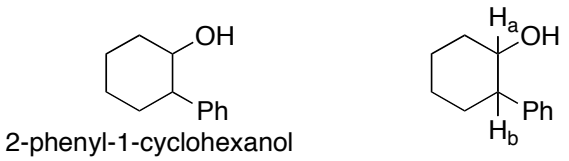
4. ^{1}H NMR spectra are shown below for a single diastereomer of 2-phenyl-1-cyclohexanol. (15 points)



2-phenyl-1-cyclohexanol

a. Draw *cis*-2-phenyl-1-cyclohexanol in the most stable chair conformation and draw *trans*-2-phenylcyclohexanol in the most stable chair conformation.

cis-2-phenyl-1-cyclohexanol

trans-2-phenyl-1-cyclohexanol

b. Name the multiplets (multiplicity and *J* values) you would expect for H_a and H_b in the *cis*- and *trans*-diastereomers.

cis-2-phenyl-1-cyclohexanol H_a _____

cis-2-phenyl-1-cyclohexanol H_b _____

trans-2-phenyl-1-cyclohexanol H_a _____

trans-2-phenyl-1-cyclohexanol H_b _____

c. Shown below is a 300 MHz ^{1}H NMR spectrum of a single diastereomer of 2-phenyl-1-cyclohexanol in $CDCl_3$.

Which stereoismer is it?

How do you know?