

Name: _____

120 points

Dr. Jay H. Baltisberger

Test 3

Chemistry 121A

December 6, 1999

SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS

Multiple Choice Questions: Circle the single best answer. No penalty for guessing.

- Which element has 7 valence electrons? (5 points)
A) Ne B) Be C) C D) N E) F
- Which of the following atoms has the largest **first** ionization energy? (5 points)
A) Cl B) K C) Rb D) Br E) Fe
- What is the highest energy occupied atomic orbital in the ground state electron configuration of iron (Ne)? (5 points)
A) 1s B) 2s C) 2p D) 3p E) 3d
- What is the hybridization of the O atom in O₂? (5 points)
A) sp B) sp² C) sp³ D) sp³d E) 2p
- The heat of formation of CO₂ (g) is -393 kJ/mol. How many kJ of heat is released if 24.02 g of elemental C (s) is burned in O₂ (g) to form CO₂ (g)? (5 points)
A) 16.4 kJ B) 197 kJ C) 393 kJ D) 786 kJ E) 9340 kJ
- Which of the following elements is allowed to form sp³d hybridized orbitals? (5 points)
A) H B) Na C) C D) Ne E) P
- Calculate the concentration of a solution prepared by diluting 25.0 mL of 2.00 M HCl to a final volume of 100.0 mL. (5 points)
A) 0.500 M B) 1.00 M C) 2.00 M D) 4.00 M E) 8.00 M
- Draw the Lewis dot structures for CO₂ and ICl₃. Remember to include formal charges (10 points)

Name: _____

Test 3

9. Write the formula or name of the following ionic compounds and indicate the solubility. (16 points)

Na_2SO_3 _____ soluble/insoluble

NH_4ClO_3 _____ soluble/insoluble

_____ Calcium Carbonate soluble/insoluble

_____ Iron (II) Nitrate soluble/insoluble

10. Draw the Lewis dot structure for NNO (use a nitrogen as the central atom). Describe the molecular and electron pair geometry as well as formal charge and oxidation state for each atom of this molecule. (15 points)

11. Arrange the following atoms in order of atomic radius from highest to lowest: Rb, K, Fe, Al, N, Ne. (12 points)

12. Discuss (using electron configurations and effective charge) why it is easier to remove an electron from a sodium atom than either a neon or magnesium atom. (10 points)

Name: _____

Test 3

13. Calculate the mass percentage of Al in Al_2O_3 . (10 points)

14. What is the net ionic equation for each of the following reaction mixtures (write NONE if there is no net reaction) (12 points)

