1. The reaction of glucose, $C_6H_{12}O_6$, with oxygen produces carbon dioxide and water. What is the sum of the stoichiometric coefficients in the balanced equation?
   a) $19 +0$
   b) $17 -0$
   c) $12 -0$
   d) $6 -0$

2. Which of the following is a nonpolar molecule?
   a) $H_2S -0$
   b) $CO_2 +0$
   c) HF -0
   d) $NH_3 -0$

3. Which of the following does not have the same electron configuration as a noble gas
   a) $S^2 -0$
   b) $Al^{3+} -0$
   c) $Sb^{5+} +0$
   d) Ar -0

4. A sample of a 20.0 % solution of KCl in water has a mass of 400 g. What mass of KCl is contained in this sample?
   a) 20.0 g -0
   b) $80.0 g +0$
   c) 320 g -0
   d) 400 g -0

5. What is the molarity of the resulting solution when 300 ml of a 0.600 M aqueous solution is diluted by the addition of 400 ml of water? Assume volumes are additive.
   a) $0.257 M +0$
   b) 0.450 M -0
   c) 0.800 M -0
   d) 1.40 M -0

6. What mass of silver nitrate is dissolved in 40.0 ml of a 0.400 M aqueous solution of silver nitrate?
   a) 0.272 g -0
   b) $2.72 g +0$
   c) 27.2 g -0
   d) 272 g -0

7. Acids react with carbonates to produce
   a) hydrogen -0
   b) carbon dioxide +0
   c) nitrogen -0
   d) oxygen -0
8. Which of the following describes reagents, whose reaction will form calcium sulfate?
   a) CaOH and H₂SO₃ -0
   b) CaOH and H₂SO₄ -0
   c) Ca(OH)₂ and H₂SO₃ -0
   d) Ca(OH)₂ and H₂SO₄ +0

9. How many times higher is the hydrogen ion concentration in a solution with a pH of 3 than that with a pH of 5?
   a) 2 times -0
   b) 10 times -0
   c) 100 times +0
   d) 1000 times -0

10. Which is a conjugate acid-base pair in the following equation?
    H₂SO₄ + H₂O ——→ HSO₄⁻ + H₃O⁺
    a) H₂SO₄ and HSO₄⁻ +0
    b) H₂SO₄ and H₂O -0
    c) HSO₄⁻ and H₃O⁺ -0
    d) H₃O⁺ and H₂SO₄ -0

11. What is the concentration of a HCl solution if 20.0 ml of the solution is neutralized by 15.0 ml of a 0.10 M Ca(OH)₂ solution?
    a) 0.075 M -0
    b) 0.038 M -0
    c) 0.15 M +0
    d) 0.13 M -0

12. In which direction will the point of equilibrium shift when the pressure is increased in the following equilibrium? N₂ (g) + 3 H₂ (g) ⇌ 2 NH₃ (g)
    a) shift to the right +0
    b) shift to the left -0
    c) no shift -0
    d) the reaction does not proceed -0

13. What will be the [H⁺] in a 0.50 M solution of HClO? The Kₐ of HClO = 3.5 × 10⁻⁸.
    a) 1.8 × 10⁻⁸ M -0
    b) 7.0 × 10⁻⁸ M -0
    c) 1.3 × 10⁻⁴ M +0
    d) 1.9 × 10⁻⁴ M -0

14. How many moles of electrons are needed to reduce 1 mol MnO₄⁻ to 1 mol Mn²⁺?
    a) 1 mol -0
    b) 3 mol -0
    c) 4 mol -0
    d) 5 mol +0
15. PbO₂ is correctly named
   a) lead oxide -0  
   b) lead dioxide -0  
   c) lead(II) oxide -0  
   d) lead(IV) oxide +0

16. Isopropyl alcohol, CH₃CH(OH)CH₃, is classified as a
   a) primary alcohol -0  
   b) secondary alcohol +0  
   c) tertiary alcohol -0  
   d) glycol -0

17. Sugar molecules easily dissolve in water because
   a) they have multiple hydroxyl groups +0  
   b) they have multiple ether groups -0  
   c) they have a ring structure -0  
   d) they have polar carbon-carbon double bonds -0

18. Ethanol is converted to which compound during the first reaction of ethanol metabolism in humans?
   a) Ethane -0  
   b) Acetic acid -0  
   c) Acetaldehyde +0  
   d) Diethyl ether -0

19. Which of the following reactions cannot form an alcohol?
   a) hydrolysis of an ester -0  
   b) hydration of an alkene -0  
   c) fermentation -0  
   d) dehydration +0

20. Which of the following is a correct name for this compound? H —C=O
   a) formaldehyde +0  
   b) methanone -0  
   c) methanol -0  
   d) None is correct -0

21. Which of the following amino acids contains sulfur?
   a) asparagine -0  
   b) methionine +0  
   c) histidine -0  
   d) threonine -0
22. Identify the product formed from the reduction of acetone.
   a) 1-propanol -0  
   b) **2-propanol +0**
   c) propene -0  
   d) propanal -0  

23. Which of the following is the correct formula for acetic acid?
   a) HCOOH -0  
   b) **CH₃COOH +0**
   c) CH₃OCOOH -0  
   d) CH₃CH₂COOH -0  

24. What is this compound? H—C—OCH₃
   a) aldehyde -0  
   b) ether -0  
   c) acid -0  
   d) **ester +0**  

25. Soaps can be produced by a reaction of fat with sodium hydroxide. What small molecule is also produced as a byproduct?
   a) ethanol -0  
   b) ethylene glycol -0
   c) **glycerol +0**
   d) water -0  

26. Which of the following is not a heterocyclic compound?
   a) choline +0  
   b) histamine -0  
   c) purine -0  
   d) serotonin -0  

27. Bees have an enzyme known as invertase. This allows bees to split sucrose into the following two monosaccharides
   a) **fructose and glucose +0**
   b) sucrose and glucose -0
   c) mannose and glucose -0
   d) galactose and fructose -0  

28. Which of the following is **not** true of fructose?
   a) **It is an aldohexose +0**  
   b) Is found in many plants -0  
   c) It is the sweetest common sugar -0  
   d) It is a hexose -0
29. Phosphatidylcholine is an example of a
a) glycolipid -0
b) wax -0
c) triacylglycerol -0
d) phospholipid +0

30. Which of the following is not a component of ATP?
   a) ribose -0
   b) adenine -0
c) thymine +0
d) triphosphate -0