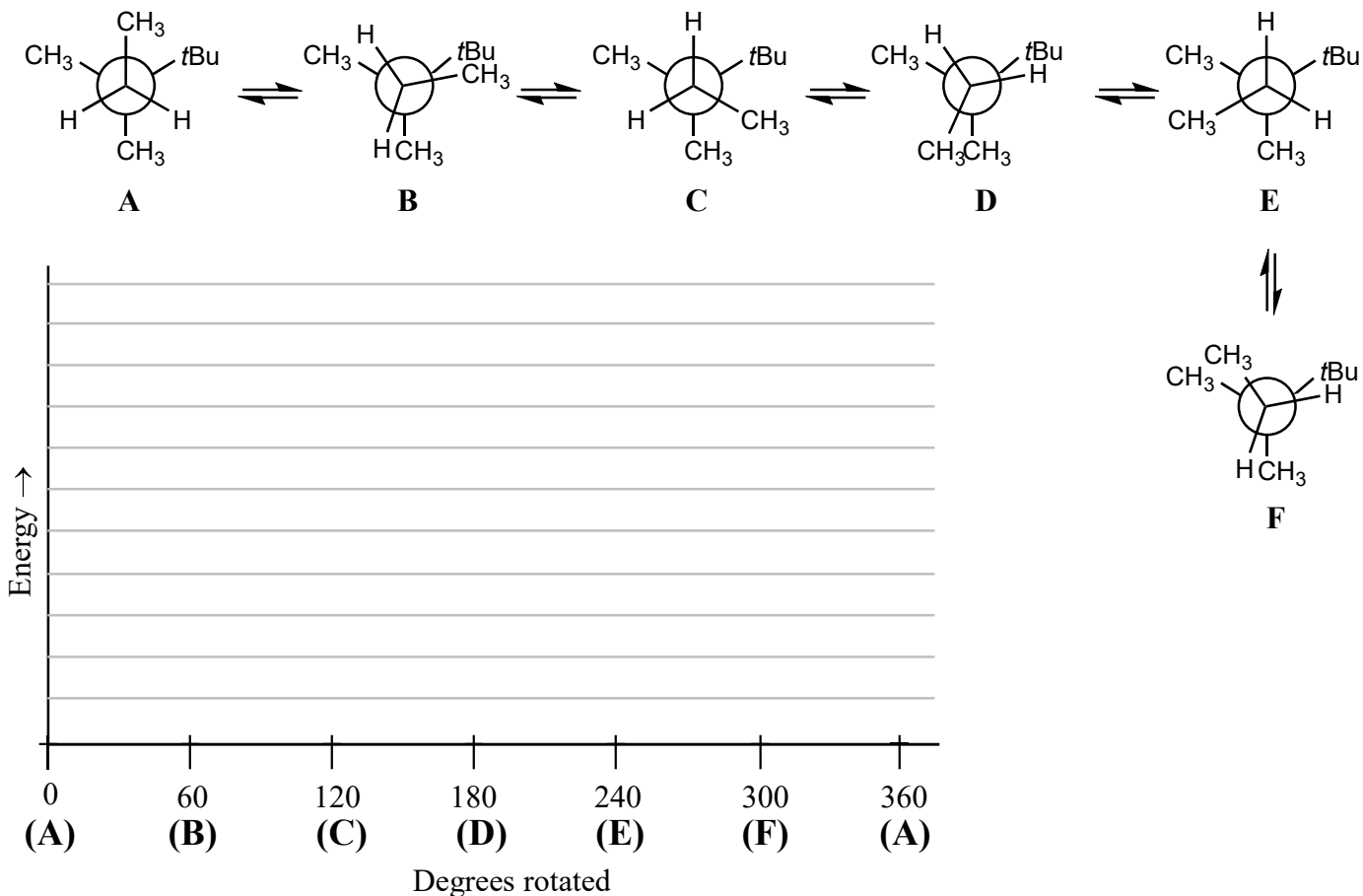
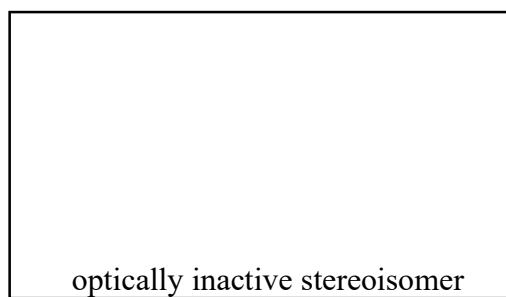
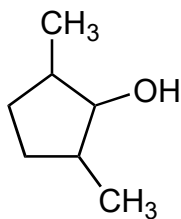


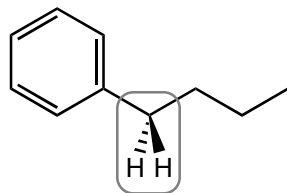
3A. (10 pts) Given the Newman projections below, sketch an energy diagram showing the relative energies of the conformers. Start with **A** at 0° and clearly label your diagram.



3B. (4 pts) Draw a stereoisomer of the following compound that is **optically inactive** ( $\alpha = 0^\circ$ ).



3C. (7 pts) Describe the relationship of the highlighted protons (homotopic, enantiotopic, diastereotopic), and provide the approximate chemical shift (also known as the  $\delta$  value, see table on page 6) and expected splitting pattern (singlet/doublet/etc.) for these protons in a  $^1\text{H}$  NMR spectrum. No explanation is needed.



relationship: \_\_\_\_\_

approximate  $\delta =$  \_\_\_\_\_ ppm

splitting pattern: \_\_\_\_\_