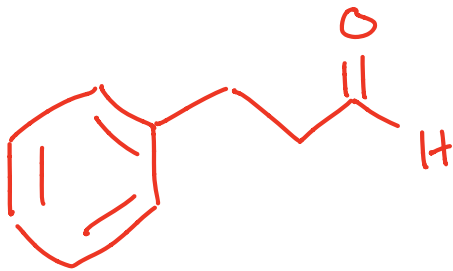
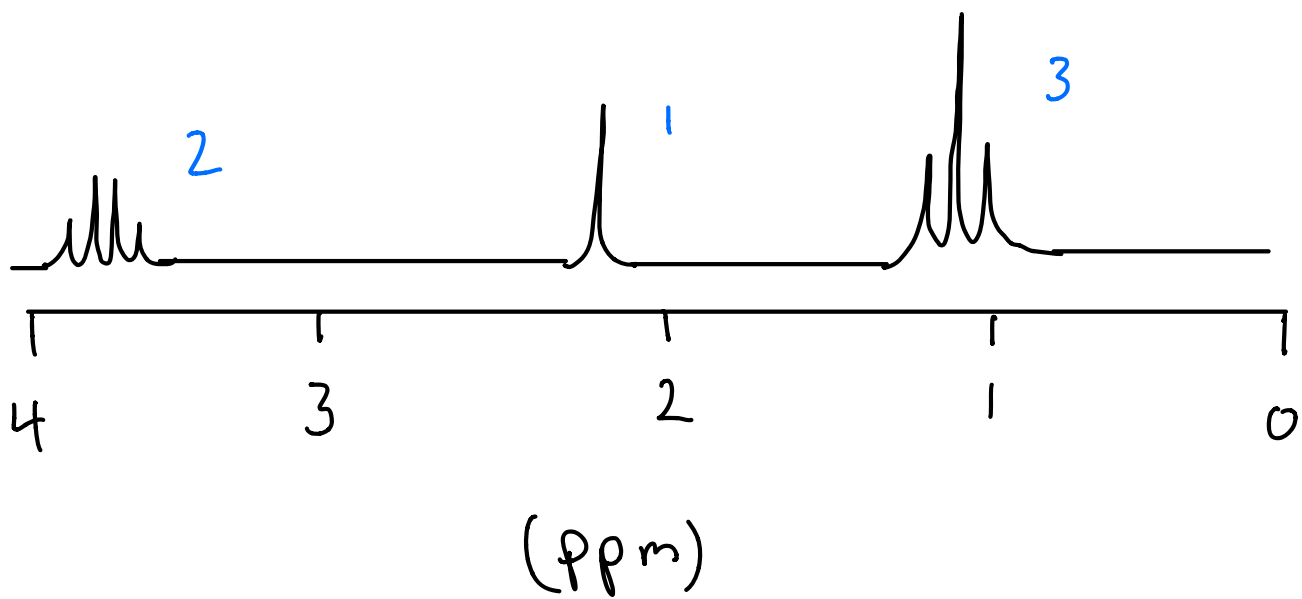


