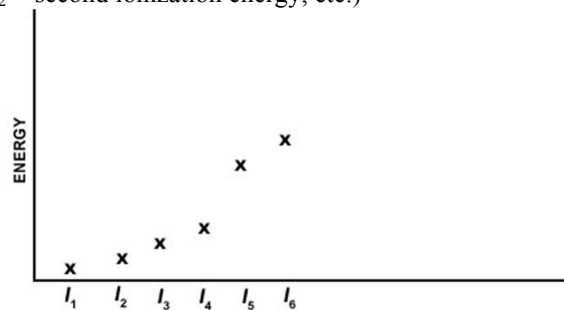


Chem 2 Chapter 8 Multiple Choice Review

- How many *valence electrons* does a carbon atom have?
A. 1 B. 2 C. 3 D. 4 E. 6
- Which of these atoms has the largest radius?
A. B B. Ga C. Br D. Si E. Cl
- If the radius of atom X is greater than the radius of atom Y, then it is also likely that
A. X has a larger electron affinity than Y does.
B. X has a larger effective nuclear charge than Y does.
C. X has greater metallic character than Y does.
D. X has a larger first ionization energy than Y does.
E. X is a poorer conductor of electricity than Y when in the solid state.
- The elements in Group 7A are known by what name?
A. transition metals D. alkaline earth metals
B. halogens E. noble gases
C. alkali metals
- The nineteenth century chemists arranged elements in the periodic table according to increasing
A. atomic number.
B. number of electrons.
C. atomic mass.
D. number of neutrons.
E. nuclear binding energy.
- Which of these compounds is a *basic oxide*?
A. NO₂ B. H₂O C. Na₂O D. SnO E. SO₂
- Which of these elements has the smallest first ionization energy?
A. Li B. Na C. Be D. K E. Rb
- Which of these atoms has the smallest radius?
A. Al B. P C. As D. Te E. Na
- The sulfide ion, S²⁻, is isoelectronic with which one of the following?
A. O²⁻ B. F⁻ C. Na⁺ D. Al³⁺ E. K⁺
- Which of these elements exhibits chemical behavior similar to that of potassium?
A. magnesium D. chlorine
B. sodium E. iron
C. beryllium
- Which one of these ions has the largest radius?
A. Cl⁻ B. K⁺ C. S²⁻ D. Na⁺ E. O²⁻
- Which of these ground-state ions has unpaired electrons?
A. P³⁻ B. V⁵⁺ C. Mg²⁺ D. Sc²⁺ E. S²⁻
- The representative elements are those with unfilled energy levels in which the "last electron" was added to
A. an s orbital. D. a p or d orbital.
B. an s or p orbital. E. an f orbital.
C. a d orbital.
- The second ionization energy of Mg is _____ than its first ionization energy, and is _____ than the second ionization energy of Na.
A. higher, higher C. higher, lower
B. lower, higher D. lower, lower
- What is the charge on the monatomic ion of nitrogen, the nitride ion?
A. +2 B. +1 C. -1 D. -2 E. -3
- The general electron configuration for atoms of the halogen group is
A. ns²np⁶. D. ns¹.
B. ns²np⁵. E. ns²np⁷.
C. ns²np⁶(n-1)d⁷.
- Which of these elements has the greatest metallic character?
A. Br B. F C. Ge D. Mn E. Sc
- Which of these elements has the highest first ionization energy?
A. Cs B. Ga C. K D. Bi E. As
- How many 3d electrons does the copper(I) ion, Cu⁺, have?
A. 10 B. 9 C. 8 D. 7 E. 6
- An element with the general electron configuration for its outermost electrons of ns²np¹ would be in which element group?
A. 2A B. 3A C. 4A D. 5A E. 8A
- Which one of these ions does *not* have [Kr] as its electronic configuration?
A. Se²⁻ B. Br⁻ C. Rb⁺ D. Y³⁺ E. Zn²⁺
- Which of these elements has the greatest electron affinity (largest positive value)?
A. Mg B. Al C. Si D. P E. S
- Since zirconium is a metal, ZrO₂ is expected to be a/an _____ oxide.
A. acidic D. neutral
B. ionic E. basic
C. amphoteric
- The general electron configuration for noble gas atoms is
A. ns²np⁶. D. ns²np³.
B. ns²np⁵. E. ns².
C. ns²np⁴.
- For phosphorus atoms, which ionization energy will show an exceptionally large increase over the previous ionization energy?
A. 2nd B. 3rd C. 4th D. 5th E. 6th

