

## CHEM HELP *ASAP*

### Organic Chemistry Problem Set Solutions

#### Assigning Hybridization and Geometry to Atoms

Instructions: For the questions below, assign the correct hybridization ( $sp^3$ ,  $sp^2$ , or  $sp$ ), approximate bond angle, and geometry to each of the second-row atoms in each molecule.

Suggested playlist:

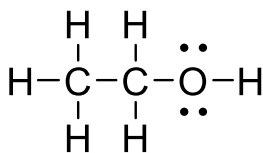
[https://www.youtube.com/watch?v=4zu2x2GsLVg&list=PLIzSRqjN72jfPWtbRF7X\\_kegZ6YcV-rNG](https://www.youtube.com/watch?v=4zu2x2GsLVg&list=PLIzSRqjN72jfPWtbRF7X_kegZ6YcV-rNG)

YouTube video of answered questions:

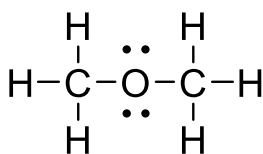
<https://youtu.be/jHoPPCEXt5M>

Questions:

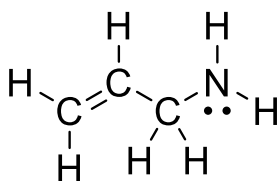
1. ethanol



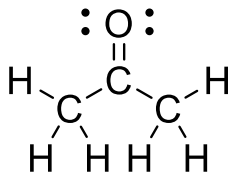
2. methyl ether



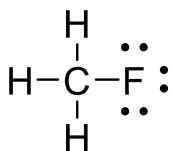
3. allyl amine



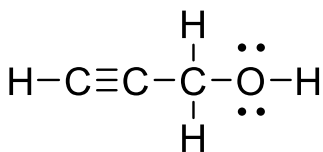
4. acetone



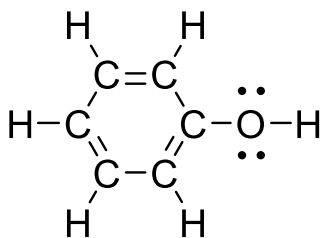
5. fluoromethane



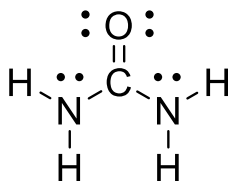
6. propargyl alcohol



7. phenol

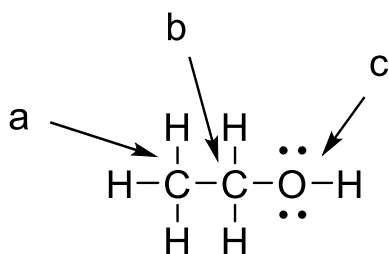


8. urea



Solutions:

1. ethanol

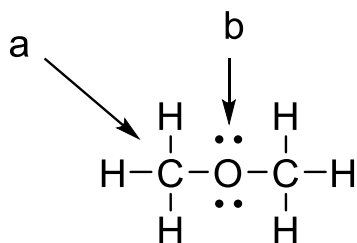


a:  $sp^3$ ,  $109.5^\circ$ , tetrahedral

b:  $sp^3$ ,  $109.5^\circ$ , tetrahedral

c:  $sp^3$ ,  $109.5^\circ$ , bent

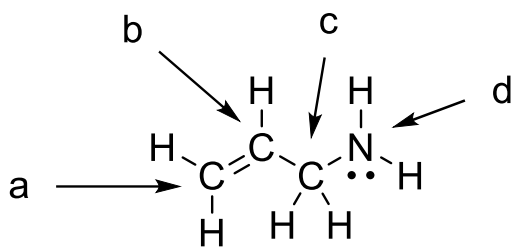
2. methyl ether



a:  $sp^3$ ,  $109.5^\circ$ , tetrahedral

b:  $sp^3$ ,  $109.5^\circ$ , bent

3. allyl amine



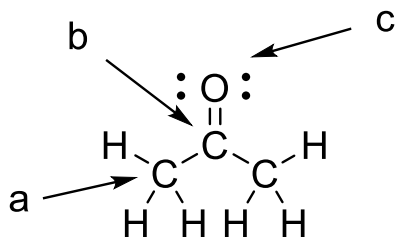
a:  $sp^2$ ,  $120^\circ$ , trigonal planar

b:  $sp^2$ ,  $120^\circ$ , trigonal planar

c:  $sp^3$ ,  $109.5^\circ$ , tetrahedral

d:  $sp^3$ ,  $109.5^\circ$ , trigonal pyramidal

4. acetone

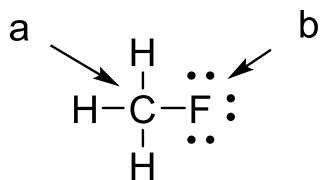


a:  $sp^3$ ,  $109.5^\circ$ , tetrahedral

b:  $sp^2$ ,  $120^\circ$ , trigonal planar

c:  $sp^2$ , n/a, n/a

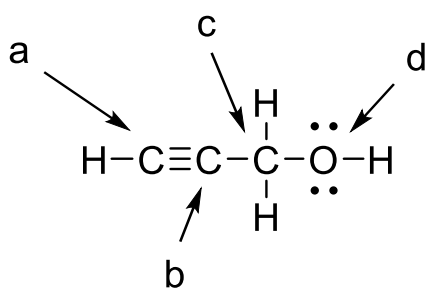
5. fluoromethane



a: sp<sup>3</sup>, 109.5°, tetrahedral

b: sp<sup>3</sup> (?), n/a, n/a

6. propargyl alcohol



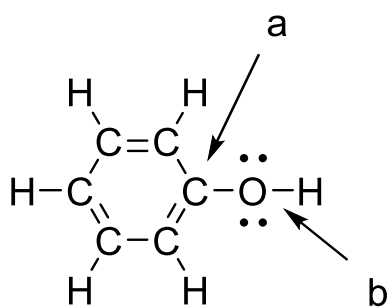
a: sp, 180°, linear

b: sp, 180°, linear

c: sp<sup>3</sup>, 109.5°, tetrahedral

d: sp<sup>3</sup>, 109.5°, bent

7. phenol

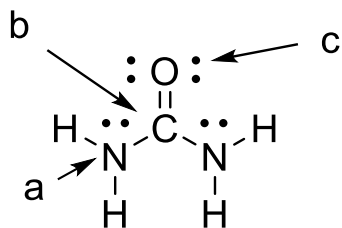


a: sp<sup>2</sup>, 120°, trigonal planar

b: sp<sup>2</sup>, 120°, bent

(other carbons also sp<sup>2</sup>, 120°, trig. pl.)

8. urea



a: sp<sup>2</sup>, 120°, trigonal planar

b: sp<sup>2</sup>, 120°, trigonal planar

c: sp<sup>2</sup> (?), n/a, n/a