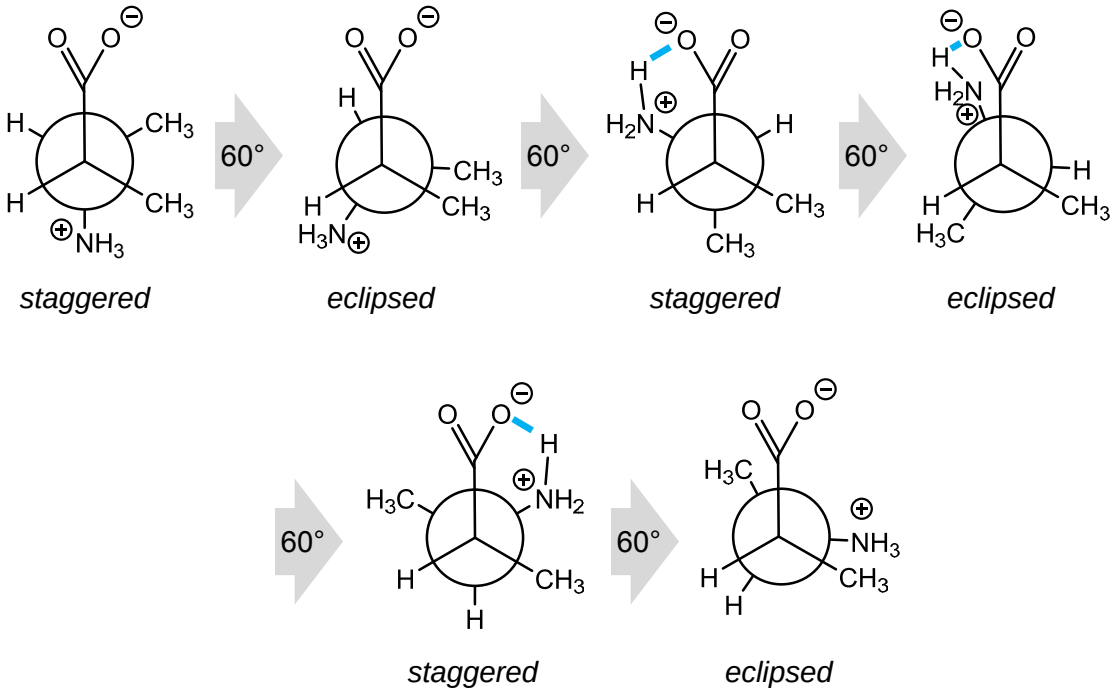
Chemistry 2301

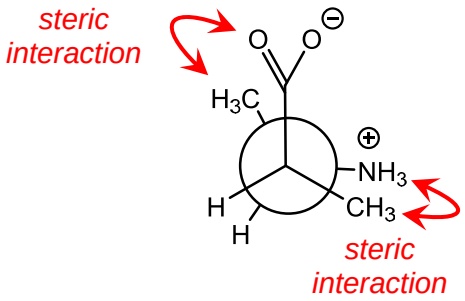
Workshop 7 Solutions
Newman Projections and Potential Energy Diagrams

1.