26. The electron configuration of a cobalt(III) ion is
 A. $[\text{Ar}]3d^5$ D. $[\text{Ar}]3d^6$
 B. $[\text{Ar}]4s^13d^5$ E. $[\text{Ar}]4s^23d^9$
 C. $[\text{Ar}]4s^23d^4$
27. The successive ionization energies of a certain element are $I_1 = 577.9 \text{ kJ/mol}$, $I_2 = 1820 \text{ kJ/mol}$, $I_3 = 2750 \text{ kJ/mol}$, $I_4 = 11,600 \text{ kJ/mol}$, and $I_5 = 14,800 \text{ kJ/mol}$. This pattern of ionization energies suggests that the unknown element is
 A. K. B. Al. C. Cl. D. Se. E. Kr.
28. Which two electron configurations represent elements that would have similar chemical properties?
 (1) $1s^22s^22p^4$
 (2) $1s^22s^22p^5$
 (3) $[\text{Ar}]4s^23d^{10}4p^3$
 (4) $[\text{Ar}]4s^23d^{10}4p^4$
 A. (1) and (2) D. (2) and (4)
 B. (1) and (3) E. (2) and (3)
 C. (1) and (4)
29. Which of these species make an *isoelectronic pair*: Cl^- , O^{2-} , F , Ca^{2+} , Fe^{3+}
 A. Ca^{2+} and Fe^{3+} D. Cl^- and Ca^{2+}
 B. O^{2-} and F E. none of these
 C. F and Cl^-
30. Which of these compounds is an *amphoteric oxide*?
 A. Na_2O D. SO_2
 B. MgO E. Cl_2O_7
 C. Al_2O_3
31. Which of these compounds is an *acidic oxide*?
 A. P_4O_{10} D. K_2O
 B. MgO E. Cr_2O_3
 C. Fe_2O_3
32. Which ion is *isoelectronic* with Ar?
 A. Fe^{2+} B. F^- C. Br^- D. Ga^{3+} E. Ca^{2+}
33. Which of these ground-state ions has the largest number of unpaired electrons?
 A. Cr^{2+} B. Mn^{2+} C. Ni^{2+} D. Cu^+ E. Co^{2+}
34. Consider the following reaction: $3\text{Li} + \text{Z} \rightarrow \text{Li}_3\text{Z}$. What is the formula for the compound if we substitute magnesium for lithium?
 A. MgZ D. Mg_3Z
 B. Mg_2Z E. Mg_3Z_2
 C. MgZ_2
35. For which of these reactions is the enthalpy change equal to the second ionization energy of nitrogen?
 A. $\text{N}^{2+}(\text{g}) \rightarrow \text{N}^{3+}(\text{g}) + \text{e}^-$
 B. $\text{N}^{2+}(\text{g}) + \text{e}^- \rightarrow \text{N}^+(\text{g})$
 C. $\text{N}(\text{g}) \rightarrow \text{N}^{2+}(\text{g}) + 2\text{e}^-$
 D. $\text{N}^-(\text{g}) + \text{e}^- \rightarrow \text{N}^{2-}(\text{g})$
 E. $\text{N}^+(\text{g}) \rightarrow \text{N}^{2+}(\text{g}) + \text{e}^-$
36. How many 3d electrons does an Fe^{3+} ion have?
 A. 9 B. 6 C. 5 D. 4 E. 3
37. Which of these elements has the following pattern for its first six ionization energies? (I_1 = first ionization energy, I_2 = second ionization energy, etc.)



- A. Ca B. Si C. Al D. Se E. P

38. For silicon atoms, which ionization energy will show an exceptionally large increase over the preceding ionization energy?
 A. 2nd B. 3rd C. 4th D. 5th E. 6th
39. Consider the following reaction $2\text{A} + 3\text{F}_2 \rightarrow 2\text{AF}_3$. What is the formula for the reaction product if we substitute sulfur for fluorine?
 A. A_2S_3 B. A_3S_2 C. AS_3 D. A_3S E. AS
40. Arrange these ions in order of increasing ionic radius:
 K^+ , P^{3-} , S^{2-} , Cl^- .

- Increasing radius \rightarrow
 A. $\text{K}^+ < \text{Cl}^- < \text{S}^{2-} < \text{P}^{3-}$
 B. $\text{K}^+ < \text{P}^{3-} < \text{S}^{2-} < \text{Cl}^-$
 C. $\text{P}^{3-} < \text{S}^{2-} < \text{Cl}^- < \text{K}^+$
 D. $\text{Cl}^- < \text{S}^{2-} < \text{P}^{3-} < \text{K}^+$
 E. $\text{Cl}^- < \text{S}^{2-} < \text{K}^+ < \text{P}^{3-}$