CH301 Fall 2009 Practice Quiz 4

1. All of the species below have the same bond order except for one. Which is it?
   1. C_2^{3+}
   2. H_2^-
   3. F_2^+
   4. O_2^{3-}
   5. Ne_2^+

2. Which of the species below is the most paramagnetic?
   1. O_2^-
   2. C_2
   3. N_2^+
   4. B_2
   5. Li_2^-

3. Rank the following species from longest to short bonds based on bond order: O_2^+, He_2^+, B_2^-, F_2, C_2.
   1. $B_2^- > He_2^+ > F_2 > C_2 > O_2^+$
   2. $B_2^- > He_2^+ > F_2 > O_2^+ > C_2$
   3. $He_2^+ > F_2 > B_2^- > C_2 > O_2^+$
   4. $He_2^+ > F_2 > B_2^- > C_2 > O_2^+$
   5. $F_2 > He_2^+ > B_2^- > C_2 > O_2^+$

4. Consider the reaction below. If one 1 g of ethanol (CH_3CH_2OH) is completely combusted and the products are collected in a 0.5 L vessel, what will the pressure be inside that vessel at 450 K?

   $CH_3CH_2OH(l) + 3\ O_2(g) \rightarrow 3\ H_2O(l) + 2\ CO_2(g)$

   1. 5.84 atm
   2. 1.60 atm
   3. 2.57 atm
   4. 8.02 atm

5. A sample of gas stored at 25 °C has a pressure of 2.50 atm. If the temperature is increased to 50 °C, what will the new pressure be?
   1. 2.71 atm
   2. 5.00 atm
   3. 1.25 atm
   4. 2.31 atm

6. According to kinetic molecular theory, which of the following factors will affect the velocity of a gas molecule?

   I. the system's temperature
   II. the molecule's dipole
   III. the molecule's mass

   1. I only
   2. II only

3. III only
4. I and II
5. I and III
6. II and III
7. I, II and III