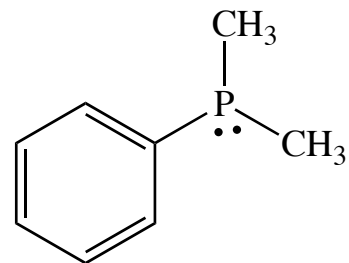
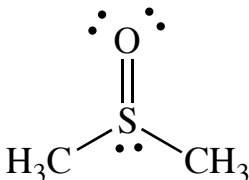
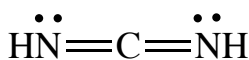
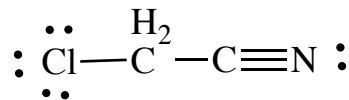
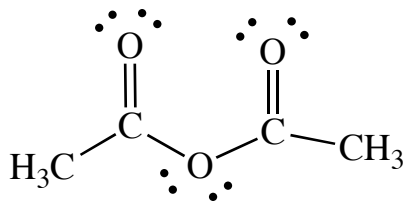
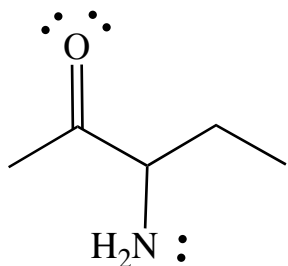


## Ex16 - Lewis/Resonance

### Question One

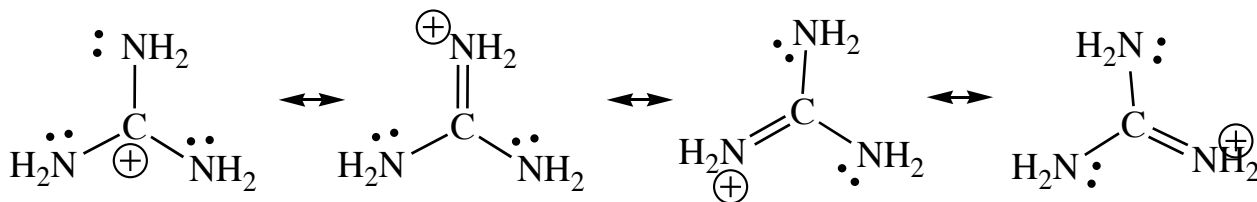
For each of the following, add the requisite non-bonding electrons.



### Question Two

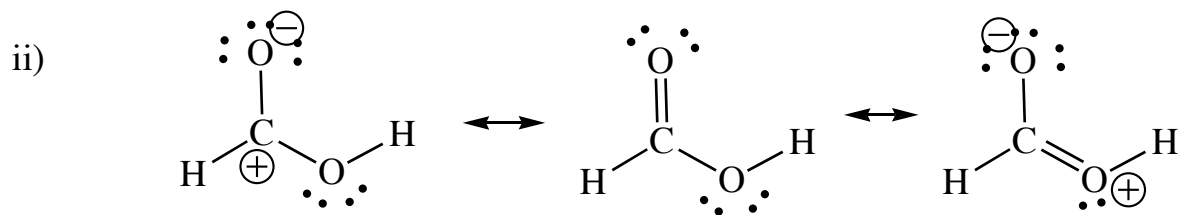
Work out the Lewis structures for all of the following using the connectivity information given.

i)  $C(NH_2)_3^+$  - C is central with 3 C-N bonds.



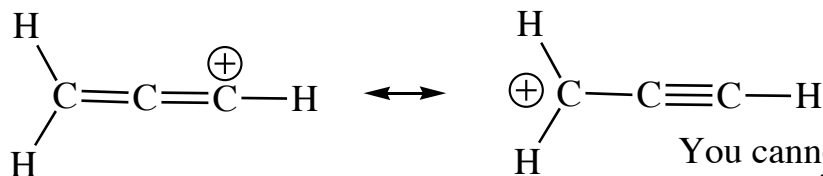
Electron deficient carbon, so minor.

The last three are degenerate.



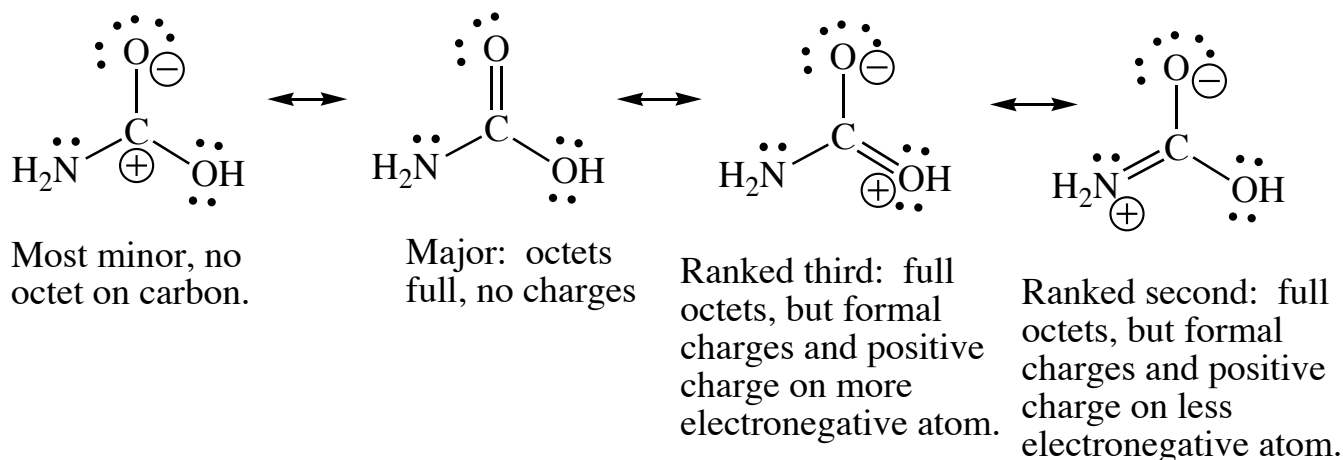
The second structure contributes most (all octets complete, no charges). the first contributes least because carbon lacks an octet.

