The types of electronic transitions:

There are four electronic transitions are:

1. $\delta - \delta^*$ transition: this transition needs high energy, its very strong and occurs in saturated hydrocarbons such as (methane, ethane, …), this transition requires very short radiation of wavelength (high energy).

2. $n - \delta^*$ transition: this type of transition occurs in saturated compounds which containing one hetero atom has unshared pair electron such as (alcohols, ethers).
   Energy of $n - \delta^*$ transition less than energy of $\delta - \delta^*$ transition.

Note:
In saturated alkyl halides that energy required for $n - \delta^*$ transition decreases with increases in the size of the halogen atom or decreases in the electronegativity of the halogen atom.

3. $\pi - \pi^*$ transition: this type of transition occurs in unsaturated compounds.
   This types occurs at longer wavelength than $\delta - \delta^*$ transition.
   Alkenes, alkynes and carbonyl compounds contain this transition.

4. $n - \pi^*$ transition: this type of transition occurs in unsaturated compounds which containing hetero atom has unshared pair electron.
   Unshared electron (n) on hetero atom excited to ($\pi^*$) level.
   Energy of $n - \pi^*$ transition less than energy of other transition and occurrence at longer wavelengths.
Identification of Organic Compounds 

Electronic energy levels and transitions

\[ \begin{align*}
\sigma & \rightarrow \sigma^* \text{ In alkanes} \\
\pi & \rightarrow \pi^* \text{ In alkenes, carbonyl compounds, alkynes, azo compounds, and so on} \\
n & \rightarrow \sigma^* \text{ In oxygen, nitrogen, sulfur, and halogen compounds} \\
n & \rightarrow \pi^* \text{ In carbonyl compounds}
\end{align*} \]