

In Class Exam Ch 6 – 9, 25
Version E (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.

- The energy associated with the transition from $n=2$ to $n=5$ is:
 - $4.574 \times 10^{-19} \text{ J}$
 - $-4.574 \times 10^{-19} \text{ J}$
 - $6.534 \times 10^{-19} \text{ J}$
 - $-6.534 \times 10^{-19} \text{ J}$
 - Not enough information given

Answer: _____
- The compound with the least polar bond is:
 - HF
 - H₂O
 - NH₃
 - CH₄
 - Not enough information given

Answer: _____
- Which series is ranked in order from largest to smallest (becoming less negative) electron affinity?
 - Ne, F, O
 - Al, Si, P
 - Br, Cl, F
 - Cl, S, P
 - None of the above

Answer: _____
- Which of the following would have the largest second ionization energy?
 - Cl
 - Ar
 - K
 - Ca
 - None of the above

Answer: _____
- The compound with the largest lattice energy is:
 - MgO
 - NaCl
 - KBr
 - CaO
 - Not enough information given

Answer: _____
- Energy transitions in which an “excited” electron returns to $n = 1$ are associated with:
 - The Lyman series.
 - The Paschen series.
 - The Brackett series
 - Infrared light.
 - None of the above.

Answer: _____

7. Which of the following atoms should display the greatest level of paramagnetism?
a. K
b. Ca
c. Cr
d. Mn
e. Not enough information given **Answer: _____**

8. Which of the following compounds is polar?
a. BeF₂
b. BF₃
c. CF₄
d. NF₃
e. Not enough information given **Answer: _____**

9. Going down any group of the periodic table,
a. Atomic radius decreases.
b. Electronegativity remains constant.
c. Ionization energy decreases.
d. Number of valence electrons increases.
e. None of the above. **Answer: _____**

10. What is the total number of resonance structures for the SO₃ compound?
a. 1
b. 2
c. 3
d. 4
e. There are no resonance structures. **Answer: _____**

11. The hybridization present in the BrF₃ compound is:
a. sp²
b. sp³
c. sp³d
d. sp³d²
e. Not enough information given **Answer: _____**

12. Which of the following atoms or ions is largest in size?
a. O²⁻
b. F¹⁻
c. Na¹⁺
d. Mg²⁺
e. Not enough information given **Answer: _____**

13. In C₃H₆, there are ___ sigma bonds and ___ pi bonds.
a. 3 sigma and 1 pi.
b. 9 sigma and 0 pi.
c. 8 sigma and 1 pi.
d. 2 sigma and 1 pi.
e. Not enough information given **Answer: _____**

14. What is a permissible set of quantum numbers for the highest energy electron of cadmium?
- a. 3, 2, 0, $\frac{1}{2}$
 - b. 4, 2, -1, $\frac{1}{2}$
 - c. 4, 3, 2, $-\frac{1}{2}$
 - d. 5, 2, -2, $-\frac{1}{2}$
 - e. None of the above

Answer: _____

15. Which series lists the compounds in order of increasing bond angle?
- a. CH_4 , NH_3 , H_2O
 - b. CH_4 , H_2O , NH_3
 - c. C_2H_2 , C_2H_6 , CH_4
 - d. C_2H_6 , C_2H_4 , C_2H_2
 - e. Not enough information given

Answer: _____

16. (15 pts) Draw and name 4 isomers of $\text{C}_4\text{H}_{10}\text{O}$, putting one isomer in each box below.

17. (8 pts) Name and label the atomic orbitals and the sigma and pi orbitals in SiO₂.