**CP Chemistry Final Exam Practice Problems**

**Short Answer**

1. Label the conversion factors that best fit in the space labeled “A, B, C, D” in this diagram?



2. Given:

Mass of solid = 20.0 g

Volume of water in graduated cylinder = 10.00 ml

Volume of water + solid = 38.0 ml

What is the volume of the solid? What is the density of the object?

3. Consider this equilibrium system at constant volume and temperature.

CO(s) + H2O(g) < CO2(g) + H2(g)

What factors cause equilibrium to shift left? What factors cause equilibrium to shift right?

4. Describe a saturated solution. Describe an unsaturated solution. Describe a supersaturated solution.

5. Calculate the energy in joules.



6. The oxidation number of K(s) is:

7. Consider the following reaction:

P4 + 10 Cl2  4 PCl5

How many moles of P4 reacts with...

2.0 mol of Cl2?

50 grams of Cl2?

25 liters of Cl2at STP?

8. What factors will in crease the rate of a chemical reaction?

9. Which family of elements contains the most reactive nonmetals?

10. How does molar mass affect the rate of diffusion in gases?

11. How does Collision Theory explain the rates of chemical reactions?

12. What is the molarity of a solution containing 68.0 grams of KBr dissolved in 80 milliliters of water?

13. What volume does .0594 mol of gas occupy

at STP?

at 423K and 3.5 atm?

14. How are acids and bases defined according to...

the Arrhenius Theory?

the Bronsted Lowry Theory?

the Lewis theory?

15. What is the pH of a solutions with...

a hydrogen ion concentration is 6.0 x 10-9 M?

a hydroxide ion concentration is 2.0 x 10-10 M?

16. The specific heat of water is 4.18 J/g°C. What mass of water can be heated from 40.0 °C to 75.0 °C with 1550 J?

17. Classify the following solutions as acid, base, or neutral..

pH=7

pH=2

pOH=7

pOH=2

18. When the expression is balanced, what is the coefficient of Mg?

? MgSO4 + ? Al  ? Al2(SO4)3 + ? Mg

19. Calculate the following to the correct number of significant figures

6.732m x 2.00m = \_\_\_\_\_

20. How many total atoms are in 5Al2(SO4)3 ?

21. Two neutral isotopes of the same element have the same number of \_\_\_\_\_ and \_\_\_\_\_ but a different number of \_\_\_

22. Place these intermolecular forces in order of increasing strength:

dipole attractions

dispersion forces

hydrogen bonding

23. What are the key assumptions of kinetic molecular theory?

24. Which type of reaction can be recognized by the general pattern

?



?



?



?



?



25. What is the percent composition of sodium in NaSCN?

26. Which are the product(s) of these chemical reactions?

FeCl3 + Al 

Fe + Cl2 

FeCl3 

FeCl3 + Al(NO3)3

27. Reactants are favored at equilibrium when Keq \_\_\_ 1

Products are favored at equilibrium when Keq \_\_\_ 1

28. Which element has the electron configuration 1s22s22p63s23p6?

29. What is the unit of energy used in the...

metric system?

SI system?

30. What is the formula for *manganese (II) chlorite*?

31. What is the concentration of hydroxide ions ([OH-]) and hydrogen ions ([H+]) of a solution with...

pH = 4?

pOH = 4?

32. The volume of a sample of helium is 6.8 mL at 45.0°C and 302.0 kPa. What will its volume be in the figure?



33. What is the oxidation number of bromine in KBr?

34. Compare & contrast suspensions, solutions, and colloids.

35. A colligative property is a property that varies with...

36. What are the common properties of acids? What are the common properties of bases?

37. What effect will a catalyst have on the rate of a chemical reaction? What effect will an inhibitor have on the rate of a chemical reaction?

38. What are the relationships described in the gas laws of Boyle, Charles, and Gay-Lussac?

39. Which is the name of the solid substance formed in an aqueous chemical reaction?

40. A \_\_\_\_\_ reaction is a chemical reaction that can occur in both the forward and reverse directions.

42. Oxidation involves the \_\_\_\_\_ of electrons while reduction involves the \_\_\_\_\_\_ of electrons.

43. An acid that can donate one hydrogen ion is called a \_\_\_\_\_ acid while an acid that can donate more than one hydrogen is called a \_\_\_\_\_\_ acid.

44. The combined gas law is represented by the equation: P1V1 = P2V2

T1 T2

What must remain constant for this to be true?

45. What volume of 0.3*M* HCl is required to neutralize 90mL of 0.5*M* NaOH?

46. What are the periodic trends for atomic radius, electronegativity,a nd first ionization energy?

47. A solid substance that dissolves in a solvent is said to be\_\_\_\_\_\_ while a liquid substance that dissolves in a liquid solvent is said to be \_\_\_\_\_\_. A solid substance that does not dissolve in a solvent is said to be\_\_\_\_\_\_ while a liquid substance that does not dissolve in a liquid solvent is said to be \_\_\_\_\_\_.

48. Draw a phase diagram for a substance and label the three phases and the triple point.

49. The erratic movement of colloid particles is called \_\_\_\_\_\_

50. Identify the acid and conjugate base pair in the following equation:



51. Identify the solution that contains the most dissolved particles:

.1M HCl .1M CH4OH .1M MgCl2 .1M KI

52. Consider the reaction below:

2H2 + O2 --🡪 2H2O + 400 Kj

How many Kj of energy are produced when 64 grams of oxygen react?

53. What is a catalyst.

How does a catalyst work?

How does a catalyst affect the ∆ H ?

54. A double replacement reaction takes place between silver nitrate and sodium chloride. Write

- The complete balanced equation

-The complete ionic equation

-The spectator ions

-The net ionic equation

1. What would you feel if you held a beaker in which an exothermic reaction was taking place?
2. What would you feel if you held a beaker in which an endothermic reaction was taking place?
3. What is oxidation? What is reduction? What does an oxidizing agent do? What does a reducing agent do?
4. What is entropy? Give an example of increasing entropy and give an example of decreasing entropy.
5. What is fusion? What is fission?
6. Calculate the moles of N2 needed to make 4.3 moles of NH3 from the reaction below.

N2 + 3 H2 🡨--🡪 2 NH3

61. Be able to balance nuclear equations.