Freehold Regional High School District

2010-2011 LAB CHEMISTRY

MIDTERM EXAMINATION STUDY GUIDE

About the Exam

The Lab Chemistry midterm exam consists of 80 multiple choice questions, each question containing 4 choices.

The exam covers the first six units of the curriculum. Unit 1: Introduction to Chemistry consists of 25 of the 80 questions, which is approximately 31%. Unit 2: Atomic Theory: consists of 22 of the 80 questions, which is approximately 28%. Unit 3: Periodicity consists of 8 questions out of the 80, which is approximately 10%. Unit 4: Chemical Bonding consists of 15 questions of the 80 which is approximately 19%. Unit 5: Naming and Formula Writing consists of 10 questions of the 80 which is approximately 12%.

Skills That You Should Practice

For Unit 1, the skills needed are to describe various scientific processes, use dimensional analysis to solve unit conversions, apply safety rules to various situations, measure based on accuracy and precision, analyze data and apply to various situations and classify matter based on properties and changes.

For Unit 2, the skills needed are to compare and contrast various atomic theories, construct and understand the structure of the nuclear atomic model based on atomic theories, use data analysis to calculate average atomic mass, predict products due to radioactive decay, and derive electron configurations and Lewis structures of various elements using the Periodic Table.

For Unit 3, the skills needed are to compare and contrast various theories that led to the development of the Periodic Table and predict various properties of elements on the Periodic Table based on trends.

For Unit 4 the skills needed are to differentiate between the various types of bonding, identify the properties of the compounds formed during bonding, and illustrate the shapes of molecules and polarity using VSEPR models.

For Unit 5, the skills needed are to construct formulas and name compounds based on elements provided.

Things That You Should Know

For Unit 1, students should focus on the district lab safety rules, scientific method, data analysis, unit conversions, classification of matter, physical and chemical properties as well as physical and chemical changes.

For Unit 2 students should focus on the development of the Periodic Table, parts of the Periodic Table, structure of the nuclear atom, various radioactive decay, Use of isotopes to calculate atomic mass, writing electron configuration and determining location of the electron in the energy levels, sublevels and orbitals.

For Unit 3 the students should focus on the development of the Periodic Table, understanding the parts of the Periodic Table, and using the Periodic Table to discuss various trends.

For Unit 4 the students should focus on the types of bonds: ionic, covalent, and metallic, properties of the compounds formed from these types of bonding, VSEPR models and polarity.

For Unit 5 the students should focus on writing and naming formulas for ionic compounds, covalent compounds and acids.

How You Should Prepare for the Exam

First and most importantly, DO NOT CRAM FOR THE EXAM!!!!! The student should start several weeks in advance to study, which provides time for them to ask their teacher for any additional explanation they might need on a topic that they are having difficulty with.

If you choose to form a study groups, first of all make sure that all members of the group are serious about contributing to the group. You might want to split up the units based on the strengths of the students and have each person responsible for the material in a particular unit. Each person should be able to teach the material and provide some form of study guide for other members in the groups. Remember this should be done well in advance in case the students need additional explanation from their teacher.

Student should review their notes, quizzes and tests they have. Rework any problems on the tests and quizzes and ask for additional explanation for material they don't understand.

Understand the material and be able to write the main ideas down in their own words

Make flash cards for the polyatomic ions and vocabulary they are unsure of. KEEP MEMORIZATION MINIMAL!!!

Do practice problems in the textbook through out the chapters and check the work in the back of the text to assure understanding.

Finally GET A GOOD NIGHT'S SLEEP the night before the exam and EAT A GOOD BREAKFAST the morning of the exam.

