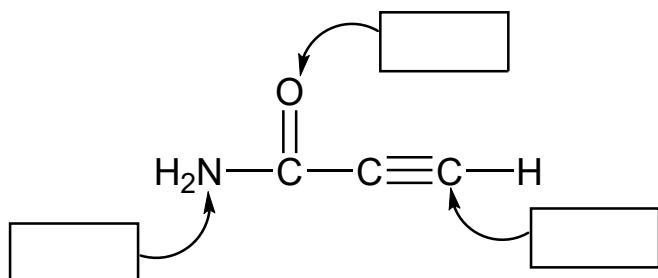


3. (27 pts) Short Answer. Place answers in boxes, when provided.

A) (7 pts) Identify the hybridization of the indicated atoms (place answers in boxes).



Are the lone pairs on the **oxygen** atom localized or delocalized?

Is the lone pair on the **nitrogen** atom localized or delocalized?

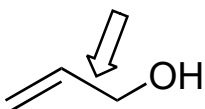
B) (4 pts) For each, indicate your choice (**A**, **B** or **C**) for whether it involves:

A) covalent bonding only; **B**) ionic bonding only; **C**) both covalent and ionic bonding



C) (5 pts) Indicate the **type** of the designated bond (sigma σ , or pi π) and the **orbitals** that are overlapping to form it (p , sp , sp^2 , sp^3).

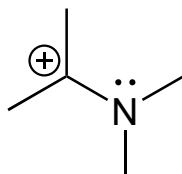
How many
hydrogen atoms
are in the given
compound?



type:

orbitals:

D) (5 pts) Draw a resonance hybrid for the following cation:



E) (6 pts) Is the following molecule polar or nonpolar? Explain, **using drawings as appropriate**.

