

Name _____

SSN _____

CHEM 121a Quiz 4

Please print your name and the "Test Color" on your Scantron sheet. Carefully mark the appropriate answer to each question on the Scantron sheet, and show any work in the space provided. Each question is worth 1 point (20 pts total). Please hand in both the Quiz and the Scantron sheet.

- Which of the following statements is incorrect?
 - Ionic bonding results from the transfer of electrons from one atom to another.
 - Dipole moments result from the unequal distribution of electrons in a molecule.
 - The electrons in a polar bond are found nearer to the more electronegative element.
 - A molecule with very polar bonds can be nonpolar.
 - Linear molecules cannot have a net dipole moment.
- Atoms having greatly differing electronegativities are expected to form:
 - no bonds
 - polar covalent bonds
 - nonpolar covalent bonds
 - ionic bonds
 - covalent bonds
- For the elements Rb, F, and O, the order of increasing electronegativity is:
 - $\text{Rb} < \text{F} < \text{O}$
 - $\text{Rb} < \text{O} < \text{F}$
 - $\text{O} < \text{F} < \text{Rb}$
 - $\text{F} < \text{Rb} < \text{O}$
 - $\text{Rb} = \text{F} = \text{O}$
- Which of the following molecules does not have a dipole moment?
 - HCl
 - CO
 - NCl_3
 - BCl_3
 - H_2O
- Which of the following has the smallest radius?
 - Cl^-
 - K^+
 - Cr
 - Al^{3+}
 - Ar

6. Calculate the lattice energy for LiF(s) given the following:

sublimation energy for Li(s)	+166 kJ/mol
H_f for F(g)	+77 kJ/mol
first ionization energy of Li(g)	+520. kJ/mol
electron affinity of F(g)	-328 kJ/mol
enthalpy of formation of LiF(s)	-617 kJ/mol

- 285 kJ/mol
- 650. kJ/mol
800. kJ/mol
- 1052 kJ/mol
- 356 kJ/mol

7. As the number of bonds between two carbon atoms increases, which one of the following decreases?

- number of electrons between the carbon atoms
- bond energy
- bond length
- all of these
- none of these

8. Using the following bond energies

Bond	Bond Energy (kJ/mol)
C C	839
C-H	413
O=O	495
C=O	799
O-H	467

estimate the heat of combustion for one mole of acetylene:



- 1228 kJ
- 1228 kJ
- 447 kJ
- +447 kJ
- +365 kJ

9. Which of the following is a valid Lewis structure for O₃?

- :O=O=O:
- :O-O-O:
- :O=O-O:
- :O-O O:
- :O-O=O:

10. Which of the following compounds contains only one unshared pair of valence electrons?
- NH₃
 - H₂O
 - CH₄
 - NaCl
 - BeF₃
11. In the Lewis structure for SF₆, the central sulfur atom shares _____ electrons.
- 4
 - 8
 - 10
 - 12
 - 0, because SF₆ is an ionic compound
12. The geometry of AsCl₅ is
- trigonal bipyramidal.
 - square pyramidal.
 - distorted tetrahedral.
 - octahedral.
 - see-saw
13. The correct molecular structure for IF₄⁻ is:
- square pyramidal
 - tetrahedral
 - square planar
 - octahedral
 - trigonal bipyramidal
14. In the molecule C₂H₄ the valence orbitals of the carbon atoms are assumed to be
- not hybridized.
 - sp hybridized.
 - sp² hybridized.
 - sp³ hybridized.
 - dsp hybridized.
15. The hybridization of sulfur in the sulfate anion, SO₄²⁻, is:
- sp³
 - sp²
 - sp
 - s²p³
 - not hybridized

16. Which of the following contains a π bond?
- H_2CO
 - PF_2
 - C_2H_6
 - HClO
 - CCl_4
17. What is the bond order of Ne_2 ?
- 0
 - $1/2$
 - 1
 - $1\ 1/2$
 - 2
18. In which of the compounds below is there more than one kind of hybridization (sp , sp^2 , sp^3) for carbon?
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
 - $\text{CH}_3\text{CH}=\text{CHCH}_3$
 - $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}_2$
 - $\text{H}-\text{C} \equiv \text{C}-\text{H}$
- II and III
 - II only
 - III and IV
 - I and IV
 - III
19. If four orbitals on one atom overlap four orbitals on a second atom, how many molecular orbitals will form?
- 1
 - 4
 - 8
 - 16
 - 32
20. The configuration $(\sigma_{2s})^2(\sigma_{2s}^*)^2(\pi_{2p_y})^1(\pi_{2p_x})^1$ is the molecular orbital description for the ground state of
- Li_2^+
 - Be_2
 - B_2
 - B_2^{2-}
 - C_2

ANSWER KEY for Quiz 4

Version 1	Version 2	Version 3	Version 4
1. e	1. d (6)	1. c (7)	1. c (20)
2. d	2. a (10)	2. e (16)	2. c (19)
3. b	3. d (5)	3. d (8)	3. d (18)
4. d	4. d (11)	4. c (19)	4. e (17)
5. d	5. d (4)	5. e (15)	5. e (16)
6. d	6. a (12)	6. c (14)	6. e (15)
7. c	7. c (20)	7. a (1)	7. c (14)
8. b	8. b (3)	8. e (17)	8. c (13)
9. c	9. c (13)	9. c (9)	9. e (12)
10. a	10. b (18)	10. b (2)	10. b (11)
11. d	11. d (2)	11. d (18)	11. e (10)
12. a	12. c (9)	12. c (13)	12. c (9)
13. c	13. a (17)	13. d (3)	13. d (8)
14. c	14. e (1)	14. c (20)	14. c (7)
15. a	15. c (14)	15. e (12)	15. b (6)
16. a	16. a (15)	16. b (4)	16. b (5)
17. a	17. c (19)	17. b (11)	17. b (4)
18. b	18. b (8)	18. b (5)	18. d (3)
19. c	19. a (16)	19. e (10)	19. b (2)
20. c	20. c (7)	20. b (6)	20. a (1)