

New West Charter High School -- Honors Chemistry -- Unit 5 -- Exam #4 -- 125 points

In everything you do here, be as neat as you can be -- PLEASE. Show ALL of your work; just giving the answer will not get you full credit, but partial achievement will earn you partial credit. PENCILS!

Write TRUE if the statement is true, OR write the word that substitutes for the underlined word that would make it true. Writing false only earns partial credit. Three points apiece.

- _____ 1) Colloids have particles large enough to settle out of a solution without stirring.
- _____ 2) A mixture of iron plus carbon produces bronze.
- _____ 3) Adding salt to water would result in a higher boiling point for the water.
- _____ 4) Molecules that have additional water molecules attached to them are called hydroniums.
- _____ 5) According to Bronsted-Lowry acid-base theory, acids are proton donors.
- _____ 6) Properties that depend only upon the concentration of the solute particles are colligative properties.
- _____ 7) Lead (II) chromate would most likely precipitate out of solution.
- _____ 8) A solution contains as much solute as it can hold at a certain temperature. We say that this solution is supersaturated.
- _____ 9) Litmus is an indicator that turns red in acid and blue in base.
- _____ 10) There were a lot of things to memorize for this test. I have to treat the subject more seriously in the future if I want a good grade.

Match Those Acids! Two points each.

- | | | |
|---|----------------------|-------------------------------|
| _____ 11) HNO_3 | a) sulfuric acid | j) phosphoric acid |
| _____ 12) HBr | b) bromous acid | k) fluoric acid |
| _____ 13) $\text{HC}_2\text{H}_3\text{O}_2$ | c) nitrous acid | l) hydrofluoric acid |
| _____ 14) H_3PO_3 | d) hydrochloric acid | m) ethanoic acid |
| _____ 15) $\text{C}_2\text{H}_5\text{COOH}$ | e) propanoic acid | n) lysergic acid |
| | f) acetic acid | o) hydrobromic acid |
| | g) nitric acid | p) not this acid |
| | h) phosphorous acid | q) not this one either |
| | i) sulfurous acid | r) why are you reading these? |

- 16) Imagine an element called Newwestine (Nw). It forms four oxygen-containing acids with the number of oxygens ranging from four to one. Each of the anions has a charge of -1. For five points, write the four acid formulas and their respective names according to what you have learned about naming acids.

Short Answer/Fill-in. Three points each.

17) We dissolve a _____ in a _____ to form a _____.

18) Molarity means _____.

19) In order to determine the concentration of an unknown base, we use a buret to carefully add a controlled amount of acid in a chemical technique called _____.

20) Name either reagent used to show off the endothermic reaction (cold and smelly!): _____
_____.

21) What is the difference between a strong acid and a weak one? _____
_____.

22) For three points, circle the substance with the lowest pH:

saliva lemon juice black coffee acid rain pure water

23) For three points, circle all of the weak acids:

citric HCl H_2CO_3 formic perchloric HI

24) What is Henry's Law? _____
_____.

25) How do soap and water remove grease from your hands? _____

_____.

26) Molality is defined as _____

Multiple Choice. Write the letter in the blank that best answers each question. Three points each.

_____ 27) A solute depresses the freezing point because the solute _____.

- a) is colder than the solvent
- b) disrupts crystal formation of the solvent
- c) has bigger molecules than the solvent
- d) tends to sink to the bottom of the solvent

- _____ 28) All of these increase the rate of dissolution except _____.
- a) increasing the temperature b) stirring the solution
c) decreasing the temperature d) increasing the surface area of the solute
- _____ 29) What mass of Na_2SO_4 is needed to make 2.5 L of 2.0 M solution? (Na = 23 g, S = 32 g, O = 16 g)
- a) 178 g b) 284 g c) 356 g d) 710 g
- _____ 30) All are categories of experimental errors except _____.
- a) personal error b) precision error
c) systematic error d) random error
- _____ 31) A compound which can behave as both an acid or a base is known as _____.
- a) bilingual b) colligative c) acid-base d) amphoteric
- _____ 32) Adding a strong base like NaOH to a weak acid like malic acid would produce a _____.
- a) basic salt b) acidic salt c) neutral salt d) saltmarsh
- _____ 33) What does NOT change when a solution is diluted by the addition of solvent?
- a) volume of solvent b) mass of solvent
c) number of moles of solute d) molarity of solution
- _____ 34) The freezing point of a solution that contains 0.550 moles of NaI in 615 g of water is _____.
(Here, $k_f = -1.86 \text{ }^\circ\text{C/m}$)
- a) $1.66 \text{ }^\circ\text{C}$ b) $-1.66 \text{ }^\circ\text{C}$ c) $3.33 \text{ }^\circ\text{C}$ d) $-3.33 \text{ }^\circ\text{C}$
- _____ 35) If the solubility of a gas in water is 4.0 g/L when the pressure of the gas above the water is 3.0 atm, what is the pressure of the gas above the water when the solubility of the gas is 1.0 g/L? (assume constant temperature)
- a) 0.75 atm b) 1.5 atm c) 4.0 atm d) 12.0 atm
- _____ 36) The term electrolyte refers to solutions that _____.
- a) can conduct an electric current b) that have a lower than normal boiling point
c) have nonpolar covalent bonds d) that do not contain either H^+ or OH^- ions
- _____ 37) The pH of a 1.6×10^{-5} solution of the strong base $\text{Ca}(\text{OH})_2$ is closest to
- a) 4.8 b) 10.6 c) 4.9 d) 9.5

Calculation Section -- Be sure to show ALL of your work for credit -- writing the answer alone will not get you full credit. Also, write any pertinent equation(s) you use. Five points each.

38) Find the pH of a 0.25 M solution of hypochlorous acid, HClO, if its $K_a = 3.5 \times 10^{-8}$.

39) Find the K_{sp} for the slightly soluble salt praseodymium (III) hydroxide, $\text{Pr}(\text{OH})_3$, if its maximum concentration is 5.95×10^{-7} M, given



40) How much water must be added to 1250 mL of a .36 M solution of $\text{Ba}(\text{NO}_3)_2$ in order to have a solution whose molarity is 0.003 M?

41) 48.6 grams of potassium chloride is added to 215.2 mL water. What will its freezing point be? (the molal freezing point constant for water is $-1.86 \text{ }^\circ\text{C/m}$)