

In Class Exam Ch 6 – 9, 25
Version F (75 pts)
AP Chem

Name: _____
I have neither given nor received aid on this exam.
Period: _____ Date: _____

$$\Delta E = h\nu \quad c = \lambda\nu \quad E_n = \frac{-2.178 \times 10^{-18} \text{ joule}}{n^2} \quad h = 6.63 \times 10^{-34} \text{ J s} \quad c = 3.0 \times 10^8 \text{ m s}^{-1}$$

Multiple Choice (4 pts each): Choose the option that is the best answer or completes each question or statement. Write your answers in the blanks provided.

1. Energy transitions in which an “excited” electron returns to $n = 3$ are associated with:

- The Brackett series
- The Lyman series.
- The Paschen series.
- Visible light.
- None of the above.

Answer: _____

2. Which of the following would have the largest third ionization energy?

- Al
- Mg
- Ne
- F
- None of the above

Answer: _____

3. Which of the following atoms would be considered diamagnetic?

- K
- Mn
- Cu
- Zn
- Not enough information given

Answer: _____

4. Which of the following atoms or ions is smallest in size?

- S^{2-}
- Cl^{1-}
- K^{1+}
- Ca^{2+}
- Not enough information given

Answer: _____

5. The compound with the most polar bond is:

- HF
- H_2O
- NaF
- HCl
- Not enough information given

Answer: _____

6. Which of the following compounds is nonpolar?

- KF
- $C_2H_2Cl_2$
- CH_3Cl
- ClF_3
- None of the above

Answer: _____

7. What is the total number of resonance structures for the NO_3^{1-} compound?
- 1
 - 2
 - 3
 - 4
 - There are no resonance structures.
- Answer:** _____
8. The compound with the smallest lattice energy is:
- MgO
 - NaCl
 - KBr
 - CaO
 - Not enough information given
- Answer:** _____
9. The hybridization present in the I_3^{1-} compound is:
- sp^2
 - sp^3
 - sp^3d
 - sp^3d^2
 - Not enough information given
- Answer:** _____
10. What is a permissible set of quantum numbers for the highest energy electron of Lu?
- 4, 4, 3, $\frac{1}{2}$
 - 5, 3, -2, $\frac{1}{2}$
 - 4, 3, 2, $-\frac{1}{2}$
 - 6, 2, 0, $-\frac{1}{2}$
 - None of the above
- Answer:** _____
11. Which series is ranked in order from smallest to largest (becoming more negative) electron affinity?
- Br, Cl, F
 - P, S, Cl
 - O, F, Ne
 - P, Si, Al
 - None of the above
- Answer:** _____
12. Going left-to-right along any period of the periodic table,
- Electron affinity remains constant.
 - Number of valence electrons decreases.
 - Atomic radius increases.
 - Electronegativity increases.
 - None of the above.
- Answer:** _____
13. In C_3H_4 , there are ___ sigma bonds and ___ pi bonds.
- 6 sigma and 2 pi.
 - 5 sigma and 3 pi.
 - 2 sigma and 2 pi.
 - 6 sigma and 1 pi.
 - Not enough information given
- Answer:** _____

14. The energy associated with the transition from $n=4$ to $n=3$ is:

- a. $1.815 \times 10^{-19} \text{ J}$
- b. $-1.815 \times 10^{-19} \text{ J}$
- c. $1.059 \times 10^{-19} \text{ J}$
- d. $-1.059 \times 10^{-19} \text{ J}$
- e. Not enough information given

Answer: _____

15. Which series lists the compounds in order of decreasing bond angle?

- a. C_2H_2 , C_2H_4 , C_2H_6
- b. C_2H_6 , C_2H_4 , C_2H_2
- c. H_2O , NH_3 , CH_4
- d. CH_4 , H_2O , NH_3
- e. Not enough information given

Answer: _____

16. (15 pts) Draw and name 4 isomers of $\text{C}_3\text{H}_6\text{O}$, putting one isomer in each box below.

17. (8 pts) Name and label the atomic orbitals and the sigma and pi orbitals in C_3H_4 .