### General Information

Lecturer and TAMU Mentor: Dr. Wendy L. Keeney-Kennicutt  
Sections 501 - 510, TR: 9:35 - 10:50 am in Room 100, HELD

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Office Hours: Mondays 11:30 am - 7pm, Wednesdays 11:10 am - 2:30pm, by appointment and whenever you can catch me.

Review Sessions: Special Review of Chapter 1 and Math Basics: First Sunday Review  
Sundays, General Review for Lecture, 2 pm, Rm 100 HELD  
Weekly Lab Reviews: to be announced

Lecture Notes: Copies of my lecture notes and old exams are on our web page (www.chem.tamu.edu/class/fyp/).

### Bonus Opportunity Problems (BOP's)

A total of 114 problems were carefully selected to complement the lectures. Additional practice problems, which are NOT to be handed in, are also provided. Answers to the even-numbered problems are in the textbook and worked out in the Solution Manual. The BOP's will be divided into four sets as we cover the material in class - the problems due will be announced in class. The first three sets will be due on the Thursday following each exam; the last set will be due on the last day of class. The BOP's may be turned in with a 10% penalty through the next Tuesday. After that time, the BOP's will absolutely not be accepted without a medical excuse. You must show all work (messy is OK). You must hand in at least 70% to receive 1 BOP point and at least 90% to receive 2 BOP points. I encourage you to work the problems.

### Problems

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[not for credit: 12, 14, 18, 20, 24, 28, 34, 38, 40, 44 and others]</td>
</tr>
<tr>
<td>2</td>
<td>18, 28, 34, 36, 39 (&amp; explain), 42, 58, 62, 78, 90, 104 [not for credit: 14, 20, 30, 50, 54, 64, 72, 74 and others]</td>
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<tr>
<td>3</td>
<td>10, 14, 22, 30, 40, 42, 43, 58, 62, 70,72, 80, 82, 94, 97 [not for credit: 8, 12, 18, 36, 48, 68, 76 and others]</td>
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<td>4</td>
<td>16, 34, 42, 56, 60, 66, 76, 94 (Consider Ca(OH)(_2) as soluble), 96, 110 [not for credit: 28, 32, 44, 52, 58, 68, 92, 98, 114, 116 and others]</td>
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<tr>
<td>5</td>
<td>20, 22, 26, 30, 42, 56 (omit part (d)), 70, 72, 76, 80 (&amp; (e) Cu, (f) Cr - tricky! Write the shorthand notation. Label diamagnetic or paramagnetic. Which one exhibits the highest degree of paramagnetism?), 96, 98, 100, 102 [not for credit: 18, 24, 28, 32, 44, 68, 74, 88 and others]</td>
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<tr>
<td>6</td>
<td>6, 10, 34 [not for credit: 8, 18, 30, 41, 48 and others]</td>
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| 7       | 100. Arrange the following atoms or ions in order of increasing diameter and explain why briefly.  
(a) Ca, Mg, Sr  
(b) S\(^{2-}\), Ar, Cl\(^-\)  
(c) P, Si, S, Al  
(d) Fe, Fe\(^{2+}\), Fe\(^{3+}\)  
(e) H, H\(^+\), H\(^-\)  
(f) F, Br, Te\(^-\), Se  
(10. Give examples and explain the following trends in the first ionization energy  
(a) across each period (include "dips" at IIIA and VIA elements for Periods 2 and 3 - see textbook), and  
(b) descending a periodic group  
100. Draw Lewis dot formulae for the following. Which violate the octet rule?  (worth 5 questions) Use the solution manual wisely, esp. the solutions to 36, 38, 56 and many in Chapter 8.  
(a) H\(_2\)O  
(b) H\(_2\)O\(^+\)  
(c) HCN  
(d) NH\(_3\)  
(e) PF\(_3\)  
(f) BeCl\(_2\)  
(g) BCl\(_3\)  
(h) PH\(_4\)\(^+\)  
(i) ICl\(_2\)\(^-\)  
(j) SeF\(_4\)\(^+\)  
(k) AsCl\(_4\)\(^-\)  
(l) ClF\(_3\)  
(m) SeF\(_6\)  
(n) XeF\(_4\)  
100. Consider the species listed in Exercise 100 in Ch. 7: For the central atom, give the number of regions of high electron density, the number of lone pairs, hybridization, electronic geometry and ideal bond angle(s). Determine molecular or ionic geometry and polarity (worth 5 questions). Use the Solution Manual for help.  
52 (& Give total number of sigma and pi bonds), 78 [not for credit: 22, 24, 28, 32, 36, 42, 46, 48, 56, 76 and others] |
| 8       | 8, 10, 14, 50, 62, 76 [not for credit: 6, 18, 24, 30, 36, 52, 56, 58, 68, 74 and others] |
| 9       | 8, 26, 42, 50, 60, 78, 90, 92 [not for credit: 20, 24, 56, 58, 74, 88 and others] |
| 10      | 14, 28, 32, 42, 50, 56, 58, 66 (Hint: use normality), 82  
100. Use the reaction in 58(a). What mass of Al (in grams) will react with 75.0 mL of 0.100 N NaNO\(_2\)?  
[not for credit: 12, 38, 40, 54, 57, 60, 62, 64 and others] |
| 11      | 16, 24, 30, 32, 44, 50, 56, 62, 66, 74, 82, 88, 112 [not for credit: 14, 22, 36, 42, 50, 100 and others] |
| 12      | 6, 10, 18, 24, 36, 48, 50, 68, 72, 78, 116 [not for credit: 22, 26, 34, 42, 74, 80, 106, 112, 118 and others] |
| 13      | [not for credit: 28, 46, 48, 50, 66, 72] |
**ANSWERS TO SOME PROBLEMS**

(Answers to even-numbered problems are in the textbook; solutions are given in the Solution Manual.)

Chapter 2  
39. (a) no (b) yes (c) no (d) no

Chapter 3  
43. 147 g S 97. #4, (b)

Chapter 5  
80. (a) paramagnetic (3 unpaired e\(^-\))  (b) paramagnetic (2 unpaired e\(^-\))  (c) paramagnetic (1 unpaired e\(^-\))  (d) paramagnetic (2 unpaired e\(^-\))  (e) paramagnetic (1 unpaired e\(^-\))  (f) paramagnetic (6 unpaired e\(^-\))

Chapter 6  
100. for example, (a) Mg<Ca<Sr

Chapter 7  
100. octet rule violaters: (f), (g), (i), (j), (k), (l), (m) and (o)

Chapter 11  
100. 0.0675 g Al

**REQUIRED ORGANIC NOMENCLATURE**

- Methane/CH\(_4\)
- Ethane/C\(_2\)H\(_6\)
- Propane/C\(_3\)H\(_8\)
- Ethylene/C\(_2\)H\(_4\) (Ethene)
- Acetylene/C\(_2\)H\(_2\) (Ethyne)
- Benzene/C\(_6\)H\(_6\)
- Methanol/CH\(_3\)OH
- Ethanol/C\(_2\)H\(_5\)OH

Note: CH\(_3\) = H-C-