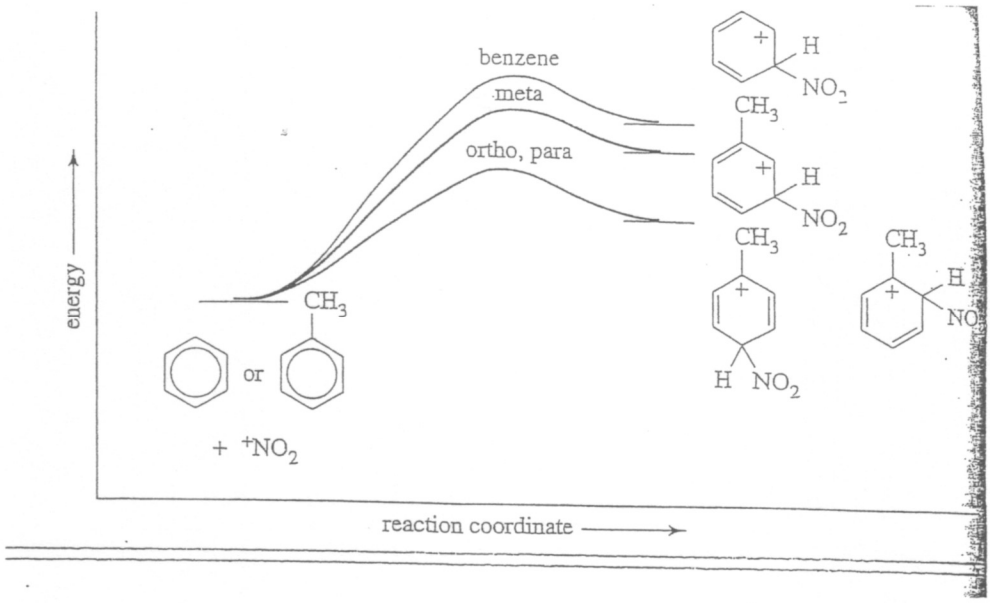
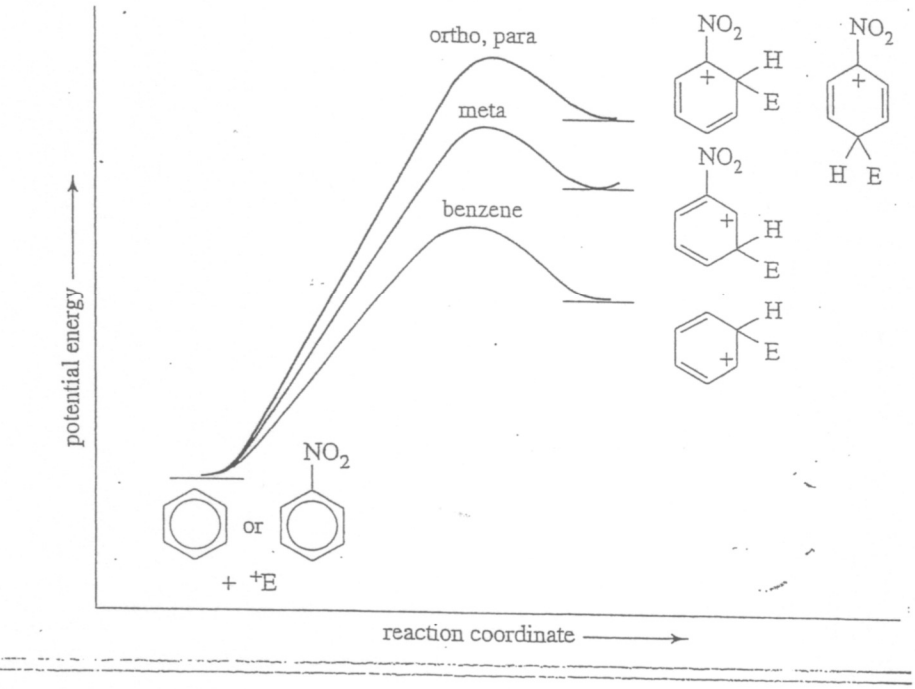
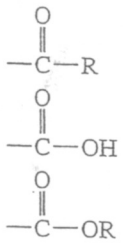
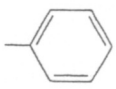


▶ **Figure 17-2**
The methyl group of toluene stabilizes the sigma complexes and the transition states leading to them. This stabilization is most effective when the methyl group is ortho or para to the site of substitution.



▶ **Figure 17-3**
Nitrobenzene is deactivated toward electrophilic aromatic substitution at *any* position, but deactivation is strongest at the ortho and para positions. Reaction occurs at the meta position, but it is slower than the reaction of benzene.

SUMMARY Directing Effects of Substituents

π Donors	*σ Donors*	*Halogens*	*Carbonyls*	*Other*
$-\ddot{N}H_2$	—R (alkyl)	—F		$-SO_3H$
$-\ddot{O}H$	 (aryl)	—Cl		—C≡N
$-\ddot{O}R$		—Br		$-NO_2$
$-\ddot{N}HCOCH_3$		—I		$-\overset{+}{N}R_3$

ortho, para-directing — meta-directing

ACTIVATING — DEACTIVATING