Chem 350 Jasperse Quiz #1 Due: Fri, Sept 6 Name:

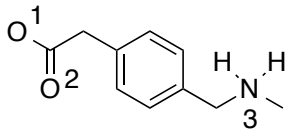
1. For the compound methylamine, CH_3NH_2, which of the following statements is true for the nitrogen atom?

a. It has a formal +1 charge.
b. It has a formal -1 charge.
c. It has no formal charge, but has a slight negative charge, δ-
d. It has no formal charge, but has a slight positive charge, δ+

2. Draw an appropriate Lewis structure nitric acid HNO_3 (which has structure $HONO_2$) Which of the following statements is true? (Note: hard one, can't do without formal charges.)

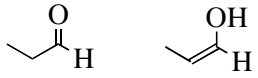
a. none of the atoms has any formal charge
b. the nitrogen has 4 bonds and a formal charge of +1. One of the two oxygens is doubly bonded with no formal charge; the other is singly bonded with formal charge -1. A second equivalent resonance structure can also be drawn.
c. the hydrogen atom is bonded to nitrogen
d. the nitrogen has a formal charge of -2
e. two of the oxygens are doubly bonded to the nitrogen, and neither has any formal charge. The other oxygen is singly bonded to both the nitrogen and the hydrogen, and also has no formal charge.

3. Circle the TWO true statements relative to the structure shown? (Assume enough lone pairs to satisfy octet rule for each atom.)

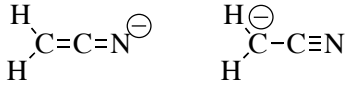


a. For lone pairs, O(1) would have one; O(2) two; and N(3) none
b. For lone pairs, O(1) would have two; O(2) two; and N(3) one
c. For lone pairs, O(1) would have three; O(2) two; and N(3) none
d. For formal charges, O(1) would be anion; O(2) neutral; and N(3) cation
e. For formal charges, O(1) would be cation; O(2) neutral; and N(3) anion
f. For formal charges, O(1) would be neutral; O(2) neutral; and N(3) cation

4. Which of the following represent pairs of resonance structures? (If you select only one pair when two pairs qualify, you won't get credit.)

a.  only

b.  only

c. 

d. Both a and c.

e. Both b and c.

5. Rank the acidity of the following chemicals, from most acidic to least acidic: (think Anion stability!)

a. HF > CH_3OH > CH_3CO_2H >CH_3NH_2
b. HF > CH_3NH_2 > CH_3CO_2H > CH_3OH
c. CH_3CO_2H > CH_3OH > CH_3NH_2 > HF
d. HF > CH_3CO_2H > CH_3OH > CH_3NH_2