know how to determine pOH from $[OH^-]$ and vice versa.
22. Know how to convert between pH and pOH and between $[H^+]$ and $[OH^-]$.
23. Know that in water $[H^+] = [OH^-]$. If acid added then $[H^+] > [OH^-]$ and if a base is added then $[OH^-] > [H^+]$.
24. Know what a buffer is (weak acid and salt derived from the weak acid or a weak base and a salt derived from the weak base).
25. Know that buffers regulate pH. If a small amount of an acid or a base is added to a buffer solution then the pH down or up slightly as opposed to added to water when the pH goes down or up significantly.
26. Know the characteristics of acids and bases.
27. Know how to ionize weak and strong electrolytes when placed in water.

Module 7:

27. Know what the 3 radioactive particles are and what is needed to protect against them.
28. Know the products or reactants in a nuclear reaction when an alpha or a beta particle is emitted if given the reactant or product, respectively.
29. Know how to work with half lives and amounts of radioactive substances. The half life is the time needed to consume half of the original amount of the substance. Use the table with time and amount.

Module 8:

30. Know the relationship between volume and pressure at constant T and moles (inversely related).
32. Know the relationship between volume and moles at constant P and T (directly related).
33. Know the relationship between temperature and volume at constant P and T (directly related).
34. Know the relationship between pressure and temperature at constant volume and moles (directly related).
35. Know how to use Dalton's law of partial pressures. (The sum of the partial pressure of each gas present in a mixture is equal to the total pressure).
36. Know the pressure units and conversion between them ($1 \text{ atm} = 760 \text{ torr} = 760 \text{ mm Hg}$).
37. Know that hyperbaric chambers have a high concentration of oxygen and according to Henry's law will increase the solubility of oxygen in the blood. This can be used to treat cancer, wounds, and carbon monoxide poisoning.
38. Know the properties of ideal gases (particles separated from one another, low attraction for each other, points in space (negligible volumes), moving in straight lines at fast speeds and undergoing elastic collisions, have kinetic energy and the higher the temperature the higher the speed and the amount of kinetic energy).