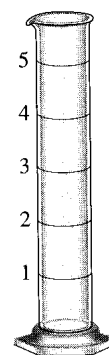
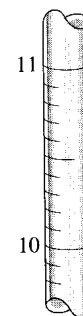


1. Give an example of *qualitative data* and an example of *quantitative data*. (2 points)

2. For Each of these pieces of glassware, provide a sample measurement to demonstrate your knowledge of precision and significant figures. (4 points)



a.



b.

3. Indicate the number of significant figures in the following measurements. (4 points)

- a. 2.54 cm
- b. 1.06 quart
- c. 54,000 spectators
- d. 0.0012 units

4. Express 54,000 spectators in scientific notation. (1 point)

1. In your own words, what is *precision*? (2 points)

2. How many significant figures should the following calculations be reported as? (2 points)

$$\frac{(24.5+24.6)}{2} = \underline{\hspace{2cm}} \text{ SF} \qquad \frac{250.364}{-212.547} = \underline{\hspace{2cm}} \text{ SF}$$

- Aspirin has a density of 1.40 g/cm³. What is the volume of an aspirin tablet having a mass of 250 mg? *Show your work.* Be sure to use the correct number of significant figures. (2 points)
- One calorie is the amount of energy required to raise the temperature of 1.00 g water by 1.00°C. Another way of saying this is that the specific heat of water is $\frac{1.00 \text{ cal}}{\text{g} \cdot ^\circ\text{C}}$. How many calories are required to raise the temperature of 125.649 g water from 22.7°C to 98.6°C? *Show your work.* Be sure to use the correct number of significant figures. (4 points)

Name: _____
 Chemistry 120, Section A
 Quiz 3, September 14, 2004

- Copper exists in two isotopic forms, copper-63 and copper-65. Indicate the number of protons, neutrons, and electrons in each of these isotopes. (2 points)
- What is the alkaline earth metal of period 4 (name and symbol)? (2 points)
- Name the following compounds. (3 points)
 - CoBr₃
 - SO₃
 - AlF₃
- Give the molecular formula of the following compounds. (3 points)
 - Carbonic acid
 - hydroiodic acid
 - dinitrogen tetroxide

Name: _____
Chemistry 120, Section A
Quiz 4, September 21, 2004

1. A solution is composed of _____ and _____. (2 points)
2. Diagram a molecule of water as described in class. (2 points)
3. Predict whether the following compounds are soluble in water. (4 points)
CoBr₃
H₃PO₄
(NH₄)₂CO₃
AlF₃
4. A strong electrolyte will *dissociate* _____. (2 points)

Name: _____
Chemistry 120, Section A
Quiz 5, September 28, 2004

Show your work and express your answers in the correct number of significant figures. Be sure to include units.

Helpful atomic weights: Mg=24.305, Cl=35.453, Na=22.98977, Br=79.904, Co=58.9332

1. Assume you need to make 750. mL of a 0.050 M solution of MgCl₂. Getting the bottle off the shelf in the stockroom, you notice the molar mass is 203.326. How would you make this solution? (4 points)
2. What is the molarity of NaCl after 192 mL of 5.00 M NaCl are diluted to a final volume of 479 mL with deionized water and mixed. (3 points)
3. How many grams of CoBr₃ are in 50.0 mL of a 2.50 M solution? (3 points)

Name: _____
Chemistry 120, Section A
Quiz 6, October 12, 2004

1. Convert the following description into a molecular equation, total ionic equation, and net ionic equation: An aqueous solution of cobalt (II) fluoride reacts with aqueous sodium sulfide to yield a precipitate of cobalt sulfide and aqueous sodium fluoride. (3 points)

2. Identify the oxidation state of all atoms in the following species. (4 points)
- BCl₃
 CO
 SO₄²⁻
 FeCl₃
3. Balance the following redox reaction, which occurs in acidic solution. (3 points)
- $$\text{PbO}_2(\text{s}) + \text{Mn}^{2+}(\text{aq}) \div \text{Pb}^{2+}(\text{aq}) + \text{MnO}_4^{-}(\text{aq})$$

