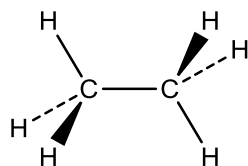


## CHEM1611 Worksheet 5 – Answers to Critical Thinking Questions

The worksheets are available in the tutorials and form an integral part of the learning outcomes and experience for this unit.

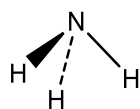
### Model 1: Bonding in Organic Molecules

1. Four.



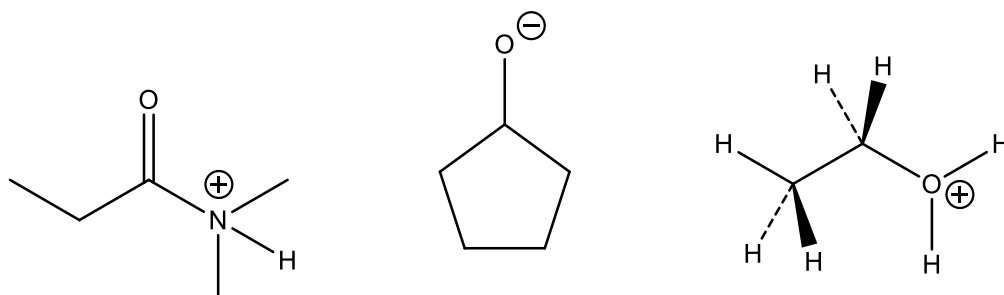
2. Two.

3. It occupies the position of a bond, causing the shape to be pyramidal rather than planar.



4. Negative charge: one less bond than typical. Positive charge: one more bond than typical.  
Number of bonds = typical number + charge.

5. See below.



### Model 2: Hybridization

- Each is made up by mixing  $2s$  with three  $2p$  orbitals. Each is 25%  $2s$  and 75%  $2p$ .
- Three hybrid orbitals would result. They are arranged in a trigonal plane with  $120^\circ$  between them.
- $sp^2$
- The  $p$ -orbital that is left over has 1 electron in it. It can combine with the  $p$ -orbital on the other carbon to make a  $\pi$  bond with 2 electrons in.
- Weaker due to poorer overlap.
- 2 bonds: a double bond.