Practice Spring Final Exam

1. Which is considered matter?
   (A) energy (B) rain (C) an idea (D) a dream

2. Which is **NOT** part of the definition of matter?
   (A) Something that you can see with your eyes.
   (B) Something that has mass.
   (C) Something that has volume.
   (D) Something that takes up space.

3. What piece of lab equipment would you use to accurately measure the volume of a liquid?
   (A) beaker (B) test tube (C) graduated cylinder (D) hot plate

4. What is the density of a liquid sample if the volume is 25 mL and the mass is 20 grams?
   (A) 0.8 g/mL (B) 1.3 g/mL (C) 45 g/mL (D) 500 g/mL

5. In a solution of silver nitrate, water is the
   (A) solute (B) solvent (C) solution (D) element

6. The correct way to represent a solution of copper nitrate is
   (A) Cu (s) (B) Cu (aq) (C) $Cu(NO_3)_2$ (s) (D) $Cu(NO_3)_2$ (aq)

7. Which elements would you expect to have similar properties?
   (A) C and Si (B) Cu and Zn (C) N and O (D) H and He

8. The Group VIII elements are called
   (A) alkali metals (B) alkaline earth metals
   (C) noble gases (D) halogens

9. Which of the following is a transition metal?
   (A) Na (B) Sn (C) Al (D) Fe

10. The least reactive group of elements on the periodic table is the
    (A) alkali metals (B) noble gases (C) halogens (D) transition metals

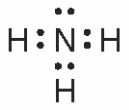
11. How many bonds should carbon form in a structural formula?
    (A) 1 (B) 2 (C) 3 (D) 4

12. How many lone pairs are in a Lewis dot diagram of PH_3?
    (A) 1 (B) 2 (C) 3 (D) 4

13. A chlorine atom forms bonds in order to get how many total valence electrons?
    (A) 2 (B) 4 (C) 6 (D) 8

14. In a double bond, the atoms share
    (A) 1 electron (B) 2 electrons (C) 3 electrons (D) 4 electrons

15. The picture below is which type of representation of a molecule?



    (A) Lewis dot diagram (B) structural formula
    (C) molecular formula (D) ball-and-stick model

16. Which is NOT one of the five smell categories?

(A) sweet (B) putrid (C) stinky (D) fishy

17. In an ionic bond the electrons

(A) are shared equally (B) are shared unequally

(C) are not shared at all (D) are not involved in bonding

18. Which of these elements has the greatest electronegativity?

(A) Fr (B) At (C) Li (D) O

19. If the electronegativity difference between two atoms is extremely small, what type of bond will they form?

(A) ionic (B) polar covalent (C) nonpolar covalent (D) nonpolar ionic

20. Given equal masses, which substance takes up the least volume?

(A) Rb (1.53 g/mL) (B) Si (2.33 g/mL) (C) Li (0.534 g/mL) (D) Sb (6.69 g/mL)

21. When you make a measurement using a piece of equipment, you should read

(A) only the numbers you can read off of the piece of equipment.

(B) the numbers you can read off of the piece of equipment plus one more estimated number.

(C) the numbers you can read off of the piece of equipment plus two more estimated numbers.

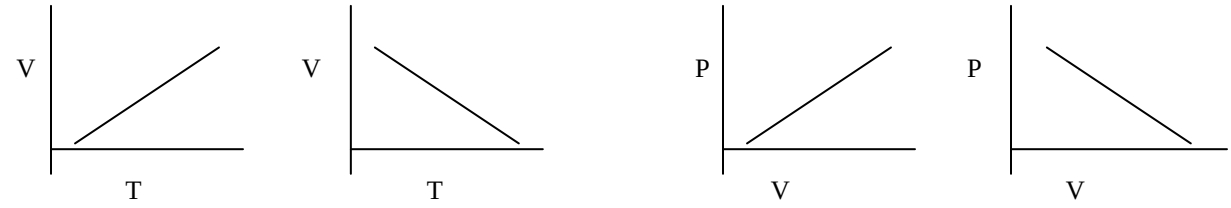
(D) the numbers you can read off of the piece of equipment plus three more estimated numbers

22. Convert 33°C to K.

(A) 300 K (B) 450 K (C) 250 K (D) 306 K

23. Which is the correct graph for the relationship between volume and temperature?

(A) (B) (C) (D)



24. Calculate the volume that 0.881 mol of gas at STP will occupy.

(A) 19.7 L (B) 22.4 L. (C) 22.4 atm (D) 19.7 mmHg

25. The weather news gives the atmospheric pressure as 2.00 atm. What is this atmospheric pressure in torr?

(A) 760 torr (B) 4.81 torr (C) 1813 torr (D) 1520 torr

26. A gas has a volume of 500.0 mL at -23.00 °C and 300.0 torr. What would the volume of the gas be at 227.0 °C and 600.0 torr of pressure?