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LABORATORY CHEMISTRY REVIEW QUESTIONS

1. Choose the best answer and circle it
   A. When diluting an acid you must
      a. Add the water to the acid b. Add the acid to the water c. it does not matter
   B. In performing your experiment it produces a dangerous vapor, you must
      a. Perform it very carefully at your lab station
      b. Perform it under the fumehood
      c. Perform it by a window
   C. You are to identify an unknown substance. Which test should you NOT perform in chemistry?
      a. color by sight b. odor by wafting c. taste
   D. When is it alright to use chipped or cracked glassware heating a substance?
      a. If the teacher says it is okay b. anytime c. never
   E. You should never take too much of a chemical because
      a. It will contaminate the rest of the chemicals.
      b. It will explode when you put it back
      c. It will turn to a chemical
   F. You are mixing sulfuric acid with sucrose. What pieces of personal safety equipment must you wear?
      a. goggles only b. apron only c. both goggles and apron d. none of the above
2. Perform the following metric to metric conversions.
   A. 32.6 cm =_____Km
   B. 0.0086 Kg =_____dg
   C. 2.75 mL =_____cm^3
   D. 81.6 L =_____mL
3. Determine the number of significant figures in the following values and write it on the line provided
   A. 1025 cm _____ C. 0.00327 L_____ E. 1000g_____
   B. 100.0 s _____ D. 0.0080 mL _____
4. Perform the following calculations and write the answer s in the correct amount of significant figures.
   A. 3.5 cm X 4.5 cm =_____
   B. 96.0 g / 3.0 mL =_____
   C. 4.200 g + 3.65 g + 3.888g =_____

5. What is the density of a piece of wood whose mass is 35.0g and the volume is 30.0 cm^3?

6. The mass of a ball is 125g. What is the volume of the ball if the density is 0.500 g/mL?

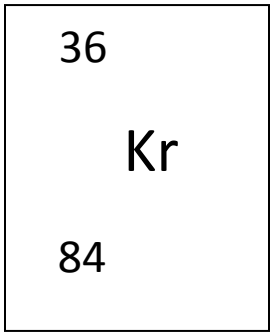
7. The mass of a ball is 35.0 g. Three students took measurements of the ball. State if their measurements are accurate, precise, both accurate and precise, neither accurate nor precise or any combination.
   A. Student 1: 35.1 g, 35.3 g 35.0 g _____
   B. Student 2: 12.6 g, 4.8 g, 3.7 g_____
   C. Student 3: 12.5 g, 12.6 g, 12.4 g_____
8. Calculate the percent error of the experiment if the accepted density of a ball is 35.6 g/mL. The student calculated the density of ball to be 30.3 g/mL ?

9. State if the following is a conclusion or observation
   A. The color of the gas is yellow_____
   B. When sugar is added to sulfuric acid it turns brown_____
   C. The clear liquid is water_____
10. State whether the following is an element, compound, homogeneous mixture or heterogeneous mixture:
   A. Salt water_____
   B. Sodium_____
   C. Calcium chloride_____
   D. Maple sugar_____
   E. Salt and pepper_____
11. State what change in state is being described
   A. H_2O (s) $\rightarrow H_2O$(l) _____
   B. H_2O (g) $\rightarrow H_2O$(l) _____
   C. H_2O (l) $\rightarrow H_2O$(s) _____
   D. H_2O (l) $\rightarrow H_2O$(g) _____
   E. CO_2(s) $\rightarrow CO_2$(g)_____

12. State if the following descriptions are quantitative or qualitative:
    A. 500 meters_____ C. Hot soup_____
    B. Blue ball_____D. 6 L_____
13. State if the following description is a chemical property, physical property, chemical change or physical change
    A. Melting butter_____
    B. Hydrochloric acid combined with magnesium produces hydrogen gas _____
    C. Burning of paper_____
    D. Dissolving sugar in water_____
    E. The paper is flammable_____
    F. The ball is red_____
14. The smallest particle of an element that retains the properties of the element is the _____
15. A pure substance composed of one kind of atom is a(n)_____
16. Two or more elements that are chemically combined is a(n)_____
17. The electron was discovered by_____
18. The Gold Foil Experiment that discovered that the atom is composed mostly of empty space was performed by _____.
19. Fill in the table below

Subatomic Particle	Charge of Particle	Location of Particle	Mass of Particle
Proton			
Neutron			
Electron			