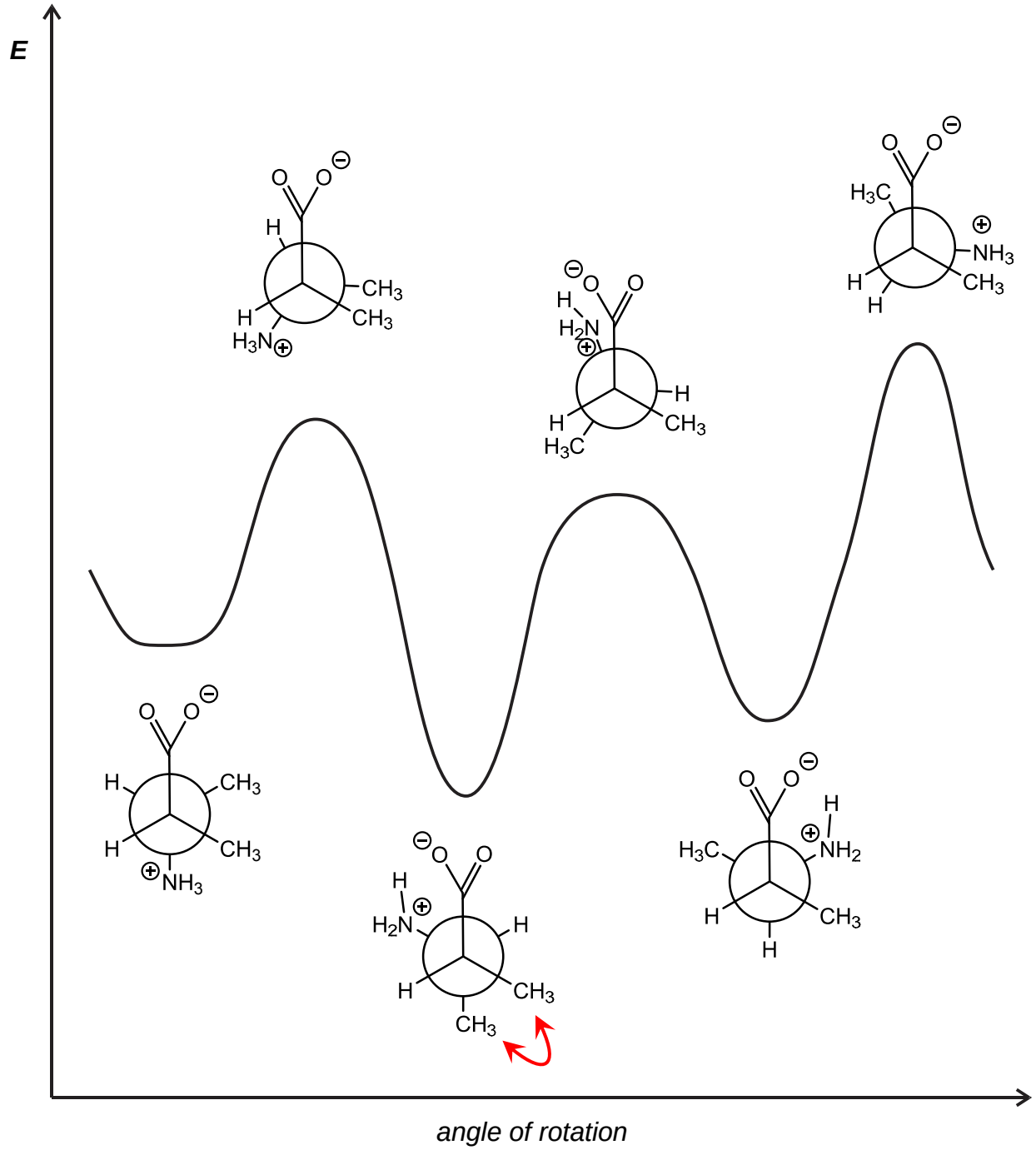
In these structures, the -COO^- groups attract the -$NH3^+$ groups by both hydrogen bonding and attraction of the opposite charges.

2. All of our staggered conformations are lower-energy conformations, and our eclipsed conformations are higher-energy conformations; on the potential energy diagram for twisting the central C-C bond, staggered conformers will be maxima (hills) and eclipsed conformers will be minima (valleys). But which hill will be highest, and which valley lowest?



Of the eclipsed conformers, I think the highest-energy conformer will be the one with the most steric interactions between directly eclipsed (ϕ = 0°) groups, and with no attractive interactions. The "best of the worst" will be the eclipsed conformer that puts the charged groups closest together. The most stable conformer will be the staggered one that has the fewest steric interactions, with the charged groups closest together.

3.



4. To answer this last question, I think you had to go through most of the above process for the other stereoisomer. If you did that, you should have found two staggered conformers that are nearly equally stable:

These staggered conformations are stable, but not as stable as the first stereoisomer's lowest-energy conformer. So I think the first isomer will be more stable, because it will occupy that lower-energy state most of the time.