$$IHD = \frac{2C + 2 + N - H - X}{2}$$

$$= \frac{18 + 2 - 10}{2} = 5 \rightarrow \text{benzene} + 1 \pi \text{ bond}$$



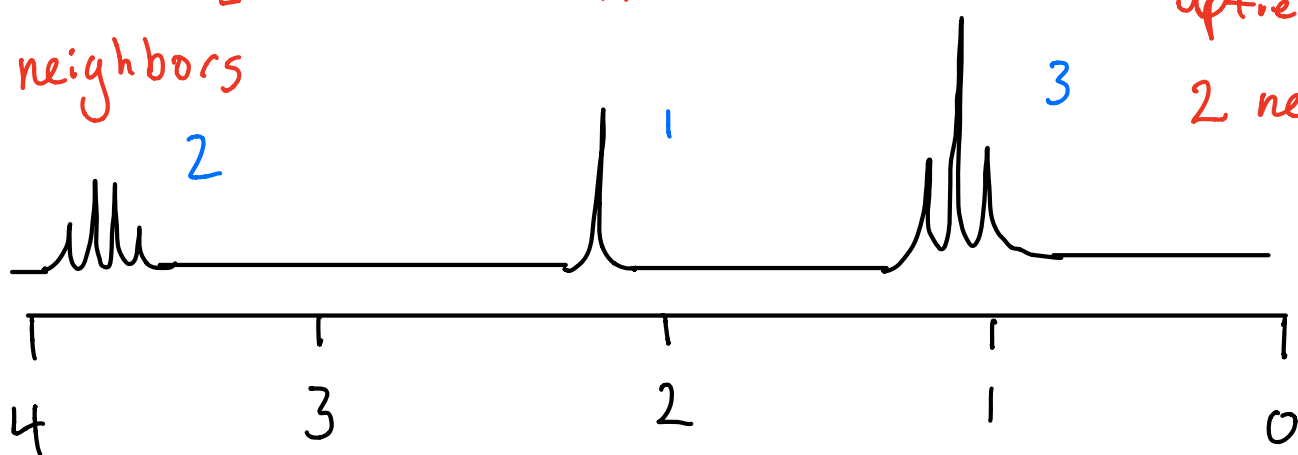




downfield  $\text{CH}_2$   
3 neighbors

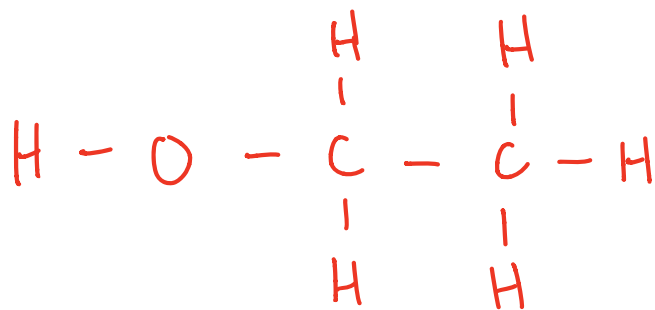
H -

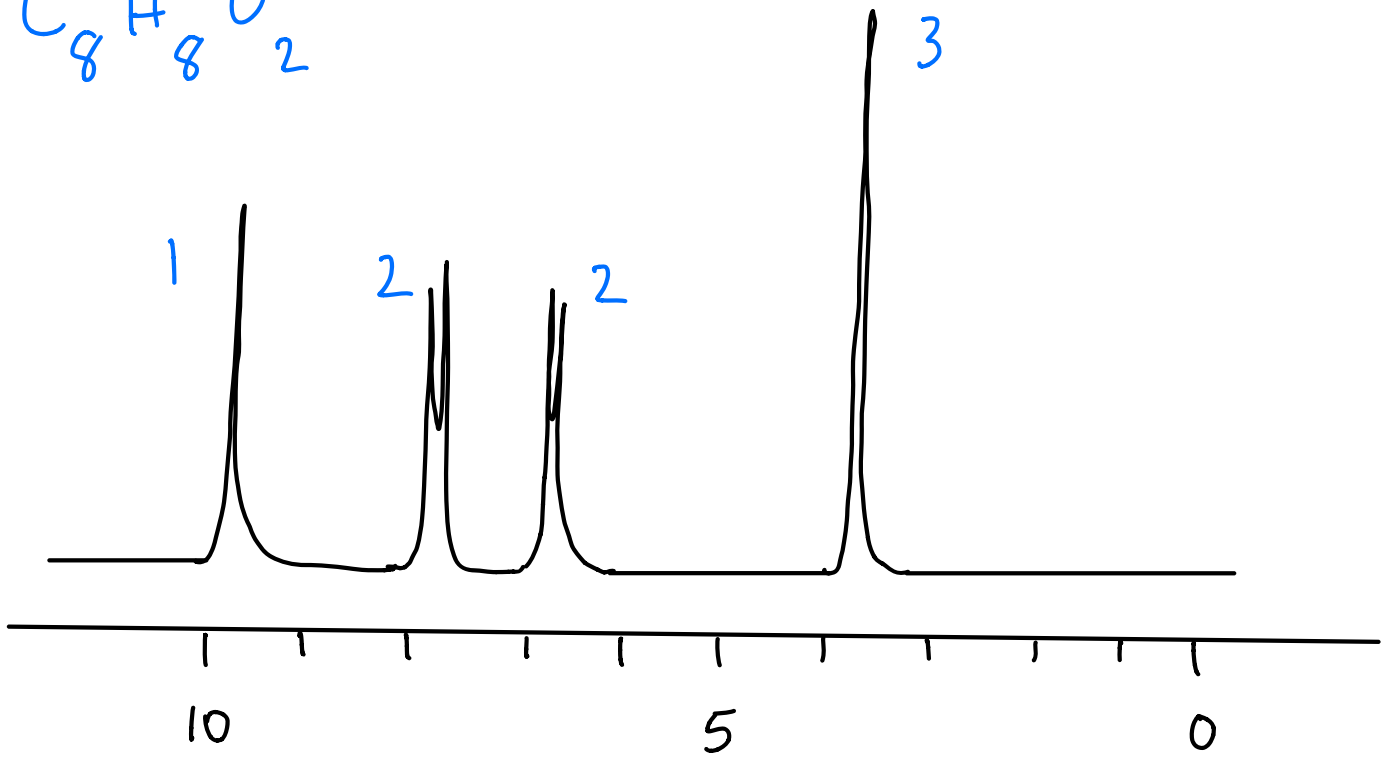
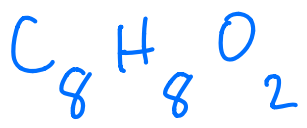
upfield  $\text{CH}_3$   
2 neighbors

