

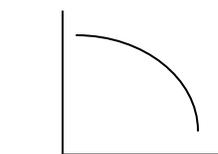
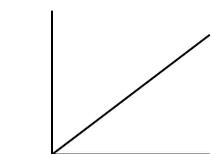
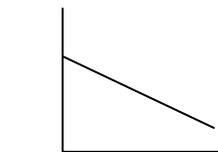
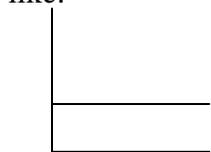
## Units 1 – 5

## 1--INTRODUCTION TO CHEMISTRY

1. Which two pieces of equipment are specifically designed to measure the volume of liquids most precisely?

i.	Beaker
ii.	Erlenmeyer flask
iii.	Buret
iv.	Graduated Cylinder

- a) i and iv                      c) ii and iv  
b) iii and iv                  d) i and ii
2. The “glowing splint test” is a test for  
a) O<sub>2</sub>                              c) H<sub>2</sub>  
b) CO<sub>2</sub>                          d) CH<sub>4</sub>
3. If we mix hydrogen peroxide and yeast, which gas will be formed?  
a) O<sub>2</sub>                              c) H<sub>2</sub>  
b) CO<sub>2</sub>                          d) CH<sub>4</sub>
4. The “limewater test” is a test for  
a) O<sub>2</sub>                              c) H<sub>2</sub>  
b) CO<sub>2</sub>                          d) CH<sub>4</sub>
5. If we graph the mass vs. volume of four objects made of the same material, the graph would look like:

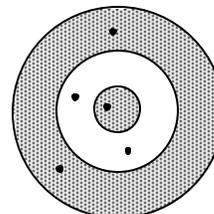


## MIDTERM PRACTICE EXAM

6. During a demonstration using light sticks, one light stick is kept at room temperature for comparison. This is called a(n) \_\_\_\_\_  
a) experimental control.  
b) experimental variable.  
c) source of error.  
d) experimental standard.
7. Why is it dangerous to dilute sulfuric acid by pouring water into the concentrated acid?  
a) A fire may be started.  
b) The water may decompose.  
c) A poisonous gas may be evolved.  
d) The heat liberated may cause spattering.

## 2--MEASUREMENT

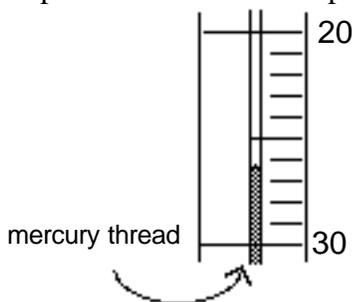
8. Which one of the following statements is true?  
a) 1000 cm = 1 m  
b) 1 mm =  $\frac{1}{100}$  meter  
c) 1 kg = 1000 g  
d) each of these statements is true
9. The marks on the following target represent someone who is:



- a) accurate, but not precise.  
b) precise, but not accurate.  
c) both accurate and precise.  
d) neither accurate nor precise.

10. The density of copper is known to be 8.96 g/mL. A student's experimental result shows that the density of her copper cube is 8.79 g/mL. The percent error in this data is \_\_\_\_\_.
- a) 1.93 %                      c) 1.90 %  
b) 0.17 %                      d) 0.98 %

11. Which measurement below shows the temperature to the correct precision?



- a) 26.3 °C                      c) 26.25 °C  
b) 26 °C                      d) 26.30 °C
12. Which measurement is the most precise?
- a)  $5.6 \pm .1$  g                      c)  $2.3 \pm .2$  g  
b)  $3.5 \pm .4$  g                      d)  $4.2 \pm .3$  g

