

Practice Test Chapters 7-9

In which set of elements would all members be expected to have very similar chemical properties?

- A) O, S, Se
- B) N, O, F
- C) Na, Mg, K
- D) S, Se, Si
- E) Ne, Na, Mg

The atomic radius of main-group elements generally increases down a group because _____.

- A) effective nuclear charge increases down a group
- B) effective nuclear charge decreases down a group
- C) effective nuclear charge zigzags down a group
- D) the principal quantum number of the valence orbitals increases
- E) both effective nuclear charge increases down a group, and the principal quantum number of the valence orbitals increases

Which of the following is an isoelectronic series?

- A) B^{5-} , Si^{4-} , As^{3-} , Te^{2-}
- B) F^- , Cl^- , Br^- , I^-
- C) S, Cl, Ar, K
- D) Si^{2-} , P^{2-} , S^{2-} , Cl^{2-}
- E) O^{2-} , F^- , Ne, Na^+

Of the following elements, _____ has the most negative electron affinity.

- A) S
- B) Cl
- C) Se
- D) Br
- E) I

In general, as you go across a period in the periodic table from left to right:

- (1) the atomic radius _____;
- (2) the electron affinity becomes _____ negative; and
- (3) the first ionization energy _____.

- A) decreases, decreasingly, increases
- B) increases, increasingly, decreases
- C) increases, increasingly, increases
- D) decreases, increasingly, increases
- E) decreases, increasingly, decreases

In which of the molecules below is the carbon-carbon distance the shortest?

- A) $\text{H}_2\text{C}=\text{CH}_2$
- B) $\text{H}-\text{C}\equiv\text{C}-\text{H}$
- C) $\text{H}_3\text{C}-\text{CH}_3$
- D) $\text{H}_2\text{C}-\text{C}\equiv\text{CH}_2$
- E) $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_3$

How many electrons are in the Lewis structure of a nitrite ion (NO_2^-)?

- A) 18
- B) 17
- C) 16
- D) 23
- E) 24

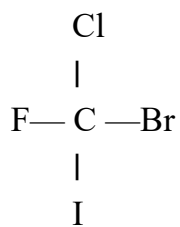
Resonance structures differ by _____.

- A) number and placement of electrons
- B) number of electrons only
- C) placement of atoms only
- D) number of atoms only
- E) placement of electrons only

What is the electron configuration for the Co^{2+} ion?

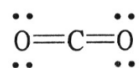
- A) $[\text{Ar}]4s^13d^6$
- B) $[\text{Ar}]3d^7$
- C) $[\text{Ar}]3d^5$
- D) $[\text{Ar}]4s^23d^9$
- E) $[\text{Ne}]3s^23p^{10}$

In the molecule below, which atom has the largest partial negative charge?



- A) Cl
- B) F
- C) Br
- D) I
- E) C

The formal charge on carbon in the molecule below is _____.



- A) 0
- B) +1
- C) +2
- D) +3
- E) -1

The oxidation number of phosphorus in PF_5 is _____.

- A) +5
- B) +3
- C) +1
- D) -5
- E) 0

The molecular geometry of the BrO_3^- ion is _____.

- A) trigonal pyramidal
- B) trigonal planar
- C) bent
- D) tetrahedral
- E) T-shaped

An electron domain consists of _____.

- a) a nonbonding pair of electrons
 - b) a single bond
 - c) a multiple bond
- A) a only
 - B) b only
 - C) c only
 - D) a, b, and c
 - E) b and c

What is the molecular shape of H_2O ?

- A) T-shaped
- B) tetrahedral
- C) linear
- D) trigonal pyramidal
- E) bent

Of the molecules below, only _____ is nonpolar.

- A) BF_3
- B) NF_3
- C) IF_3
- D) PBr_3
- E) BrCl_3

The hybridizations of nitrogen in NF_3 and NH_3 are _____ and _____, respectively.

- A) sp^2 , sp^2
- B) sp , sp^3
- C) sp^3 , sp
- D) sp^3 , sp^3
- E) sp^2 , sp^3

An antibonding MO _____ the corresponding bonding MO.

- A) is always lower in energy than
- B) can accommodate more electrons than
- C) can accommodate fewer electrons than
- D) is always higher in energy than
- E) is always degenerate with

The F-N-F bond angle in the NF_3 molecule is slightly less than _____.

- A) 90°
- B) 109.5°
- C) 120°
- D) 180°
- E) 60°