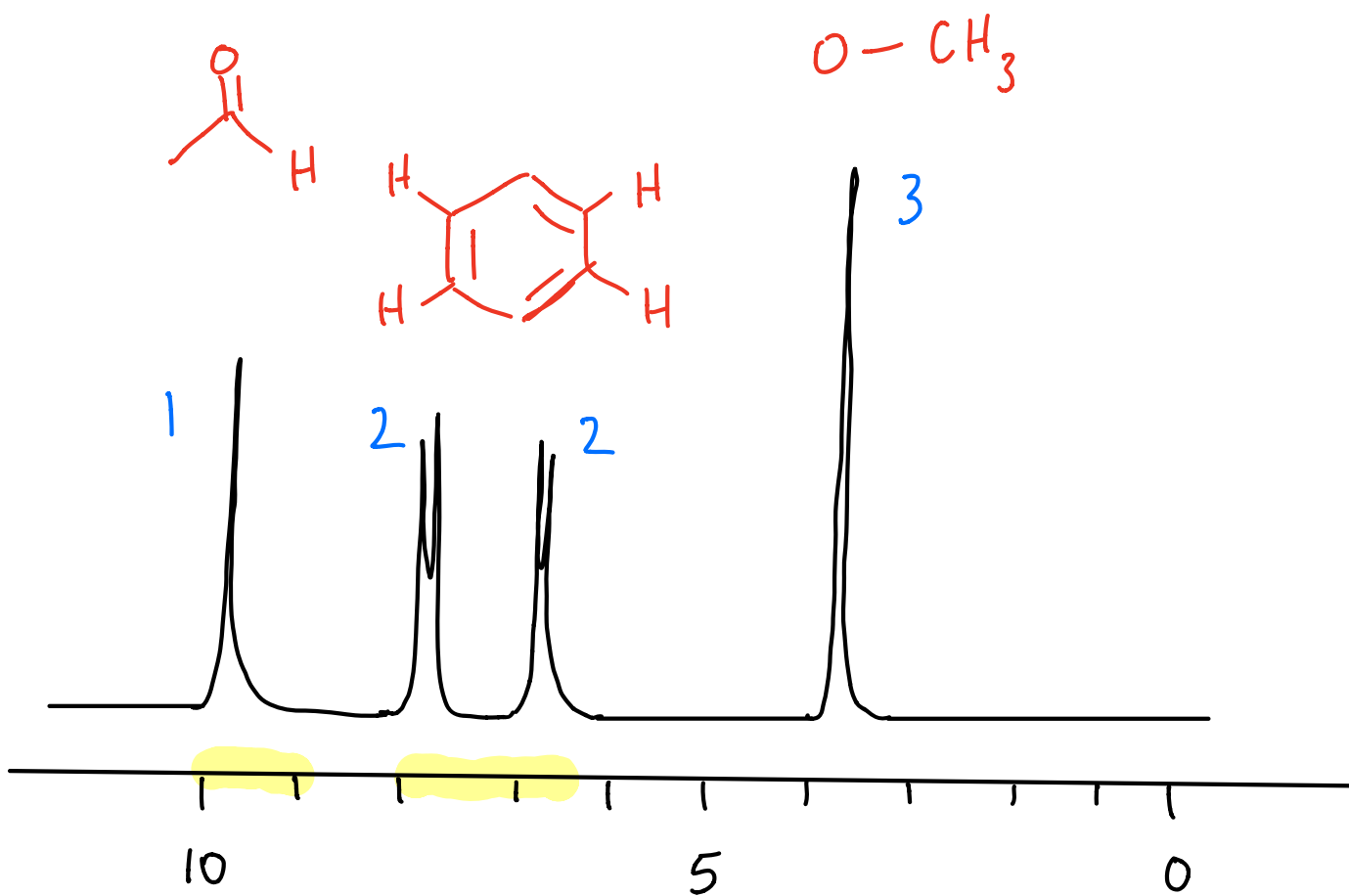
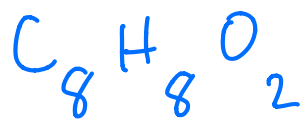


