FUNDAMENTALS OF CHEMISTRY TEST #4 (Chapters 9–10)

1. What is a chemical reaction? **A change in chemical composition when two or more types of matter contact one another (or are heated).**
2. What is another name for combustion? **Burning.**
3. In this general chemical reaction, what are the reactants and products? **C_3H_8 and O_2 are the reactants and CO_2 and H_2O are the products.**
4. What is the significance of the arrow in the above equation? **The arrow signifies a chemical reaction occurred.**
5. The equation in question 3 is not balanced. What is the name of a chemical equation that correctly shows the reactants and products but isn't balanced? **A skeletal equation.**
6. Write the balanced equation for question 3. 6. **$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$**
7. What are the numbers called the are placed in front of the reactants and products to balance chemical reaction equations? **Reaction coefficients.**
8. What is the name of the law that requires us to balance skeletal equations? **Law of conservation of mass.**
9. Write and balance the following reactions:
   a. $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
   b. $2H_2 + O_2 \rightarrow 2H_2O$
   c. $3C + SeO_2 \rightarrow CSe + 2CO$
   d. $Li_2S + SrI_2 \rightarrow 2LiI + SrS$
   e. $3Ca + 2GaCl_3 \rightarrow 2Ga + 3CaCl_2$
   f. $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$
10. What kind of reaction is $Ca + Cl_2 \rightarrow CaCl_2$? **A combination reaction.**
11. What kind of reaction is $2Ag_2O \rightarrow 4Ag + 2O_2$? **A decomposition reaction.**
12. List at least 5 changes you can pick up with your senses that a chemical reaction is occurring/has occurred. **A combination of the following to get a total of five: temperature change, color change, sound production, bubble or foam production, smoke formation, light production, odor, change in taste, formation of a precipitate.**
13. True or False? An aqueous environment is one where water serves as the basis of the solution. **True.**
14. Choose the correct statements. **c, d and f are correct.**
15. True or False? Arrhenius acids are bases are soluble in water. **True.**
16. True or False? When in solution, a hydrogen ion, (H^+) dissociates from the acid molecule. **True.**
17. True or False? A hydrogen ion is the same thing as a proton. **True.**
18. Why is this Arrhenius acid equation—Acid-H + $H_2O \rightarrow$ $Acid^-$ + H_3O —preferred over Acid-H + $H_2O \rightarrow$ $Acid^-$ + H+ + H_2O? **Research revealed that the hydrogen ion is not floating free in the aqueous solution but bonds to a water molecule to form H_3O.**
19. What is the term for H_3O^+? **Hydronium ion.**
20. True or False? An acid is also called an alkaline substance. **False.**
21. What is the term for this ion? **Hydroxide ion.**
22. True or False? Arrhenius bases usually contain an alkali metal. **True.**
23. Write the equation for potassium hydroxide dissolving into water. **$KOH \xrightarrow{H_2O} K^+ + OH^-$**
24. Write the equation for hydrobromic acid dissolving in water. **$HBr + H_2O \rightarrow Br^- + H_3O$**
25. What is a stronger acid, a substance with a pH of 3.8 or 14.2? **3.8 is a stronger acid.**
26. What is the term for a solution with a pH of 7? **Neutral.**
27. What is the difference in concentration of H_3O^+ ions between a solution with a pH of 6 and a pH of 9? **A pH 6 solution has 1,000 times more hydronium ions than a pH 9 solution.**

28. What is the name for a substance that is added to a solution and changes color based upon the pH of the solution? **An indicator.**
29. What two substances are always produced in an acid-base neutralization reaction? **A salt and water.**
30. Write the neutralization reaction that occurs when hydrochloric acid is mixed with rubidium hydroxide. **HCl + RbOH → RbCl + H_2O.**
31. True or False? In an acid base neutralization reaction, the metal of the base is an anion and the non-metal of the acid is a cation. **False.**