

In Class Exam Ch 6 – 9, 25
Version G (84 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 $n = 4$ are associated with:

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

Answer: _____

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

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

Answer: _____

3. Which of the following atoms would be considered the most paramagnetic?

- K
- Sc
- Ti
- Ni
- Not enough information given

Answer: _____

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

- O^{2-}
- F^{1-}
- Na^{1+}
- Mg^{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?

- NaCl
- $C_2F_2Cl_2$
- CH_3Cl
- BrF_5
- None of the above

Answer: _____

7. What is the total number of resonance structures for the SO_4^{2-} compound?
a. 1
b. 2
c. 3
d. 4
e. There are no resonance structures. **Answer: _____**

8. The compound with the smallest lattice energy is:
a. BaS
b. MgS
c. LiF
d. NaF
e. Not enough information given **Answer: _____**

9. The hybridization present in the PBr_3 compound is:
a. sp^2
b. sp^3
c. sp^3d
d. sp^3d^2
e. Not enough information given **Answer: _____**

10. What is a permissible set of quantum numbers for the highest energy electron of Ac?
a. 6, 3, 1, $\frac{1}{2}$
b. 5, 3, -2, $\frac{1}{2}$
c. 7, 2, 2, $-\frac{1}{2}$
d. 6, 2, 0, $-\frac{1}{2}$
e. None of the above **Answer: _____**

11. Which series is ranked in order from smallest to largest (becoming more negative) electron affinity?
a. O, F, Ne
b. P, Si, Al
c. Br, Cl, F
d. P, S, Cl
e. None of the above **Answer: _____**

12. Going down any column of the periodic table,
a. Electron affinity decreases.
b. Electronegativity increases.
c. Number of valence electrons decreases.
d. Atomic radius increases.
e. None of the above. **Answer: _____**

13. In C_2H_2 , there are ___ sigma bonds and ___ pi bonds.
a. 2 sigma and 2 pi.
b. 2 sigma and 3 pi.
c. 3 sigma and 2 pi.
d. 3 sigma and 1 pi.
e. Not enough information given **Answer: _____**

14. The energy associated with the transition from $n = 4$ to $n = 2$ 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. None of the above

Answer: _____

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

- a. H_2O , NH_3 , CH_4
- b. CH_4 , H_2O , NH_3
- c. NO_3^- , SO_4^{2-} , CN^-
- d. CN^- , NO_3^- , SO_4^{2-}
- e. None of the above

Answer: _____

16. (16 pts) Draw and name 4 isomers of $\text{C}_2\text{H}_7\text{N}$, 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 .