Review Material #3

1. An inductive effect is _________________.
   a) felt through space
   b) felt through bonds
   c) felt through bonds or space
   d) none of the above

2. Inductive effect _________________.
   a) is highest for most electronegative atoms
   b) decreases as the number of intervening bonds increase
   c) is typically additive
   d) all of the above

3. The inductive effect on methylenic carbon in F3C-CH2-OH is _________________.
   a) greater than that on equivalent carbon in F3C-CH3
   b) lower than that on equivalent carbon in F3C-CH3
   c) equal to that on equivalent carbon in F3C-CH3
   d) none of the above

4. The pKa of acetic acid is 4.5, while that of ethanol is 16.5 because
   a) of stronger hydrogen bonding between H2O and COOH than between H2O and OH.
   b) of weaker hydrogen bonding between H2O and COOH than between H2O and OH.
   c) of stronger inductive effect of =O than –H.
   d) of weaker inductive effect of =O than –H.

5. The order of pKa for the following series of compounds is:
   CH3COOH       CH2FCOOH       CF3COOH
   I             II            III
   a) I > II > III
   b) II > III > I
   c) III > I > II
   d) III > II > I

6. The order of pKa for the following series of compounds is:
   CH3CH2CH2COOH       I
   Cl-CH2CH2CH2COOH      II
   CH3CHCICH2COOH       III
   CH3CH2CHClCOOH       IV
7. The order of pKa for the following series of compounds is:
   CH₃COOH
   ClCH₂COOH
   CHCl₂COOH
   CCl₃COOH

   a) I > II > III > IV
   b) II > III > IV > I
   c) III > IV > I > II
   d) IV > III > II > I

8. The order of pKa for the following series of compounds is:
   CH₃CH₂CH₂NH₂
   Cl-CH₂CH₂CH₂NH₂
   CH₃CHClCH₂NH₂
   CH₃CH₂CHClNH₂

   a) I > II > III > IV
   b) II > III > IV > I
   c) III > IV > I > II
   d) IV > III > II > I

9. Aniline is less basic than cyclohexylamine due to
   a) resonance
   b) inductance
   c) none of the above
   d) all of the above

10. The order of group electronegativities is ______________
    e) −NO₂ > -COOH > -CHO ~ -CN
    f) −NO₂ > -CN ~ -CHO > -COOH
    g) −all of the above
    h) −none of the above