(ppm)

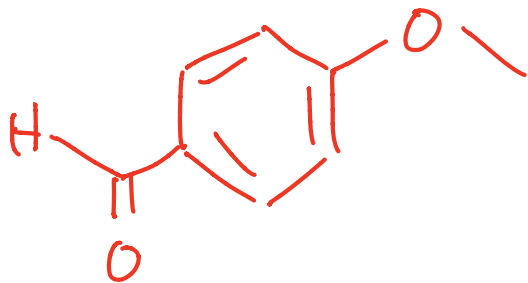
$$IHD = \frac{4 + 2 - 6}{2} = 0$$

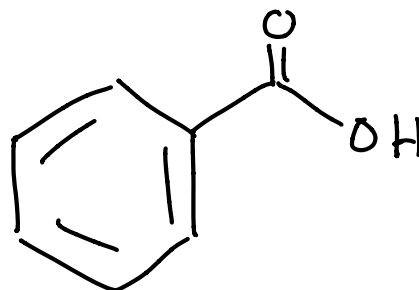
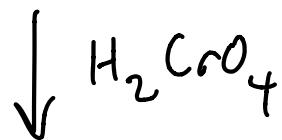
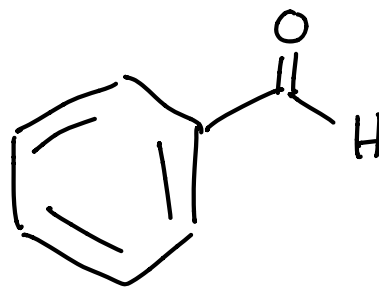
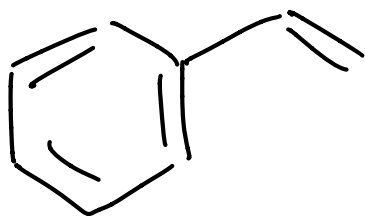