20. Use the diagram below to answer the following questions



The atomic number is _____

The mass number is _____

The number of protons are_____

The number of neutrons are_____

The number of electrons are_____

21. Atoms of the same element that varies in the number of neutrons is an _____

22. The isotopic symbol for carbon 14 is C -14 :

    A. What does the 14 stand for ?_____

    B. The number of protons are_____

    C. The number of electrons are_____

    D. The number of neutrons are _____

23. What scientist arranged his elements in groups of 3 called "triads" on his Periodic Table _____

24. _____ developed the "Law of Octaves" because every eighth element had similar properties.

25. _____ arranged his Periodic Table according to increasing atomic mass.

26. _____arranged his Periodic Table according to increasing atomic number

27. The _____ states that when elements are arranged in increasing atomic number, there is a periodic repetition of both chemical and physical properties.

28. Group number indicates the number of _____.

29. Period number indicates the _____.

30. The ability to attract electrons is _____ and its trend _____(increase or decrease) across a period and

    _____(increase or decrease) down a group.

31. The trend for metallic properties _____ (increase or decrease) across a period.

32. The ability for an atom to lose electrons is _____

    and the trend _____(increase or decrease) across a period

    and _____(increase or decrease) down a group.

33. The trend for electronegativity _____(increases or decreases)

    across the period and _____(increases or decreases) down a group.

34. The Quantum Mechanical model of the atom states that the pathway or position of an electron is best represented by_____

35. _____ states that the electrons must fill the lowest available energy level first.

36. _____states that the electron must fill each empty orbital before pairing up.

37. _____states that no two atoms can have the same set of quantum numbers and if two electrons occupy the same orbital they must have opposite spins.

38. When an excited electron drops from a higher to lower energy level its energy is

    _____(released or absorbed)

39. _____ is minimum amount of energy that can be gained or lost by an atom

40. Fill in the chart below

Sublevel	Number of Orbitals	Maximum electrons	Shape
s			
p			
d			
f			_____

41. Write the electron configuration and electron dot diagram for each element listed below

A. Calcium_____

_____

B. Sulfur_____

_____

C. Bromine_____

_____

47. Given the following electron configuration : $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^3$

A. What element is it?_____

B. What is the number of valence electrons?_____

48. An atom that gains or loses electrons is a(n)_____

49. A positive ion is called a (n)_____ (cation or anion)

50. A negative ion is called a(n)_____(cation or anion)

51. When an atom loses electrons it becomes a _____ion.

52. When an atom gains electrons it becomes a _____ion.

53. What type of bond is formed when electrons are transferred?_____

54. What type of bond is formed when electrons are shared?_____

55. What type of bond is formed when delocalized electrons are shared by all nuclei? _____

56. What type of bond forms a compound that will form an electrolyte when dissolved in water? _____

57. What type of bond forms a compound that will conduct electricity? _____

58. Draw the Electron (Lewis) Dot diagram for the following molecules and state the number of shared and unshared electrons

A. H_2O shared_____ unshared_____

B. N_2 shared_____ unshared_____

C. CO_2 shared_____ unshared_____

D. O_2 shared_____ unshared_____

59. Fill in the chart below

Formula	VESPR Diagram	Name of Shape	Angle
HCl			
H_2O			
BF_3			
NH_3			
CH_4			

60. How many atoms are found in the formula $Al_2(SO_4)_3$?_____

61. Write the formula for the following compounds

A. Hydrosulfuric acid_____

B. Sodium oxide_____

C. Phosphoric acid_____

D. Nitrogen trioxide_____

E. Calcium hydroxide_____

F. Barium phosphate_____

62. Name the following compounds

A. $HClO_3$_____

B. H_2S_____

C. Li_2O_____

D. HBr_____

E. CO_____

F. $Mg_3(PO_4)_2$ _____

63. _____states that the mass of the products in a chemical reaction is equal to the mass of the reactants.

64. The symbol for oxygen gas is _____.