

Chem 350 Jasperse Quiz #1

Name:

Due: Wednesday, Sept. 6

Class # (Copy for Future Reference!):

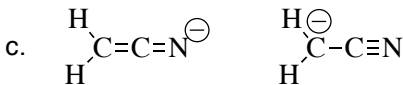
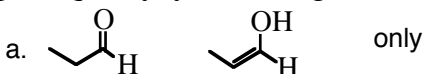
1. For the compound methylamine, CH_3NH_2 , which of the following statements is true for the nitrogen atom?

- It has a formal +1 charge.
- It has a formal -1 charge.
- It has no formal charge, but has a slight negative charge, δ^- .
- 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.)

- none of the atoms has any formal charge
- 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.
- the hydrogen atom is bonded to nitrogen
- the nitrogen has a formal charge of -2
- 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. Which of the following represent pairs of resonance structures? (If you select only one pair when two pairs qualify, you won't get credit.)



d. Both a and c.

e. Both b and c.

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

- $\text{HF} > \text{CH}_3\text{OH} > \text{CH}_3\text{CO}_2\text{H} > \text{CH}_3\text{NH}_2$
- $\text{HF} > \text{CH}_3\text{NH}_2 > \text{CH}_3\text{CO}_2\text{H} > \text{CH}_3\text{OH}$
- $\text{CH}_3\text{CO}_2\text{H} > \text{CH}_3\text{OH} > \text{CH}_3\text{NH}_2 > \text{HF}$
- $\text{HF} > \text{CH}_3\text{CO}_2\text{H} > \text{CH}_3\text{OH} > \text{CH}_3\text{NH}_2$

5. Draw the Lewis structure for ethanal, CH_3CHO . Which of the following statements is true?

- Both carbons are sp^3 hybridized.
- One of the carbons has 109° bond angles and the other has 120° bond angles.
- One of the carbons has 109° bond angles and the other has 180° bond angles.
- It is possible for all of the atoms in the molecule to be in the same plane.