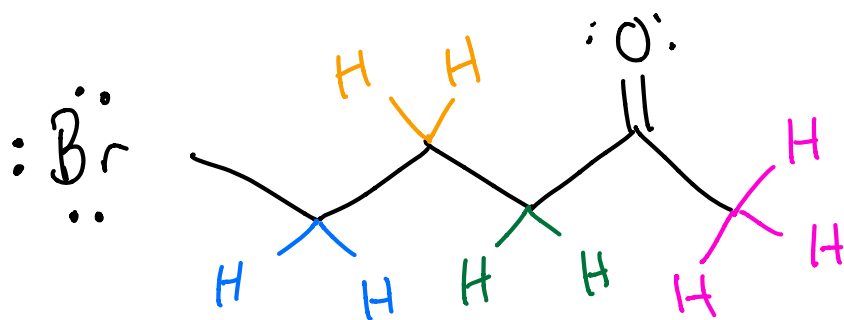
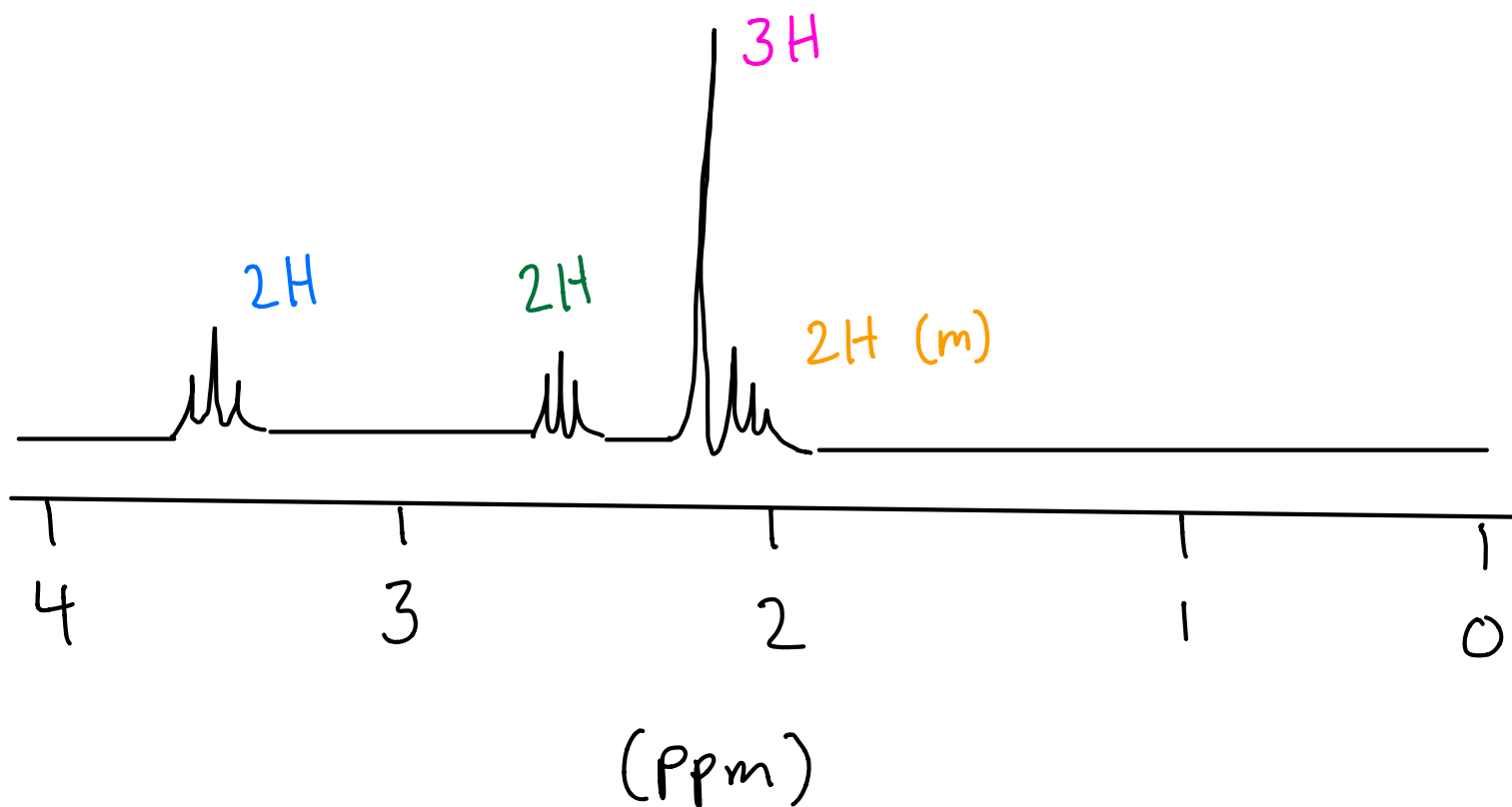
$$IHD = \frac{16 + 2 - 8}{2} = 5 \rightarrow \text{benzene} + \pi \text{ bond}$$



