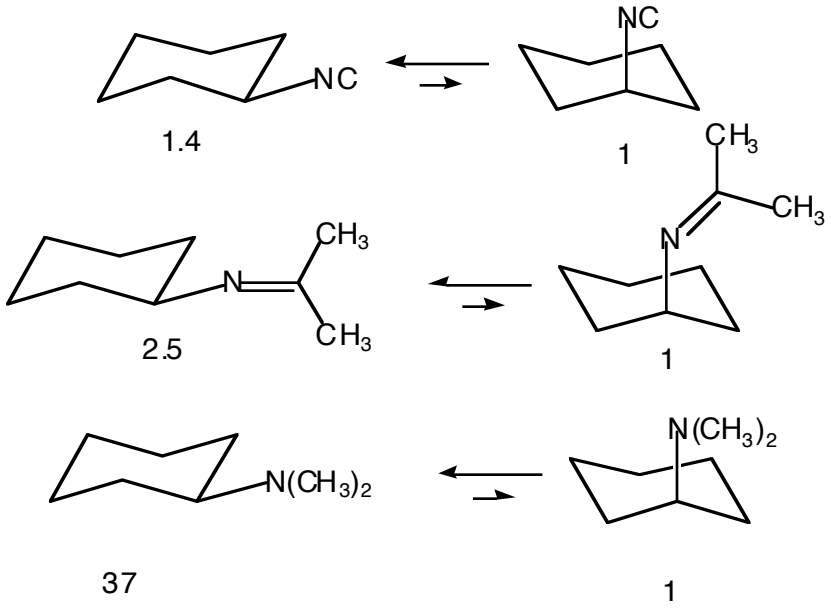
Answers to Problem 44, Chemistry 301X - 2006

a) As the nitrogen substituent gets bigger, the equatorial form is increasingly favored. Notice that it matters where the dimethyl groups are in the last two examples. In the middle one, they are farther from the "action" than they are in the last example



b) Here, the 1,3 destabilizing interactions with an axial group diminish as methylene groups (CH_2) are replaced with the smaller oxygens (in a sense,the C-H bonds are replaced with smaller lone pairs). Thus, the axial form becomes relatively better as we go down the series: