

Construct Newman projections for all of the unique rotational conformations of **3,4-dimethylhexane** (focus down C₃-C₄). Identify the lowest (E_{min}) and highest (E_{max}) energy conformations and determine the barrier to rotation in KJ/mol (difference between E_{max} and E_{min}). Use the data provided (Me = methyl; Et = ethyl). How many unique conformations are there? _____

Interaction energy cost (KJ/mol)

Me-Me gauche	3.8
Me-Et gauche	4.1
Et-Et gauche	4.5
H-H eclipse	4.0
Me-H eclipse	6.0
Et-H eclipse	7.0
Me-Me eclipse	11.0
Me-Et eclipse	12.0
Et-Et eclipse	13.0

Consider the molecule **1,2,4-trimethylcyclohexane** where the methyl groups are all *cis*. The *less stable* conformation has an energy of approximately **26.8 KJ/mol**. Draw the two chair conformations of this compound and determine the energy of the more stable conformation using the data below. How much steric strain (KJ/mol) does a methyl – methyl 1,3-diaxial interaction contribute to the less stable conformation? *Also*, draw a Newman projection of the *more stable* conformation sighting along C_{1,2} and C_{5,4}.

Interaction Energy (kJ/mol)

Methyl-Methyl gauche	3.8
Methyl -H 1,3-diaxial	3.8
Methyl-Methyl 1,3-diaxial	??