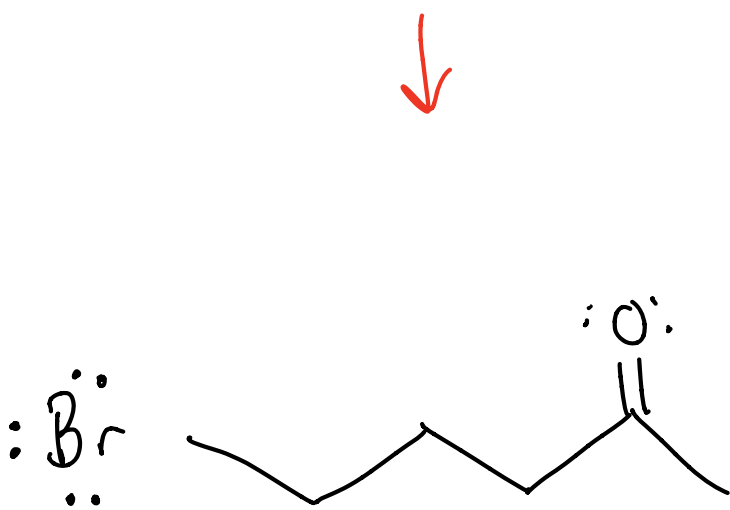
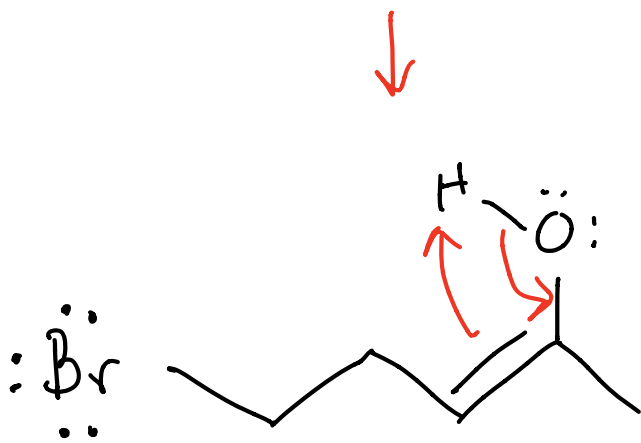
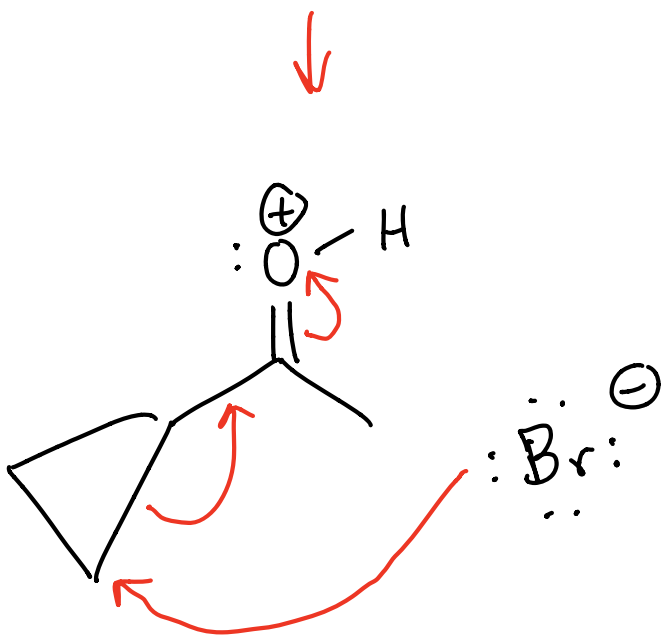
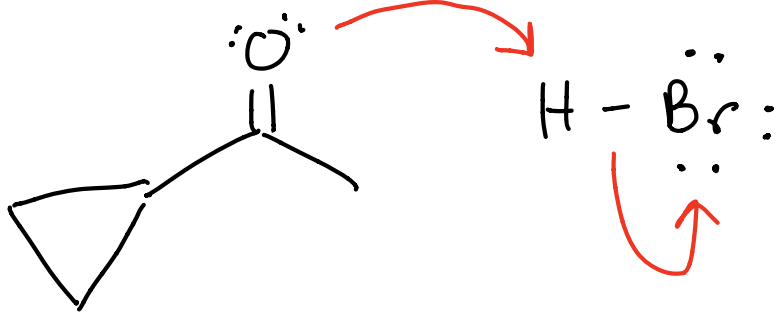