### 3--PROBLEM SOLVING

13. What conversion factor would you use to convert from feet to inches?
- a)  $\frac{1 \text{ foot}}{12 \text{ inches}}$                       c)  $\frac{12 \text{ feet}}{1 \text{ inch}}$   
b)  $\frac{12 \text{ inches}}{1 \text{ foot}}$                       d)  $\frac{1 \text{ inch}}{12 \text{ feet}}$
14. What conversion factor would you use to convert milligrams to grams?
- a)  $\frac{1000 \text{ mg}}{1 \text{ g}}$                       c)  $\frac{1 \text{ gram}}{1000 \text{ mg}}$   
b)  $\frac{1 \text{ mg}^2}{10 \text{ g}^2}$                       d)  $1 \text{ g} = 1000 \text{ mg}$
15. Which value is the same as  $1.52 \times 10^{-3}$ ?
- a) 0.000152                      b) 152,000  
c) 1520                      d) 0.00152

### 4--MATTER

16. Which property is always conserved during a chemical reaction?
- a) mass                      c) pressure  
b) volume                      d) solubility
17. A cube of metal measures 2 cm on each side. It's mass is 90.4 grams. What kind of metal is the cube made of?
- a) Fe (7.86 g/mL)                      c) Au (19.3 g/mL)  
b) Al (2.70 g/mL)                      d) Pb (11.3 g/mL)
18. Which process is a chemical change?
- a) The melting of ice.  
b) The burning of a candle.  
c) The magnetizing of steel.  
d) The liquifaction of oxygen.
19. Which set consists only of elements?
- a) Na, Ca, H<sub>2</sub>  
b) H<sub>3</sub>O<sup>+</sup>, Cl<sup>-</sup>, I<sub>3</sub><sup>-</sup>  
c) NaCl, CH<sub>4</sub>, Br<sub>2</sub>  
d) H<sub>2</sub>S, CuCl<sub>2</sub>, KI

20. The second most abundant gas in the atmosphere is
- a) CO<sub>2</sub>                      c) N<sub>2</sub>  
b) Ar                      d) O<sub>2</sub>

### 7--CHEMICAL FORMULAS

21. Which one of the following is the correct formula for calcium phosphate?
- a) CaPO<sub>4</sub>                      c) Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>  
b) PO<sub>4</sub>Ca<sub>3</sub>                      d) Ca<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>
22. What is the name of the compound N<sub>2</sub>O<sub>3</sub>?
- a) nitrate  
b) dinitrogen trioxide  
c) nitrogen oxide  
d) dinitrogen trioxygen

23. In the compound  $\text{Sn}(\text{SO}_4)_2$ , what is the name of the positive ion?

- a) strontium                      c) stannic  
b) tin(II)                         d) stannous

24. The acid,  $\text{H}_2\text{CO}_3$ , is called

- a) hydrocarbonic acid  
b) carbonic acid  
c) dihydrogen carbonate  
d) hydrogen carbonate

### 8--THE MATH OF CHEMICAL FORMULAS

25. What is the volume of 0.500 mole of carbon dioxide gas,  $\text{CO}_2$ , measured at STP?

- a) 5.60 liters                      c) 33.6 liters  
b) 11.2 liters                      d) 44.8 liters

26. How many moles of hydrogen cyanide,  $\text{HCN}$ , are contained in 9.00 grams of  $\text{HCN}$ ? (molar mass = 27.03 g/mol)

- a) 0.900                              c) 1.00  
b) 0.333                              d) 9.00

27. How many molecules are in  $2.00 \times 10^{-2}$  moles of carbon tetrachloride,  $\text{CCl}_4$ ? (molar mass = 154 g/mol)

- a)  $1.20 \times 10^{22}$                       c)  $3.01 \times 10^{23}$   
b)  $1.20 \times 10^{23}$                       d)  $6.02 \times 10^{23}$

28. What is the percent of carbon in barium carbonate,  $\text{BaCO}_3$ ?

(molar mass = 197.3 g/mol)

- a) 3.04%                              c) 14.0%  
b) 6.09%                              d) 20.0%

29. What is the mass of one mole of aluminum sulfate,  $\text{Al}_2(\text{SO}_4)_3$ ?

- a) 630 g                                c) 273 g  
b) 342 g                                d) 123 g

### 9--CHEMICAL EQUATIONS

30. Which set of coefficients balances the equation for the complete combustion of ethane,  $\text{C}_2\text{H}_6$ ?

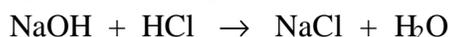


- a) 1,3,2,3                              c) 2,6,4,5  
b) 1,6,2,6                              d) 2,7,4,6

31. When this expression is balanced,  $2 \text{C}_3\text{H}_6 + \underline{\quad} \text{O}_2 \rightarrow \underline{\quad} \text{CO}_2 + 6 \text{H}_2\text{O}$  what is the coefficient of oxygen,  $\text{O}_2$ ?