Name: _____
 Chemistry 120, Section A
 Quiz 7, October 26, 2004

1. What is the difference between *temperature* and *heat*? (2 points)
2. A calorimeter contains 50.0 mL water at 23.4°C. A piece of unknown metal (mass = 6.121 g) which has been heated in a boiling water bath to 99.8°C is transferred into the water, causing the temperature to rise to 26.1°C. What is the specific heat of the metal? The specific heat of water is 4.184 J/g°C. The density of water at 23.4°C is 0.9984 g/mL. (4 points)
3. Given the following data
- $$2 \text{O}_3(\text{g}) \div 3 \text{O}_2(\text{g}) \quad \Delta H = -427 \text{ kJ}$$
- $$\text{O}_2(\text{g}) \div 2 \text{O}(\text{g}) \quad \Delta H = +495 \text{ kJ}$$
- $$\text{NO}(\text{g}) + \text{O}_3(\text{g}) \div \text{NO}_2(\text{g}) + \text{O}_2(\text{g}) \quad \Delta H = -199 \text{ kJ}$$
- calculate the ΔH for the following reaction. (4 points)
- $$\text{NO}(\text{g}) + \text{O}(\text{g}) \div \text{NO}_2(\text{g})$$

Name: _____
 Chemistry 120, Section A
 Quiz 8, November 2, 2004

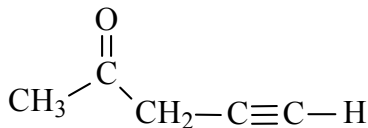
1. What is the name of the group that barium is in? (2 points)
2. List the electron configuration of: (4 points)
- A. Ca
- B. Cl⁻

3. Give the quantum numbers for a $3p^4$ electron (2 points)
4. Which element is expected to have the highest electron affinity, tungsten (W) or osmium (Os)? (2 points)

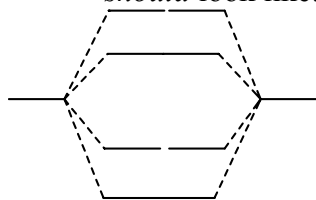
Name: _____
 Chemistry 120, Section A
 Quiz 9, November 16, 2004

1. Many organic molecules contain carbon atoms that vary in their hybridizations (sp , sp^2 and sp^3 can all be present in the same molecule). For the organic molecule below, indicate the hybridization of *each* carbon atom. Use "A" to indicate an sp carbon, "B" for an sp^2 carbon and "C" for an sp^3 carbon. (5 points)

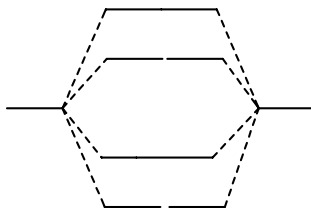
2. The correct Lewis dot structure of N_2 is $:\text{N}\equiv\text{N}:$. The bonds holding the nitrogen atoms together are _____ and _____ bonds. (2 points)



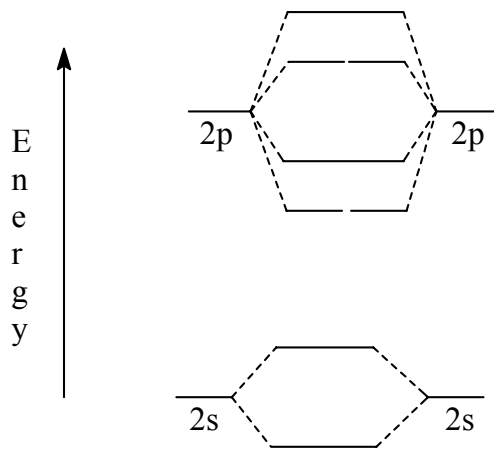
3. There is an apparent discrepancy in the figure from your textbook that I used in class on Monday the 15th of November. It arises from the fact that a p orbital is higher in energy than an s orbital. An extension of this principle is that the more reactive pi bond should be of higher energy than the sigma bond, and so we expect that the molecular orbital diagram *should* look like:



However, for reasons hard to conceptually see, the actual order is switched, so that it *really* looks like:



In other words, the energy levels of the sigma and pi electrons are switched. With this knowledge, for the molecule N_2 , complete following molecular orbital diagram. (3 points)



Name: _____
 Chemistry 120, Section A
 Quiz 10, November 23, 2004

- Using molecule(s) of your choice, diagram and explain what a dipole-dipole interaction is. (3 points)
- Given the molecules, rank them in order of increasing boiling point: CH₃OH, CO₂, CS₂, He
 lowest boiling point _____ highest boiling point. (4 points)
- Explain the difference between *normal boiling point* and *boiling point*. (3 points)

