1) A <sup>13</sup>C-labelling experiment revealed a carbon shift in naphthalene at *very* high temperatures. Describe a mechanism for this transformation. Can you describe more than one? Which is most plausible?



**2** a) The following tertiary alcohol was prepared as a 60:40 mixture of isomers. Upon exposing the material to  $FSO_3H/SO_2ClF$ , a spectrum with a highly upfield shifted proton was found to exist (~ -3.9 ppm). Explain this observation, consider that the t-butyl carbocation (formed from butylfluoride +  $SbF_5$  shows a singlet at 4.15 ppm.

b) The ketoalcohol A was subjected to the following sequence of reactions. Identify unknown products **B-E.** D is thought to exist predominantly in the enol form. D --> E requires C-C bond cleavage.

MeMgI B 
$$\xrightarrow{H_3PO_3}$$
 C

 $C \xrightarrow{\text{Ethyl formate}} D \xrightarrow{H_2O_2} E$ 
Base Base  $C \xrightarrow{\text{Base}} D \xrightarrow{\text{Bas$