

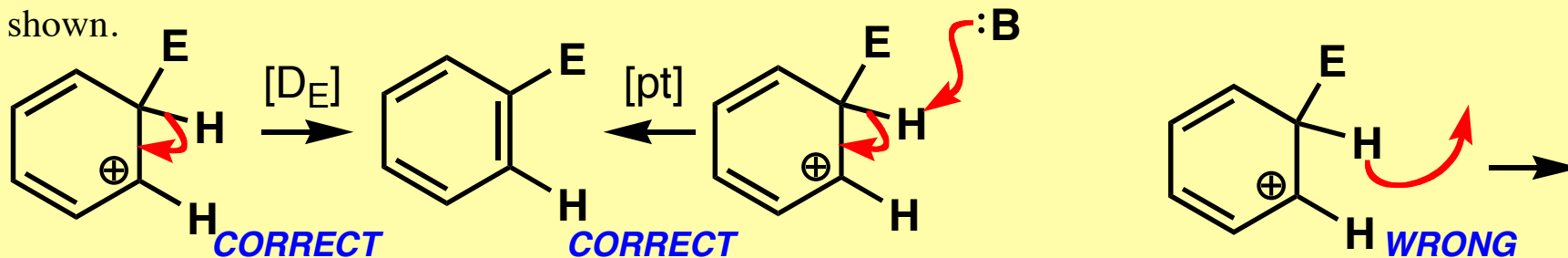
# Summary

- The  $\pi$  bonds in aromatic compounds behave as nucleophiles and are thus reactive toward electrophiles. In the first step of **electrophilic aromatic substitution**, the aromatic ring attacks an electrophile in an  $[A_E]$  fashion to give a delocalized carbocation intermediate.

- In the second step of **electrophilic aromatic substitution**, the carbocation undergoes  $[D_E]$  with loss of  $H^+$  from the same carbon to which the electrophile added, re-forming the benzene ring (the net result is substitution at this C).

- The electronic nature of substituents on an aromatic ring has profound effects on the rate of reactivity and the regiochemistry of electrophilic aromatic substitution reactions.

- Draw your curved arrows correctly. Arrows should not show the  $H^+$  flying off into space! If  $H^+$  loss via  $[D_E]$  bothers you, show a weak base making a new bond to hydrogen at the same time the C–H bond is cleaved (technically now a  $[p_t]$  step). Often the base is assumed to be present but need not be shown.



Which best represents the transition state for the first step in the electrophilic aromatic substitution pathway?

