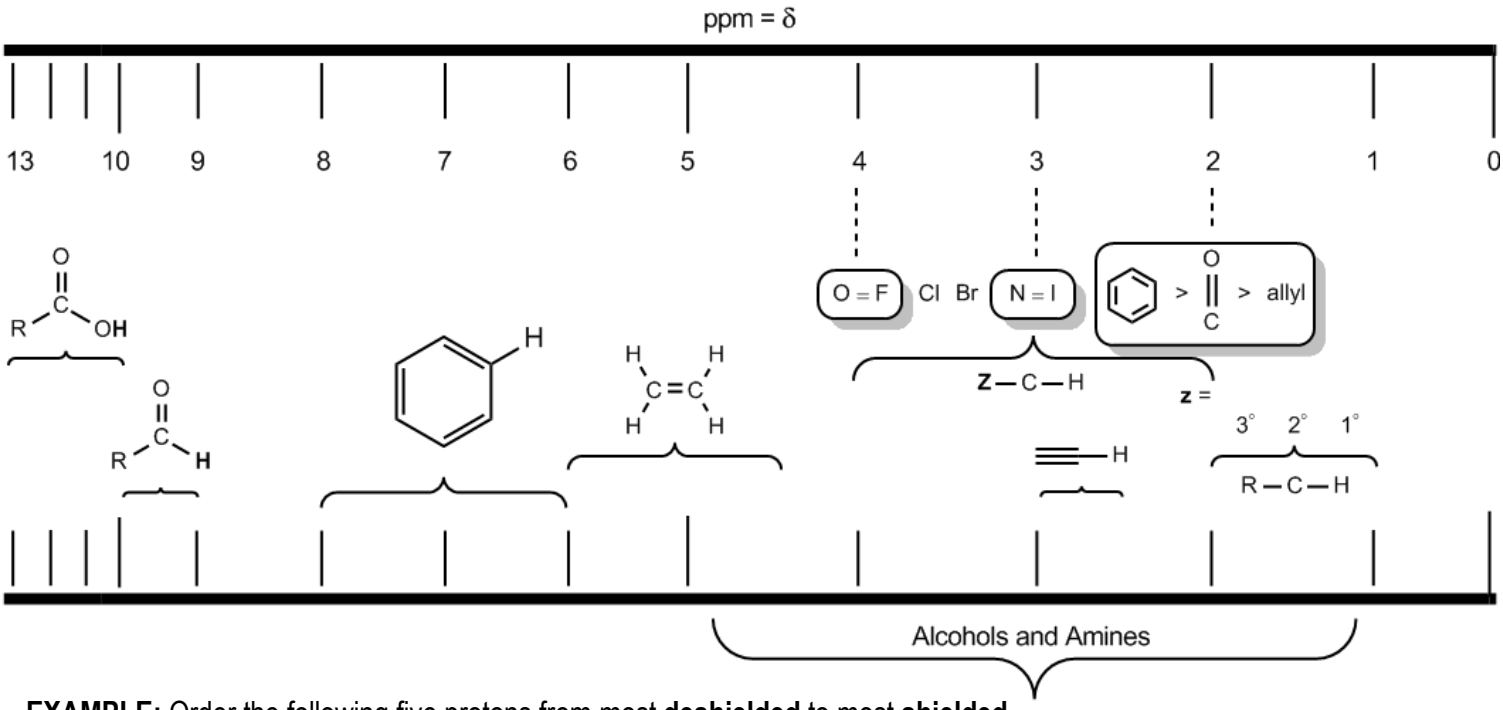
CONCEPT: ^{1}H NMR – CHEMICAL SHIFTS

The chemical shift indicates the exact electrochemical environment that each proton is experiencing.

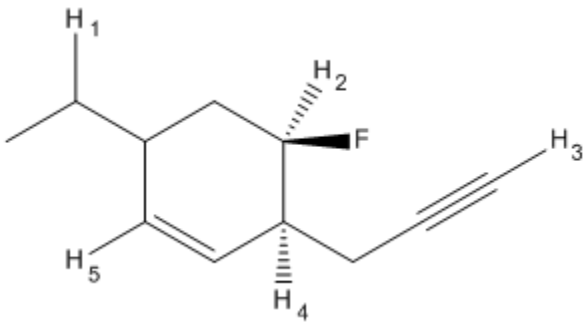
- In general, *electronegative groups* will pull electrons away from nuclei, *deshielding* them
- Shifts increase (move *downfield*) as protons become more deshielded

C – H	**1 – 2**	C = C	**4.5 – 6**
C ≡ C	**2.5**	Benzene	**6 – 8**
Z – C – H	**2 – 4**	Aldehyde, -CHO	**9-10**
OH, NH	**1 – 5**	Carboxylic Acid , -COOH	**10-13**

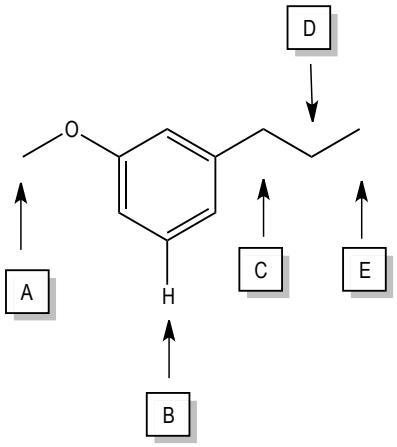
Your professor will determine how many chemical shifts you should memorize. We'll go over them just in case.



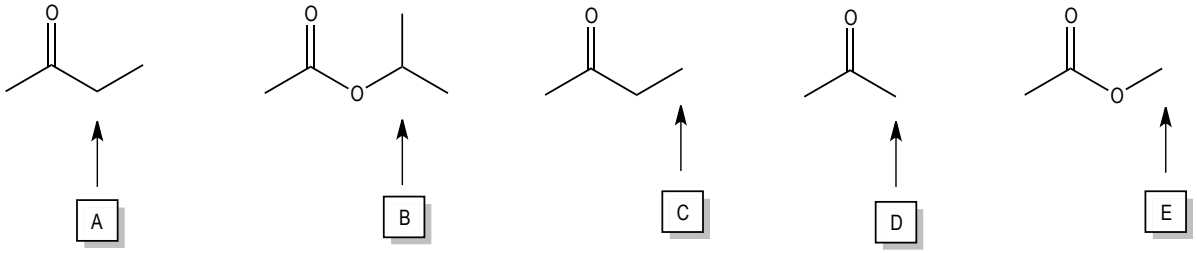
EXAMPLE: Order the following five protons from most **deshielded** to most **shielded**



PRACTICE: Which of the labeled protons absorbs energy most ***upfield*** in the ^{1}H NMR?



PRACTICE: Which of the labeled hydrogens will be most ***de-shielded***?



PRACTICE: Which compound possesses a hydrogen with the highest chemical shift for its ^{1}H NMR signal?