1 1A 1 H 1.00794 ^Δ	2 2A 2 He 4.002602 [*]	3 3A 3 Li 6.941 [*]	4 4A 4 Be 9.01218	5 5A 5 B 10.811 ^Δ	6 6A 6 C 12.011	7 7A 7 N 14.0067	8 8A 8 O 15.9994 [†]	9 9A 9 F 18.998403	10 10A 10 Ne 20.179	11 11A 11 Na 22.98977	12 12A 12 Mg 24.305	13 13A 13 Al 26.98154	14 14A 14 Si 28.0855 [†]	15 15A 15 P 30.97376	16 16A 16 S 32.066 ^Δ	17 17A 17 Cl 35.453	18 18A 18 Ar 39.948
19 1A 19 K 39.0983	20 2A 20 Ca 40.078 ^Δ	21 3d 21 Sc 44.95591	22 4d 22 Ti 47.88 [†]	23 5d 23 V 50.9415	24 6d 24 Cr 51.9961 ^Δ	25 7d 25 Mn 54.9380	26 8d 26 Fe 55.847 [†]	27 9d 27 Co 58.9332	28 10d 28 Ni 58.69	29 11d 29 Cu 63.546 [†]	30 12d 30 Zn 65.39 [*]	31 13 31 Ga 69.723 ^Δ	32 14 32 Ge 72.59 [†]	33 15 33 As 74.9216	34 16 34 Se 78.96 [†]	35 17 35 Br 79.904	36 18 36 Kr 83.80
37 3A 37 Rb 85.4678 [†]	38 4A 38 Sr 87.62	39 3d 39 Y 88.9059	40 4d 40 Zr 91.224 [*]	41 5d 41 Nb 92.9064	42 6d 42 Mo 95.94	43 7d 43 Tc (98)	44 8d 44 Ru 101.07 [*]	45 9d 45 Rh 102.9055	46 10d 46 Pd 106.42	47 11d 47 Ag 107.8682 [†]	48 12d 48 Cd 112.41	49 13 49 In 114.82	50 14 50 Sn 118.710 ^Δ	51 15 51 Sb 121.75 [†]	52 16 52 Te 127.60 [†]	53 17 53 I 126.9045	54 18 54 Xe 131.29 [†]
55 3A 55 Cs 132.9054	56 4A 56 Ba 137.33	57 3d 57 La 138.9055 [†]	72 4d 72 Hf 178.49 [†]	73 5d 73 Ta 180.9479	74 6d 74 W 183.85 [†]	75 7d 75 Re 186.207	76 8d 76 Os 190.2	77 9d 77 Ir 192.22 [†]	78 10d 78 Pt 195.08 [†]	79 11d 79 Au 196.9665	80 12d 80 Hg 200.59 [†]	81 13 81 Tl 204.383	82 14 82 Pb 207.2	83 15 83 Bi 208.9804	84 16 84 Po (209)	85 17 85 At (210)	86 18 86 Rn (222)
87 3A 87 Fr (223)	88 4A 88 Ra 226.0254	89 3d 89 Ac 227.0278	104 4d 104 Unq (261)	105 5d 105 Unp (262)	106 6d 106 Unh (263)	<ul style="list-style-type: none"> • New IUPAC ■ Former IUPAC ◆ New Chemical Abstract Service ★ Former Chemical Abstract Service 											

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 §The International Union of Pure and Applied Chemistry (IUPAC) has not adopted official names or symbols for these elements.
 *These weights are considered reliable to ±2 in the last place.
 †These weights are considered reliable to ±3 in the last place.
 ΔThese weights are considered reliable in the last place, as follows: Calcium and Gallium ±4; Boron ±5; Chromium and Sulfur ±6; Hydrogen and Tin ±7.
 All other weights are reliable to ±1 in the last place. All reliabilities are based on an uncertainty scale of ±1 to 9.
 Atomic weights corrected to conform to the most recent values of the Commission on Atomic Weights. Column nomenclature conforms to IUPAC system and data in this chart have been checked by the National Bureau of Standards, Office of Standard Reference Data.
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58 6s 58 Ce 140.12	59 6s 59 Pr 140.9077	60 6s 60 Nd 144.24 [†]	61 6s 61 Pm (145)	62 6s 62 Sm 150.36 [†]	63 6s 63 Eu 151.96	64 6s 64 Gd 157.25 [†]	65 6s 65 Tb 158.9254	66 6s 66 Dy 162.50 [†]	67 6s 67 Ho 164.9304	68 6s 68 Er 167.26 [†]	69 6s 69 Tm 168.9342	70 6s 70 Yb 173.04 [†]	71 6s 71 Lu 174.967
90 7s 90 Th 232.0381	91 7s 91 Pa 231.0359	92 7s 92 U 238.0289	93 7s 93 Np 237.0482	94 7s 94 Pu (244)	95 7s 95 Am (243)	96 7s 96 Cm (247)	97 7s 97 Bk (247)	98 7s 98 Cf (251)	99 7s 99 Es (252)	100 7s 100 Fm (257)	101 7s 101 Md (258)	102 7s 102 No (259)	103 7s 103 Lr (260)