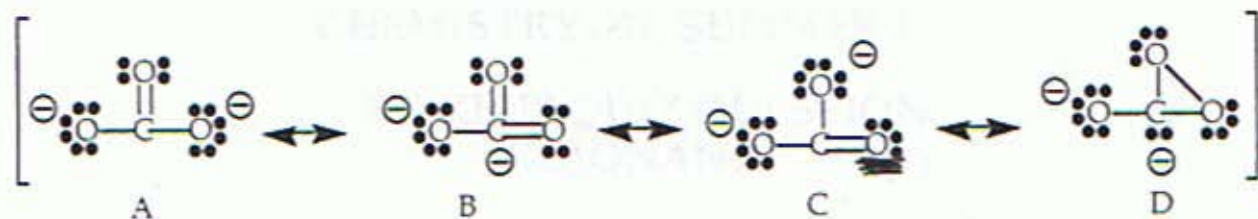


III. (26 points total)

A resonance description of the carbonate ion,  $\text{CO}_3^{2-}$ , is shown below. It is known that the only bonds are between carbon and the oxygens.

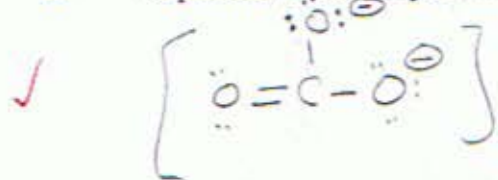
26



a. (6 points) What structure(s) should not be considered important? Why?

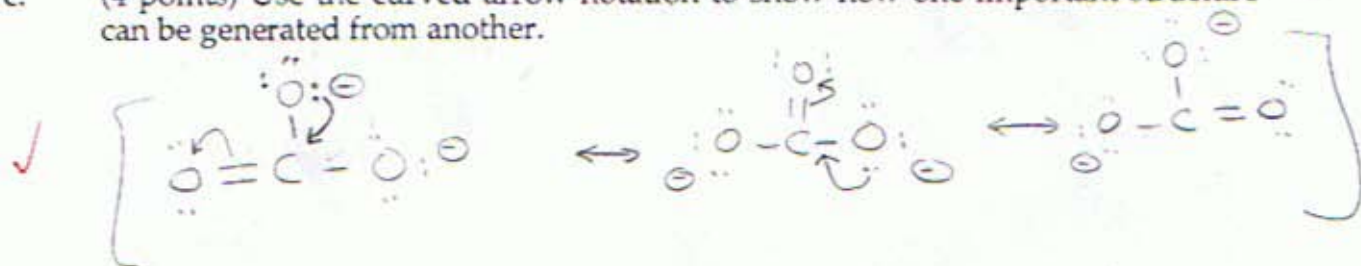
✓ D and B because octet rule is violated for B. Also there are bonds between O-O in D, less number of bonds between C-O for B the carbon has extra double bonds, more than 8 electrons in valence shell which can't happen for second row in periodic table because lack of f orbital.

b. (4 points) What important structure(s) should be added?



- also Carbon having a -ve charge eventhough oxygen is the more electronegative. In general a good Lewis structure should obey the octet rule, have maximum number of double bond and -ve charge post to be on more electronegative.

c. (4 points) Use the curved arrow notation to show how one important structure can be generated from another.



d. (6 points) What is the predicted bond order of a CO bond?

✓  $\frac{4}{3} = 1\frac{1}{3}$

e. (6 points) What is the predicted charge on each oxygen?

✓  $\frac{-1-1}{3} = -\frac{2}{3}$