- a) 6                                        c) 12  
b) 9                                        d) 18

32. During a "titration lab," an acid was neutralized by the following reaction:



This reaction would be classified as...

- a) synthesis  
b) decomposition  
c) double replacement  
d) single replacement

33. The complete combustion of ethane,  $\text{C}_2\text{H}_6$ , produces

- a)  $\text{C}_2\text{H}_5\text{OH}$                               c)  $\text{CO}_2$  and  $\text{H}_2$   
b)  $\text{CH}_3\text{COOH}$                             d)  $\text{CO}_2$  and  $\text{H}_2\text{O}$

34. Which reaction below would be classified as a single replacement reaction?

- a)  $\text{NaHCO}_3 \rightarrow \text{NaOH} + \text{CO}_2$   
b)  $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$   
c)  $2 \text{AgNO}_3 + \text{Cu}^\circ \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}^\circ$   
d)  $\text{Ba}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2 \text{H}_2\text{O}$

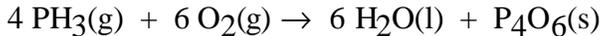
### 10--THE MATH OF CHEMICAL EQUATIONS

35. What mass of sulfur dioxide,  $\text{SO}_2$  (64.0 g/mole), is produced when 245 g of sulfuric acid,  $\text{H}_2\text{SO}_4$  (98.0 g/mole) reacts completely with zinc metal?



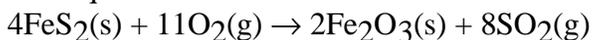
- a) 64.0 g                                c) 128 g  
b) 80.0 g                                d) 160 g

36. At STP, how many Liters of oxygen gas react with 4.00 moles of  $\text{PH}_3$  according to this equation?



- a) 32.0                      c) 134  
b) 89.6                      d) 146

37. How many moles of  $\text{FeS}_2$  are required to produce 64 grams of  $\text{SO}_2$  according to the equation



- a) 0.40                      c) 3.2  
b) 0.50                      d) 4.5

### 16--SOLUTIONS

38. In a sample of salt water, the salt is called the

- a) solvent                      c) solution  
b) solute                      d) precipitate

39. How many grams of sodium hydroxide pellets,  $\text{NaOH}$ , are required to prepare 50.0 mL of a 0.150 M solution?

[molar mass  $\text{NaOH} = 40.0 \text{ g/mol}$ ]

- a) 0.300                      c) 3.00  
b) 2.00                      d) 200.

40. If 50 mL of a 200 mL sample of 0.10 M sodium chloride solution is spilled, what is the concentration of the remaining solution?

- a) 0.20 M                      c) 0.075 M  
b) 0.10 M                      d) 0.025 M

41. A 100 mL sample of a solution with a concentration of 5.00 M is diluted to a new volume of 400 mL with distilled water. The new concentration will be

- a) 1.25 M                      c) 1.66 M  
b) 20.0 M                      d) 15.0 M

### 17--CHEMICAL KINETICS & THERMODYNAMICS

42. Which one of the following changes will result in a **decreased** rate of reaction?

- a) adding a catalyst  
b) heating up the reactants  
c) cutting the reactants into smaller pieces  
d) diluting the reactants

43. A catalyst is a substance that...

- a) oxidizes undesired waste products.  
b) changes the rate & doesn't get used up.  
c) lowers the energy of the reactants.  
d) increases the kinetic energy of the molecules.

44. Increasing the surface area of a solid mixed with a gas will

- a) slow down a reaction.  
b) increase the rate of reaction.  
c) have no effect on reaction rate.