(A) 50 L (B) 500 mL (C) 60 mL (D) 600 L

27. Assuming that the temperature of a gas stays constant, what happens to pressure when the volume increases?

(A) It decreases. (B) It increases.

(C) It remains constant. (D) It is always 0.08205 L*atm/K*mol.

28. A mole is equal to

(A) 12 (B) STP (C) 0.08206 (D) 6.02×10^{23}

29. Which weighs more, 100 atoms of He or 100 moles of He?

(A) both weigh the same (B) 100 atoms of He

(C) 100 moles of He (D) cannot determine which weighs more

30. A gas occupies 1.56 L at 1.00 atm. What will be the volume of this gas if the pressure becomes 4.00 atm?

(A) 3.90 L (B) 0.39 L (C) 0.520 L (D) 520 L

31. Which gas law would you use to solve the following problem? At 1.1 atm, the volume of a beach ball is 2.3 L. Assuming that the temperature is constant, at what pressure will the volume of the balloon be 1.7 L?

(A) $P_1V_1 = P_2V_2$ (B) $P_1V_1/T_1 = P_2V_2/T_2$

(C) $V_1/T_1 = V_2/T_2$ (D) $PV = nRT$

32. What is the answer to the question above?

(A) 1.5 atm (B) 0.8 atm (C) 3.6 atm (D) 4.3 atm

33. Assuming that the temperature of a gas stays constant, what happens to pressure when the volume increases?

(A) It decreases. (B) It increases.

(C) It remains constant. (D) It is always 0.08205 L*atm/K*mol.

34. How many atoms are in 25 L of Ne gas?

a. 6.02×10^{23} b. 1.5×10^{25} c. 4.2×10^{23} d. 6.7×10^{23}

35. Which of the following represents STP?
(A) 25°C, 760 mm Hg (B) 0°C, 101.3 kPa (C) 0 K, 1 atm (D) 0 K, 760 atm

36. How much space do $5.7x10^{28}$ molecules of oxygen gas occupy?
(A) 4227 L (B) $2.1x10^{6}$ mL (C) $1.53x10^{51}$ L (D) $2.1x10^{6}$ L

37. The mass of one mole of $Ca(OH)_2$ is:
(A) 29 g (B) 38 g (C) 57 g (D) 74 g

38. How many moles are in 100 g of O_2 gas?
(A) 1 mol (B) 1.3 mol (C) 3.1 mol (D) 6.3 mol

39. You have 3 L of H_2 gas in a balloon and 3 L of O_2 gas in another balloon. The balloon with H_2 gas floats, while the balloon with O_2 gas falls to the ground. Which of the following is NOT true?
(A) Both have the same volume. (B) Both have the same number of moles.
(C) The O_2 balloon has more molecules. (D) Oxygen gas is more dense than hydrogen gas.

40. If a solution has a pH of 5, it is
(A) an acid (B) a base (C) neutral (D) an indicator

41. To dilute an acid, you would use
(A) an acid (B) a base (C) an indicator (D) water

42. The correct chemical formula for aluminum hydroxide is
(A) Al_2OH (B) $Al_2(OH)_3$ (C) $Al(OH)_2$ (D) $Al(OH)_3$

43. If you have 3 moles of glucose in 6 liters of solution, what is the molarity of the solution?
(A) 18 M (B) 2 M (C) 0.5 M (D) 3 M

44. Which of the following is one of the correct products of this chemical reaction?
$CaCl_2 + Al(NO_3)_3 \rightarrow$ ____ + ____
(A) CaAl (B) $Cl_3(NO_3)_2$ (C) $AlCl_2$ (D) $AlCl_3$

45. How many moles of sodium nitrate are in 0.75 liters of a 0.5 M $NaNO_3$ solution?
(A) 1.5 moles (B) 0.375 moles (C) 0.67 moles (D) $3.75x10^{-4}$ moles

46. When the equation $Fe_2O_3 + H_2 \rightarrow Fe + H_2O$ is balanced, Fe has a coefficient of
(A) 6 (B) 3 (C) 2 (D) 1

47. What type of reaction is this: $AgNO_3$ (aq) + Cu (s) → Ag (s) + $Cu(NO_3)_2$ (aq)?
(A) single displacement (B) double displacement (C) combination (D) decomposition

48. What is the pH of sour pickles if $[OH^-] = 1.6 \times 10^{-10}$M?
(A) 9.8 (B)4.2 (C) 3.6 (D) -9.8

49. Which of the following is one of the correct products of the chemical reaction
$Li + Pb(NO_3)_2 \rightarrow$ ____ + ____ ?
(A) Li_2Pb (B) Pb (C) Li $(NO_3)_2$ (D) PbLi

