

Name: \_\_\_\_\_  
120 points  
Dr. Jay H. Baltsberger

Test 2  
Chemistry 121A  
November 4, 1996

**SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS**

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

- What is the chemical symbol for Silicon? (3 points)  
A) S                      B) Si                      C) Sn                      D) Sc                      E) So
- What is the formula for hypochlorous acid? (3 points)  
A) HCl                      B) CH<sub>4</sub>                      C) H<sub>2</sub>ClO<sub>2</sub>                      D) HClO<sub>2</sub>                      E) HClO
- How many moles of carbon are found in 12 mole of butadiene (C<sub>4</sub>H<sub>6</sub>)? (3 points)  
A) 3.0 mol                      B) 4.0 mol                      C) 24.0 mol                      D) 48.0 mol                      E) 120.0 mol
- Which of the following is a weak acid? (3 points)  
A) C<sub>2</sub>H<sub>4</sub>                      B) HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>                      C) H<sub>2</sub>SO<sub>4</sub>                      D) HBr                      E) HNO<sub>3</sub>
- How many kJ of heat is needed to raise 100.0 g of H<sub>2</sub>O from 30.0° to 50.0° C? (3 points, the specific heat for water is C = 4.184 J / g °C)  
A) 0.418 kJ                      B) 4.18 kJ                      C) 8.37 kJ                      D) 12.6 kJ                      E) 20.9 kJ
- How many electrons (maximum in one atom) may have the quantum numbers n = 4 and l = 2? (3 points)  
A) 2 e<sup>-</sup>                      B) 5 e<sup>-</sup>                      C) 10 e<sup>-</sup>                      D) 14 e<sup>-</sup>                      E) 18 e<sup>-</sup>
- Use Hess' Law to calculate the H<sub>rxn</sub> for the following reaction:  
$$2 \text{CO} (g) + \text{F}_2 (g) \longrightarrow \text{CF}_4 (g) + \text{O}_2 (g)$$
  
Given the following heats of formation: CO (g) = -110.5 kJ/mol, O<sub>2</sub> (g) = 0 kJ/mol, F<sub>2</sub> (g) = 0 kJ/mol, CF<sub>4</sub> (g) = -679.9 kJ/mol. (10 points)

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8. Name the following ionic compounds and indicate the solubility. (15 points)

CaSO <sub>4</sub>	_____	_____
Li <sub>3</sub> PO <sub>4</sub>	_____	_____
HBr	_____	_____

9. Write the empirical formula for the following compounds and indicate the solubility. (15 points)

ammonium chlorite	_____	_____
silver (I) sulfite	_____	_____
iron (II) hydroxide	_____	_____

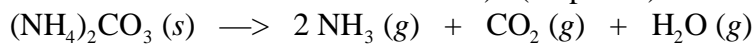
10. Calculate the wavelength of light emitted from a hydrogen atom when its electron falls from the  $n = 3$  to the  $n = 2$  state. (Potentially Useful Equations:  $E_n = -R_H / n^2$ ,  $E = n h \nu$ ,  $c = \lambda \nu$ ,  $c = 3.0 \times 10^8$  m/s,  $h = 6.626 \times 10^{-34}$  J s,  $R_H = 2.18 \times 10^{-18}$  J) (10 points)

11. Write a short description how each of the three quantum number ( $n$ ,  $l$ ,  $m_l$ ) affect the size, shape and energy of a quantum orbit. (12 points)

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12. The  $\Delta H$  for the following reaction is  $+55.2 \text{ kJ mol}^{-1}$ . Calculate the mass of  $\text{CO}_2$  which may be produced if excess ammonium carbonate is heated by 150 kJ of energy (assume constant temperature and all heat is used to drive the reaction). (15 points)



13. Give the electron configurations for the elements Fe, P, At (you may use noble gas configuration abbreviations). (9 points)

14. Balance the following two equations and write out the final net ionic equations for each. (16 points)