### 19--ACIDS, BASES AND SALTS

45. A solution that conducts electricity very well is called a:

- a) weak electrolyte  
b) strong electrolyte  
c) metallic solution  
d) liquid conductor

Describe these household substances:

- a) acidic    b) basic    c) neutral

46. Sugar water                      \_\_\_

47. Vinegar                              \_\_\_

48. Rubbing Alcohol                      \_\_\_

49. Milk of Magnesia                      \_\_\_

50. Household ammonia                      \_\_\_

### Questions 51 - 55

Match the household chemical with its formula

- \_\_\_51. Vinegar                      a)  $\text{NaOH}$   
\_\_\_52. Pool Acid                      b)  $\text{NaHCO}_3$   
\_\_\_53. Rubbing Alcohol                      c)  $\text{HCl}$   
\_\_\_54. Drano                      d)  $\text{HC}_2\text{H}_3\text{O}_2$   
\_\_\_55. Baking Soda                      e)  $\text{C}_3\text{H}_7\text{OH}$

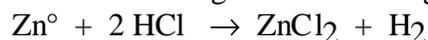
56. Acids are substances that
- increase the [H<sup>+</sup>]
  - increase the [OH<sup>-</sup>]
  - decrease the [H<sup>+</sup>]
  - decrease the [H<sub>2</sub>O]
57. A property of acids are that they
- taste sour
  - taste bitter
  - feel slippery
  - neutralize water
58. A substance that turns cabbage juice blue and slightly lights up a light bulb is a:
- strong acid
  - strong base
  - weak acid
  - weak base
59. Which of the following substances is a base?
- H<sub>2</sub>O
  - HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>
  - Ca(OH)<sub>2</sub>
  - H<sub>2</sub>SO<sub>4</sub>

## 20—ACID-BASE REACTIONS

60. When an acid and a base react, the products are
- salt and water
  - salt and base
  - base and acid
  - water and acid
61. When NaOH is mixed with H<sub>2</sub>SO<sub>4</sub>, one of the products is
- Na<sub>2</sub>SO<sub>4</sub>
  - H<sub>2</sub>OH
  - H<sub>2</sub>
  - NaSO<sub>4</sub>

## 21--OXIDATION AND REDUCTION

62. During the “ornament lab,” hydrogen gas was produced according to the following equation:



Which chemical was oxidized?

- Zn<sup>°</sup>
- HCl
- ZnCl<sub>2</sub>
- H<sub>2</sub>

63. At winter break, we made a “Chemist’s Tree” by using the reaction:
- $$\text{Cu}^{\circ} + 2\text{Ag}^+ \rightarrow 2 \text{Ag}^{\circ} + \text{Cu}^{2+}$$
- The copper, Cu<sup>°</sup>, is \_\_\_\_ electrons and being \_\_\_\_.
- gaining, oxidized
  - gaining, reduced
  - losing, oxidized
  - losing, reduced
64. When we reacted AgNO<sub>3</sub> and K<sub>2</sub>CrO<sub>4</sub> to form Ag<sub>2</sub>CrO<sub>4</sub> and KNO<sub>3</sub>, \_\_\_\_\_ was oxidized.
- silver ion
  - nitrate ion
  - chromate ion
  - nothing (it wasn’t a Redox reaction)

## 24--ORGANIC CHEMISTRY

65. The general formula C<sub>n</sub>H<sub>2n</sub> describes the molecular composition of the hydrocarbon family known as the
- alkanes
  - alkenes
  - alkynes
  - alkadienes
66. Structural formulas have advantages over molecular formulas because they show the
- bonding capacity of each carbon atom.
  - geometric arrangement of the atoms.
  - number of atoms of each element present.
  - percentage composition of the compound.
67. Organic chemistry is the branch of chemistry that is the study of
- compounds of carbon.
  - nonmetals.
  - once-living organisms.
  - compounds produced by living organisms.
68. The number of isomers of bromopropane, C<sub>3</sub>H<sub>7</sub>Br is
- 2
  - 3
  - 4
  - 7