iii) the propargyl cation,  $C_3H_3^+$ ...



You cannot yet judge which structure is better here.

iv) Carbamic acid



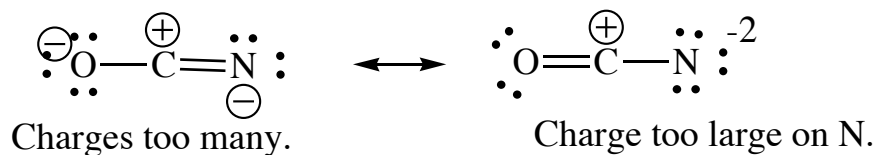
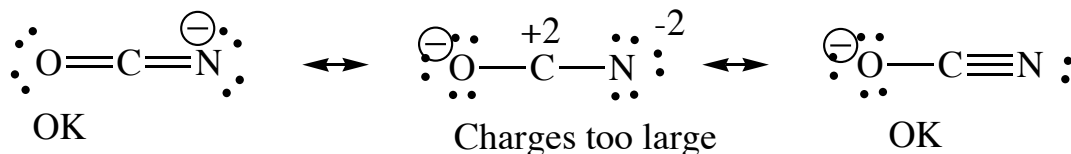
### Question Three

Where possible, evaluate the resonance structures in your answers to Question Two, determine which are degenerate, and which are major/minor contributors.

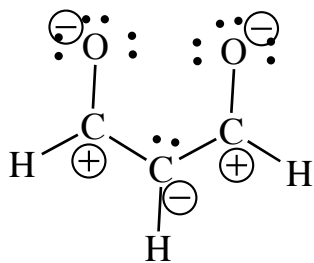
### Question Four

In each of the following cases, add formal charges and identify which resonance structures we would not include and why. All non-bonding electrons are shown.

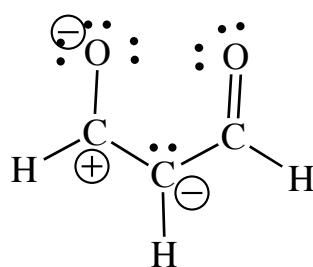
a)



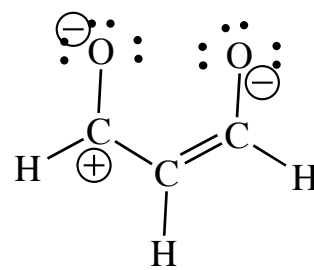
b)



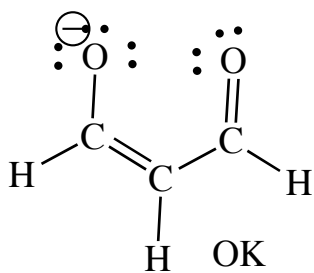
Too many charges



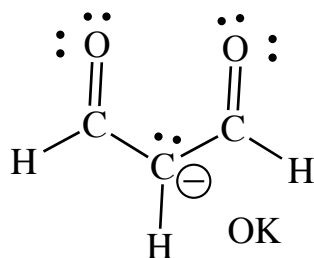
Too many charges



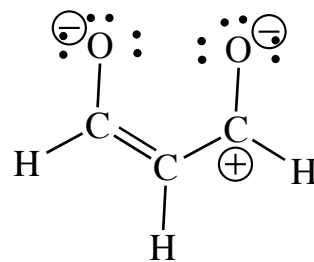
Too many charges



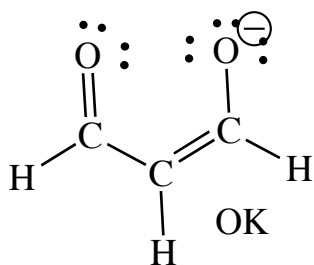
OK



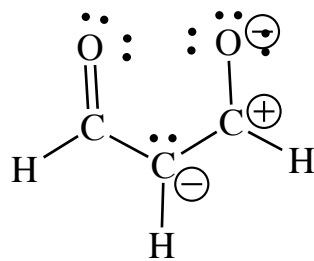
OK



Too many charges



OK



Too many charges