Use the following table of eclipsing and gauche energies to calculate energy differences and predict relative amounts in conformational isomer problems.

Approximate Eclipsing Energy Values (kcal/mole)

	H	Me	Et	i-Pr	t-Bu	Ph
H	1.0	1.4	1.5	1.6	3.0	1.7
Me	1.4	2.5	2.7	3.0	8.5	3.3
Et	1.5	2.7	3.3	4.5	10.0	3.8
i-Pr	1.6	3.0	4.5	7.8	13.0	8.1
t-Bu	3.0	8.5	10.0	13.0	23.0	13.5
Ph	1.7	1.7	3.8	8.1	13.5	8.3

$\Delta G \approx \Delta H$

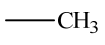
$K_{eq} = 10^{\frac{-\Delta H}{2.3RT}}$

Approximate Gauche Energy Values (kcal/mole)

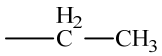
	H	Me	Et	i-Pr	t-Bu	Ph
H	0	0	0.1	0.2	0.5	0.2
Me	0	0.8	0.9	1.1	2.7	1.4
Et	0.1	0.9	1.1	1.6	3.0	1.5
i-Pr	0.2	1.1	1.6	2.0	4.1	2.1
t-Bu	0.5	2.7	3.0	4.1	8.2	3.9
Ph	0.2	1.4	1.5	2.1	3.9	2.3

Extra Problems

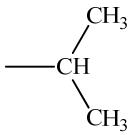
Use the following abbreviations for substituent groups in your Newman projections.



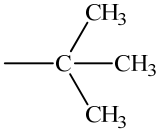
methyl = Me



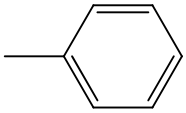
ethyl = Et



isopropyl = i-Pr

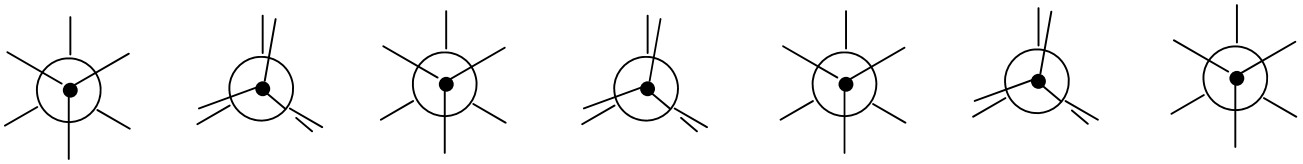


t-butyl = t-Bu

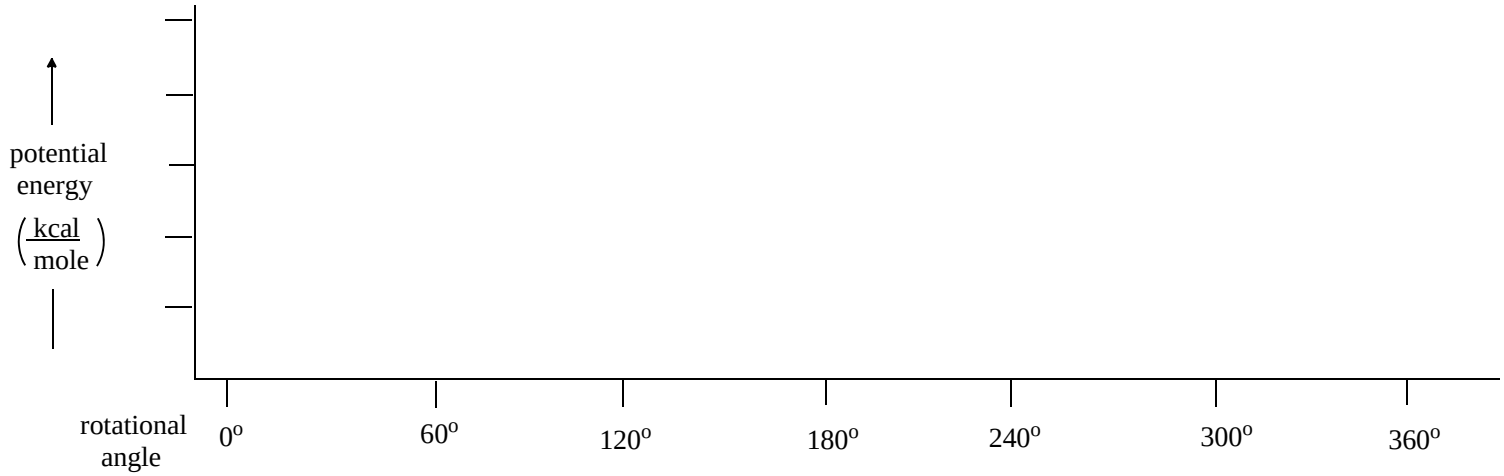


phenyl = Ph

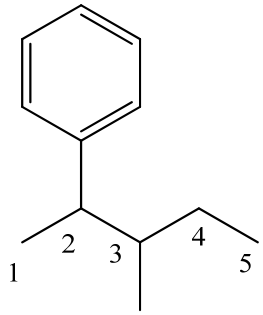
Use the given diagram as a template for each of the two problems below (on the next page).



1 2 3 4 5 6 repeat

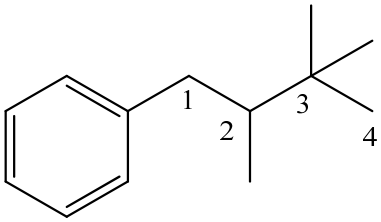


1. Draw all of the Newman projections for rotations about the C3 → C4 bonds in 3-methyl-2-phenylpentane.



3-methyl-2-phenylpentane

2. Draw all of the Newman projections for rotations about the C1 → C2 bonds in 2,3,3-trimethyl-1-phenylpentane.



2,3,3-trimethyl-1-phenylbutane