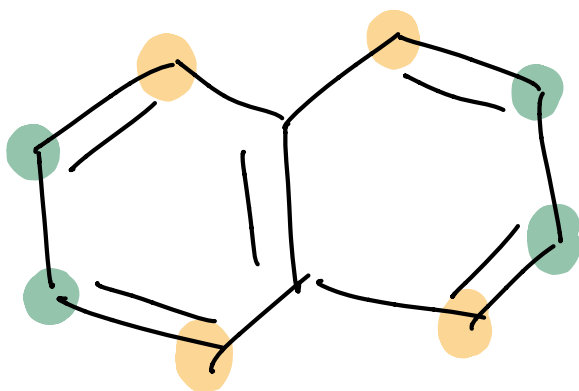
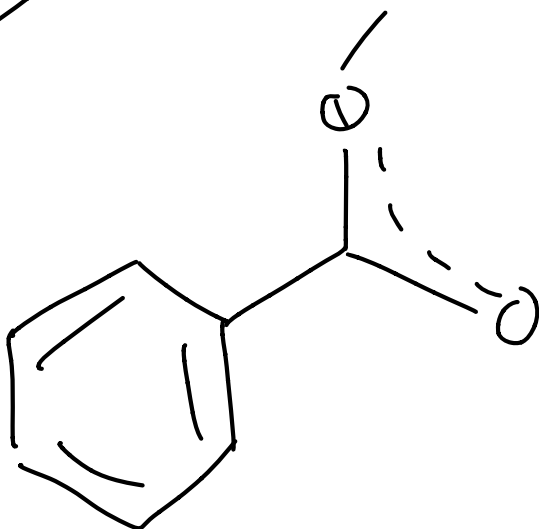
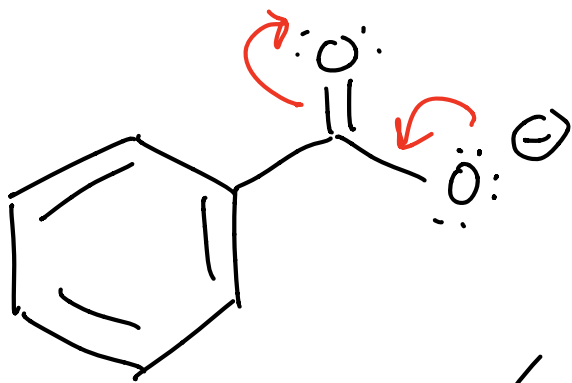
The spectrum represents the reaction product when HBr is added to acetylcyclopropane.

Propose a mechanism for its formation, and assign each signal to hydrogens on your final structure.

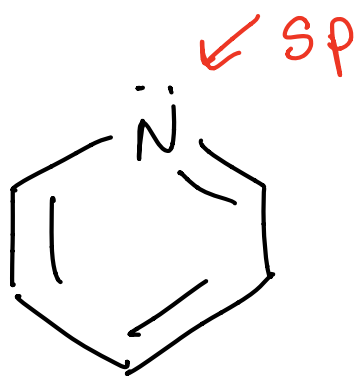




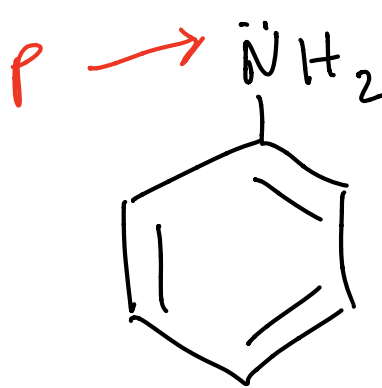




$$IHD = \frac{2C + 2 + N - H - X}{2}$$



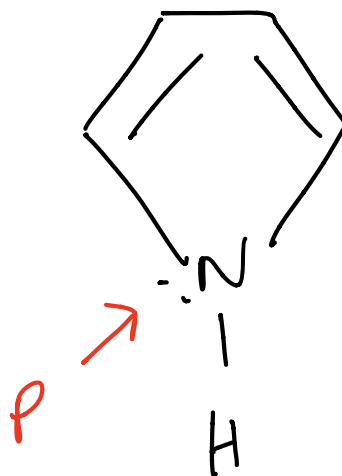
pyridine



aniline



imidazole



pyrrole

$sp^2 \rightarrow$  3 regions of electron density dedicated to bonds



$sp^2$