1. Which of the following salts will be insoluble in water?
   a. \( \text{Ca(NO}_3\text{)}_2 \)
   b. \( \text{Li}_2\text{CO}_3 \)
   c. \( \text{Ba(OH)}_2 \)
   d. \( \text{PbSO}_4 \)
   e. \( \text{(NH}_4\text{)}_3\text{PO}_4 \)
2. In the balanced equation of hydro bromic acid and calcium hydroxide, what is the summation of the coefficients in the reaction?
   a. 2
   b. 3
   c. 4
   d. 5
   e. 6
3. Which of the following molecules will be polar?
   a. H₂
   b. CH₄
   c. CCl₄
   d. CO₂
   e. H₂O
4. What is the (m/m) concentration of 0.5 moles of NaCl in 20mL of water?
   a. 4%
   b. 20%
   c. 48%
   d. 59%
   e. 11%
5. If you have a 25mL solution of HCl, how many moles are in the after you change the volume to 50mL?
   a. 0.5
   b. 0.125
   c. 0.25
   d. 1
   e. 0.75
6. Which of the following is a weak electrolyte?
   a. HF
   b. H₂SO₄
   c. NaOH
   d. HCl
   e. NaCl
7. How many grams of KCl are needed to make 300mL of a 4M solution?
   a. 91.2
   b. 89.5
   c. 35.6
   d. 61.9
   e. 80.5
8. If your conjugate base is HCO$_3^-$, what is the acid from this reaction?
   a. H$_2$C$_4$O$_4$
   b. H$_2$O
   c. HCO
   d. H$_2$C$_3$O$_3$
   e. CO$_3^-$
9. Which of the following molecules has the highest boiling point?
   a. Nonane
   b. Decane
   c. Hexane
   d. Heptane
   e. Octane
10. Which of the following acids can be described as triprotic?
   a. Sulfuric acid
   b. Carbonic acid
   c. Hydrochloric acid
   d. Hydrochloric acid
   e. Phosphoric acid
11. Carbonic aid is supplied from the chemical companies as a 87% (m/m) solution in water with a solution density of 1.560 g/mL. What is the concentration of the acid in units of molarity?
   a. 10.4
   b. 13.7
   c. 21.8
   d. 28.6
   e. 32.3
12. Which of the following molecules has the largest atomic radius?
   a. Francium
   b. Bromine
   c. Chlorine
   d. Fluorine
   e. Iodine
13. Which of the following molecules has the highest metallic character?
   a. Magnesium
   b. Calcium
   c. Strontium
   d. Barium
   e. Cesium
14. Which of the following molecules has the lowest electronegativity?
   a. Chlorine
   b. Lead
   c. Boron
   d. Barium
   e. Radium
15. Which of the following chemical lewis structures does NOT abide by the octet rule?
   a. BF$_3$
   b. CO$_2$
   c. PCl$_5$
   d. A and B
   e. A and C
16. What is the shorthand electron configuration for copper?
   a. [Ar] 4s13d10
   b. [Ar] 4s23d7
   c. [Ne] 4s23d7
   d. [Ne] 4s23d9
   e. [Ar]4s23d9
17. Draw the lewis structure of the phosphate anion
18. Draw the Lewis structure of a thiocyanate anion (SCN-).
19. What is the parent structure and actual structure of PCl₅?
20. Which of the following molecules has the highest bond angle?
   a. Cl₂
   b. H₂O
   c. CCl₄
   d. CH₄