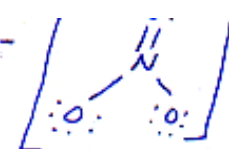


3.7 (a) Oxidation states: $N^{5+} + 3O^{2-} \equiv [NO_3]^-$
 formal charges:

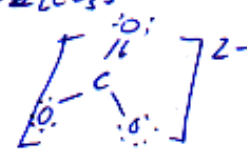


atom	Valence e^-	- nonbonding e^-	$-\frac{1}{2} \times$ bonding e^-	= formal charge
N	5	0	$\frac{1}{2} \times 8$	+1
-O:	6	6	$\frac{1}{2} \times 2$	-1
=O:	6	4	$\frac{1}{2} \times 4$	0

(b) CO_3^{2-} oxidation states: $C^{4+} + 3O^{2-} \equiv [CO_3]^{2-}$

formal charges:

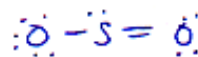
atom	VE	NBE	$\frac{1}{2} BE$	= formal charge
C	4	0	$\frac{1}{2} \times 8$	0
-O	6	6	$\frac{1}{2} \times 2$	-1
=O	6	4	$\frac{1}{2} \times 4$	0



(c) Oxidation states: $2O^{-2} + S^{+4} \equiv [SO_2]$

formal charges:

atom	VE	NBE	$\frac{1}{2} BE$	= FC
S	6	2	$\frac{1}{2} \times 6$	+1
-O	6	6	$\frac{1}{2} \times 2$	-1
=O	6	4	$\frac{1}{2} \times 4$	0



note, the sum of formal charges adds up to the total charge on the ion.

also, all ~~ways~~ of these Lewis structures can be drawn in several ~~ways~~ equivalent ways, called resonance.

For example:

