

AP Chemistry

Chapter 8 Practice Problems

1. Write the full electron configuration of the Period 2 element with the following successive IEs (i.e. 1st, 2nd, 3rd, etc. ionization energy) (in KJ/mol):
 $IE_1 = 801$; $IE_2 = 2427$; $IE_3 = 3659$; $IE_4 = 25,022$; $IE_5 = 32,822$
2. How many unpaired electrons are present in the ground state of an atom from group 5A?
3. Rank the ions in the following set in order of decreasing size; Te^{2-} , Cs^+ , I^-
4. Given the following elements S, K, F, B which one will have the;
 - a) lowest IE_1
 - b) most negative EA_1
 - c) largest atomic radius
 - d).most unpaired electrons (in their ground state)
 - e) greatest shielding of valence electron(s) from core electrons
5. A fundamental law of electrostatics states that the energy required to separate opposite charges of magnitude Q_1 and Q_2 that are distance d apart is a function of Q_1Q_2/d^2 . Use this law and any other factors to explain the following observations:
 - a) The IE_2 of He ($Z = 2$) is more than twice the IE_1 of H ($Z = 1$)
 - b) The IE_1 of He is less than twice the IE_1 of H
6. How much energy would be required to ionize 5.00mg of $Na_{(g)}$ atoms to $Na^+_{(g)}$ ions? The first ionization energy of Na atoms is 496kJ/mol
7. Write the condensed orbital box diagram for Co^{2+} in its ground state electron configuration. Is the ion paramagnetic?
8. Give a reasonable set of quantum numbers for the outermost electron in the ground state of aluminum.
9. How many electrons in a given atom can have the values $n = 5$, $l = 3$, $m_s = -\frac{1}{2}$
10. Given that the internuclear distance for an iodine molecule is 266pm and that of a chlorine molecule is 198pm, determine the internuclear distance for the molecule ICl, iodine monochloride.