

Moorpark College Chemistry 11
Fall 2007

Instructor: Professor Torres

Examination #1: Section One
September 12, 2007

Name: _____ (print)

Name: _____ (sign)

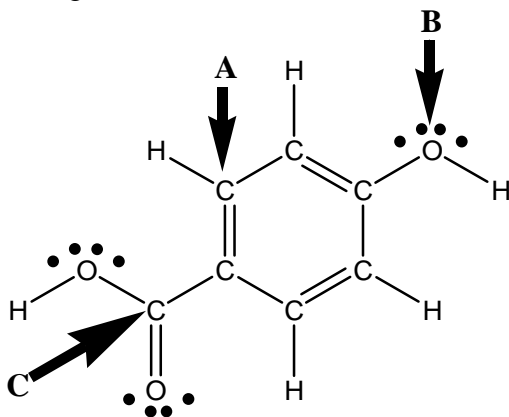
Directions: Make sure your examination contains NINE total pages (including this cover sheet) when instructed to do so. Answer all the questions in the spaces provided. Be sure to show all your work for partial credit.

Question	Points
1. – 20. (40 pts.)	
21. (3 pts.)	
22. (5 pts.)	
23. (4 pts.)	
24. (20 pts.)	
25. (28 pts.)	
TOTAL (100 points)	

Chemistry 11 Fall 2007
Examination #1

For the first portion of this exam, select the best answer choice for the questions below and mark the answers on your scantron. Then answer the free response questions that follow (100 pts. total; multiple choice 2 pts. each).

Questions 1 – 4 involve the organic molecule shown below:



1. What is the geometry associated with the carbon labeled "A"?
 - A. linear
 - B. trigonal planar
 - C. trigonal pyramidal
 - D. tetrahedral
 - E. bent
2. What is the relative bond angle associated with the oxygen labeled "B"?
 - A. 90°
 - B. 109.5°
 - C. 120°
 - D. 180°
 - E. 360°
3. What is the relative bond angle associated with the carbon labeled "C"?
 - A. 90°
 - B. 109.5°
 - C. 120°
 - D. 180°
 - E. 360°
4. Select "A" for True OR "B" for False regarding the following statement: *This molecule possesses resonance.*

5. Arrange the following in order of increasing atomic/ionic radius: I, I⁺, I⁻
- A. I < I⁺ < I⁻
 - B. I⁺ < I⁻ < I
 - C. I⁻ < I < I⁺
 - D. I < I⁻ < I⁺
 - E. I⁺ < I < I⁻
6. Which of the following is a chemical change?
- A. the freezing of water to form ice
 - B. hammering zinc into a thin film
 - C. the sublimation of dry ice
 - D. the boiling of water to form steam
 - E. the reaction of chlorine gas and sodium to form sodium chloride
7. The content of a container filled with sand and water would best be described as:
- A. elements
 - B. a homogeneous mixture
 - C. a heterogeneous mixture
 - D. a compound
 - E. a solution
8. Convert -41.0 °F to degrees Celsius and Kelvin.
- A. -40.6 °C; 232.4 K
 - B. -57.6 °C; 215.4 K
 - C. -73.0 °C; 200.0 K
 - D. -9.0 °C; 264.0 K
 - E. -117.0 °C; 156.0 K
9. List the following in order of increasing ionization energy: O, Mg, Rb, S, Si
- A. Si < O < Mg < Rb < S
 - B. Si < S < Rb < Mg < O
 - C. Mg < O < Rb < S < Si
 - D. Rb < Mg < Si < S < O
 - E. S < Si < Mg < O < Rb

10. A student measuring the density of a solution (density = 1.233 g/mL) reported the following results: 1.235, 1.237, 1.231, and 1.229. Which of the following is the best description of the student's data?
- A. precise; not accurate
 - B. precise; accurate
 - C. not precise; not accurate
 - D. not precise; accurate
 - E. Insufficient data
11. An atom which differs in charge from another atom of the same element:
- I. is called an isotope.
 - II. has more or less neutrons.
 - III. has lost or gained electrons.
 - IV. is called an ion.
 - V. has the same number of protons.
- A. I and II
 - B. I and III
 - C. II and IV
 - D. III and IV
 - E. III, IV, and V
12. The total number of protons, neutrons, and electrons in $^{31}\text{P}^{3-}$ are:
- A. 31 protons; 15 neutrons; 15 electrons
 - B. 15 protons; 16 neutrons; 18 electrons
 - C. 15 protons; 31 neutrons; 18 electrons
 - D. 16 protons; 15 neutrons; 12 electrons
 - E. 16 protons; 16 neutrons; 18 electrons
13. The Lewis structure of N_2H_2 shows which of the following?
- A. a nitrogen-nitrogen triple bond
 - B. a nitrogen-nitrogen single bond
 - C. each nitrogen possesses one electron pair
 - D. each nitrogen possesses two electron pairs
 - E. each hydrogen has one electron pair

