1) A $^{13}$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?

![Naphthalene diagram]

2 a) The following tertiary alcohol was prepared as a 60:40 mixture of isomers. Upon exposing the material to $\text{FSO}_3\text{H}/\text{SO}_2\text{ClF}$, 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.

![Tertiary alcohol structure]

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 $\rightarrow$ E requires C-C bond cleavage.

![Reactions diagram]