50. What is the pOH of peaches if the pH is 4.7?
(A) 4.7 (B)7 (C) 9.3 (D) 14

51. How many moles of 0.84 M sodium chloride solution would you need to have if you want to have 3.5 liters of NaCl?
(A) 4.17 moles (B) 2.94 moles (C) 0.24 moles (D) 172 moles

52. If 55g of NaOH was dissolved in 550 mL of water, what is the molarity?
(A) 2.5 M (B) 1 M (C) 7.2 M (D) 3 M

53. How many moles of salt are in a 0.50 liter 2.0 M solution?
(A) 3 mol (B) 1 mol (C) 4 mol (D) 8 mol

54. How many liters of water need to be added to 2.8 moles of nitric acid to prepare a 2.0 M solution?
(A) 8.6L (B) 10.3 L (C) 2.2 L (D) 1.4 L

55. According to this balanced equation, how many moles of Cu are required to produce 30 moles of Ag?
$Cu + 2\ AgNO_3 \rightarrow 2\ Ag + Cu(NO_3)_2$
(A) 5 moles (B) 10 moles (C) 15 moles (D) 20 moles

56. In order to balance a chemical equation, you can change
(A) the subscripts (B) the chemical formulas (C) the reactants and the products (D) the coefficients

57. Which of the following is one of the correct products of this chemical reaction?
$Na_2S + Fe(NO_3)_2 \rightarrow$ ____ + ____
(A) Na_2Fe (B) $S(NO_3)_2$ (C) $Na(NO_3)_2$ (D) FeS

58. When the equation $Fe_2O_3 + H_2 \rightarrow Fe + H_2O$ is balanced, H_2 has a coefficient of
(A) 6 (B) 3 (C) 2 (D) 1

59. Consider the following reaction:
$Mg\ (s) + 2\ HCl\ (aq) \rightarrow MgCl_2\ (aq) + H_2\ (g)$
How many liters of hydrogen, H_2, do you produce if 200 grams of hydrochloric acid, HCl reacts?
(A) 246.4 L (B) 50 L (C) 62.2 L (D) 101 L

60. Consider the following reaction:

$Mg\ (s) + 2\ HCl\ (aq) \rightarrow MgCl_2\ (aq) + H_2\ (g)$

How many atoms of magnesium, Mg, do you need to produce 190 grams of magnesium chloride, $MgCl_2$?

(A) 1.2×10^{24} (B) 1.2×10^{23} (C) $12. \times 10^{24}$ (D) 6.0×10^{24}

61. Balance the following equation: $Na\ (s) + O_2\ (g) \rightarrow Na_2O$. What coefficient will be in front of Na_2O?

(A) 1 (B) 2 (C) 3 (D) 4

62. Balance the following equation: $Fe\ (s) + O_2\ (g) \rightarrow Fe_2O_3\ (s)$. What coefficient will be in front of O_2?

(A) 1 (B) 2 (C) 3 (D) 4

63. How many grams of MgO will you produce if you start with 80.0g of O_2?

$2Mg + O_2 \rightarrow 2MgO$

(A) 200 (B) 50 (C) 440 (D)101

64. According to this balanced equation, how many moles of Cu are required to produce 10 moles of $AgNO_3$?

$Cu + 2\ AgNO_3 \rightarrow 2\ Ag + Cu(NO_3)_2$

(A) 5 moles (B) 10 moles (C) 15 moles (D) 20 moles

65. When the equation $Fe_2O_3 + H_2 \rightarrow Fe + H_2O$ is balanced, Fe has a coefficient of

(A) 6 (B) 3 (C) 2 (D) 1

66. How many moles of iron, Fe, are produced with 25.0 grams of magnesium, Mg?

$3\ Mg + 1\ Fe_2O_3 \rightarrow 2\ Fe + 3\ MgO$

(A) 0.686 moles (B) 3 moles (C) 1.5 moles (D) 6 moles

67. Acetylene gas (C_2H_2) is produced as a result of the following reaction.

$CaC_2(s) + 2H_2O(l) \rightarrow C_2H_2(g) + Ca(OH)_2(aq)$

If 3.2 moles of CaC_2 are consumed in this reaction, how many grams of H_2O are needed?

(A) 12.8g (B) 6.4 g (C) 115.2 g (D) 60 g

68. Acetylene gas, C_2H_2, is used in welding, produces an extremely hot flame when it burns in pure oxygen according to the following reaction.

$2\ C_2H_2(g) + 5O_2(g) \rightarrow 4CO_2(g) + 2H_2O(g)$

How many moles of CO_2 are produced when 250.0 g of C_2H_2 burns completely?

(A) 19.23 moles (B) 9.6 moles (C) 38.46 moles (D) 60 moles

69. Laughing gas (nitrous oxide, N_2O) is sometimes used as an anesthetic in dentistry. It is produced when ammonium nitrate is decomposed according to the following reaction.

$NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O(l)$

How many grams of NH_4NO_3 are required to produce 33.0 L of N_2O?

(A) 1.47 g (B) 117.9 g (C) 33.0 g (D) 2.94 g

70. For an exothermic process,

(A) Temperature decreases
(B) Energy is transferred from the solution to the environment
(C) The solution feels cold
(D) Energy is transferred from the environment to the solution

71. Which cup of water gets the hottest?

(A) Transferring 500 calories to 200 g of water starting at 30°C
(B) Transferring 700 calories to 400 g of water starting at 30°C
(C) Transferring 200 calories to 100 g of water starting at 30°C
(D) Transferring 100 calories to 50 g of water starting at 30°C

72. Which requires more energy?

(A) Heating 100 g of water from 10°C to 30°C (B) Heating 50 g of water from 10°C to 20°C
(C) Heating 10 g of water from 20°C to 60°C (D) Heating 400 g of water from 20°C to 30°C

73. Which of the following is NOT likely to extinguish a fire?

(A) Covering the fire with sand (B) Putting water on the fire
(C) Blowing oxygen gas on the fire (D) Blowing carbon dioxide gas on the fire

74. Which of the following will NOT combust?

(A) CH_4 (B) CH_3OH (C) Mg (D) $CaCl_2$

75. Which of the following will combust?

(A) Water (B) covalent compounds that don't contain too much oxygen
(C) Ionic salts (D) Carbon dioxide

76. You have water at 25°C. You dissolve ammonium acetate, $NH_4C_2H_4O_2$, in the water and find that the temperature decreases to 15°C.

(A). ΔT is positive (B). Heat is transferred from the solution to the environment
(C). Exothermic process (D). Endothermic process

77. You are camping and need to build a fire that will last all night. You have the following items with you. Which will you choose?

(A). candle wax ($C_{25}H_{52}$) (B). aluminum can (Al)
(C). salt, NaCl (D). packets of sugar ($C_{12}H_{22}O_{11}$)

78. Which is a condition of an acid solution?

(a.) It feels soapy.
(b.) It is held together by ionic bonds.
(c.) It tastes sour.
(d.) It will neutralize a buffer.

79. Which of the following is one of the correct products of this chemical reaction?

$HCl + Sr(OH)_2 \rightarrow$ ____ + ____

(A) $H(OH)_2$ (B) $SrCl_2$ (C) SrCl (D) Sr_2C

For #80-84:
Fill in the proper responses that would describe the changes that would occur due to Le Chatelier's Principle.
Choose from the following responses: **Left(A), Right(B), Increase(C), Decrease(D), Remains the Same(E).**
The following reaction takes place in a sealed container. As the reaction progresses the beaker is then heated with a hotplate.

$$4NH_3(g) + 5O_2(g) \Leftrightarrow 4NO(g) + 6H_2O(g) + 905\ kJ$$

Table FA - 1		Le Chatelier's Principle		
Reaction will Shift	**Concentration of Reactants**	**Concentration of Products**	**Pressure inside Beaker**	**Temperature inside Beaker**
80.	**81.**	**82.**	**83.**	**84.**

85. The important factor in determining the stability of a nucleus is

(A) The proton to electron ratio
(B) The electron to neutron ratio
(C) The neutron to proton ratio
(D) The valence electron to core electron ratio

86. Complete the following nuclear reaction:

$$^{222}_{86}Rn \rightarrow {}^{4}_{2}He + \_\_\_\_\_$$

a. $^{218}_{84}Rn$ b. $^{226}_{88}Rn$ c. $^{218}_{84}Po$ d. $^{226}_{88}Ra$

87. What type of decay happens in order for calcium-47 to change into scandium-47?

(A) alpha decay (B) beta decay (C) gamma rays (D) a chemical reaction

Answers:
1)B 2)A 3)C 4)A 5)B 6)D 7)A 8)C 9)D 10)B 11)D 12)A 13)D 14)D 15)A 16)C 17)C 18)D 19)C 20)D 21B 22)D 23)A 24)A 25)D 26)B 27)A 28)D 29)C 30)B 31)A 32)A 33)A 34)D 35)B 36)D 37)D 38)C 39)C 40)A 41)D 42)D 43)C 44)D 45)B 46)C 47)A 48)B 49)B 50)C 51)B 52)A 53)B 54)D 55)C 56)D 57)D 58)B 59)C 60)A 61)B 62)C 63)A 64)A 65)C 66)A 67)C 68)A 69)B 70)B 71)A 72)D 73)C 74)D 75)B 76)D 77)A 78)C 79)B 80)A 81)C 82)D 83)D 84)C 85)C 86)C 87)B