14. Which of the following is a polar molecule?
- A. CO_3^{-2}
 - B. SO_2
 - C. CS_2
 - D. NH_4^+
 - E. BCl_3
15. Arrange the following in order of increasing electronegativity: Cs, F, As, Cl
- A. $\text{As} < \text{Cl} < \text{Cs} < \text{F}$
 - B. $\text{Cl} < \text{As} < \text{F} < \text{Cs}$
 - C. $\text{As} < \text{F} < \text{Cs} < \text{Cl}$
 - D. $\text{Cl} < \text{Cs} < \text{F} < \text{As}$
 - E. $\text{Cs} < \text{As} < \text{Cl} < \text{F}$
16. When a metal and a nonmetal react, the _____ tends to oxidize, and the _____ tends to reduce.
- A. metal, metal
 - B. nonmetal, nonmetal
 - C. metal, nonmetal
 - D. nonmetal, metal
 - E. None of the above; metals and nonmetals do not react
17. Magnesium reacts with a certain element to form a compound with the general formula MgX . What would the most likely formula be for the compound formed between potassium and element X?
- A. K_2X
 - B. KX_2
 - C. K_2X_3
 - D. K_2X_2
 - E. KX
18. Convert 1400 mm to inches (*note: 2.54 cm = 1 in*)
- A. 5500 in
 - B. 550 in
 - C. 36 in
 - D. 360 in
 - E. 55 in

19. A block of wood has dimensions 1.2 cm x 5.0 cm x 7.0 cm and has a mass of 30. g. What is the density of the wood in g/cm^3 ?
- A. 1400
 - B. 0.071
 - C. 0.71
 - D. 1.4
 - E. 1300
20. The specific heat of liquid bromine is 0.226 J/g K. How much heat (in J) is required to raise the temperature of 10.0 mL of bromine from 25.0 °C to 27.3 °C? The density of liquid bromine is 3.12 g/mL.
- A. 5.20 J
 - B. 16.2 J
 - C. 300 J
 - D. 32.4 J
 - E. 10.4 J

END OF MULTIPLE CHOICE

21. (3 pts.) Convert 85 miles/hour to meters/second. Express your final answer in scientific notation.

NOTE: 1 mile = 1.61 km

22. (5 pts.) Write the COMPLETE electron configuration for the following atom: Bh (Bohrium; $Z = 107$).
23. (4 pts. total) Use Lewis theory AND VSEPR to justify the following observations: NO_3^{-1} is a nonpolar ion, while NO_2^{-1} is a polar ion.

24. (20 pts. total; 2 pts. each) Write the name/chemical formula for each of the following listed below:

A. tin(IV) oxide _____

B. calcium nitrite _____

C. Rb_2CO_3 _____

D. K_3PO_4 _____

E. NaCN _____

F. tetraphosphorus decoxide _____

G. beryllium hydroxide _____

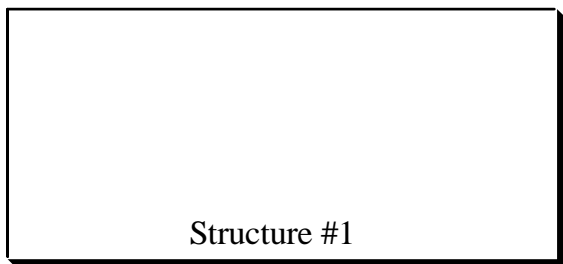
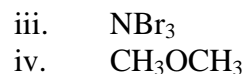
H. B_2Cl_4 _____

I. ammonium acetate _____

J. aluminum sulfite _____

25. (28 pts. total; 7 pts. each) **LAST ONE!** Consider each of the following ions/molecules shown below and write your final structures in the boxes provided:

- A. Draw the best *Lewis dot structures*, including resonance where appropriate.
- B. Use *VSEPR* theory to draw **AND** describe the geometry about each **CENTRAL** atom. Include both electronic and molecular geometries.
- C. Give the approximate bond angle(s) around each central atom.
- D. Determine whether the overall ion/molecule is polar or nonpolar.

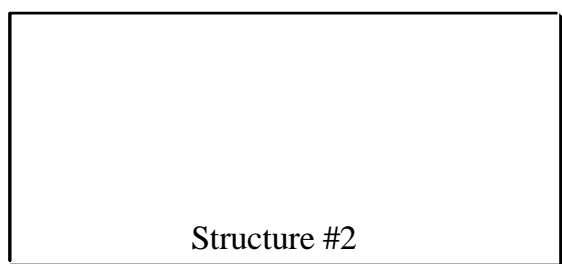


electronic geometry:

molecular geometry:

approx. bond angle:

polar or nonpolar?

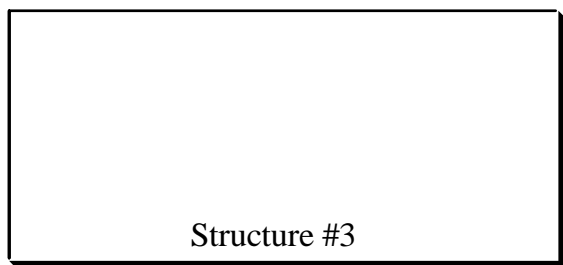


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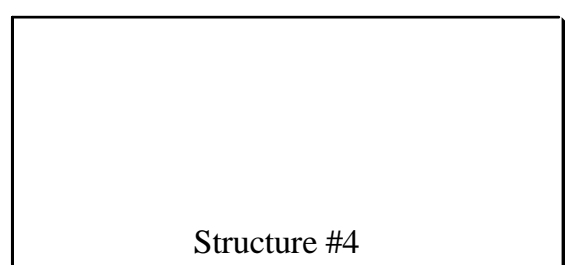


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