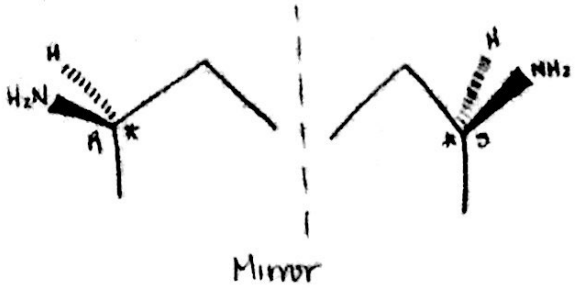
Part 1: Enantiomers/Diastereomers

*= stereogenic center

S,R = configurations

A) $H_2NCH(CH_3)CH_2CH_3$

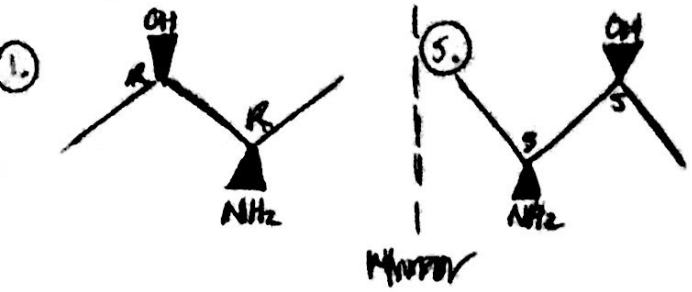


Mirror

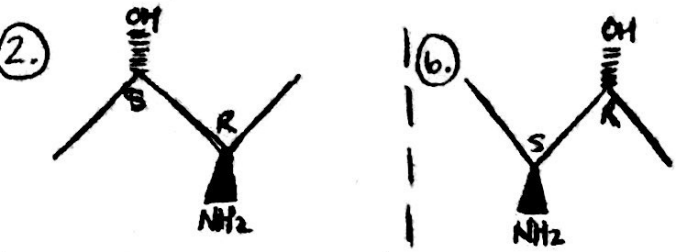
- Non-superposable Enantiomers

B) $CH_3CH(OH)CH(NH_2)CH_3$

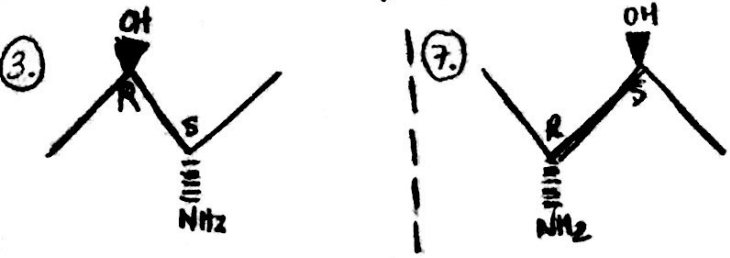
S,R = configurations and stereocenters



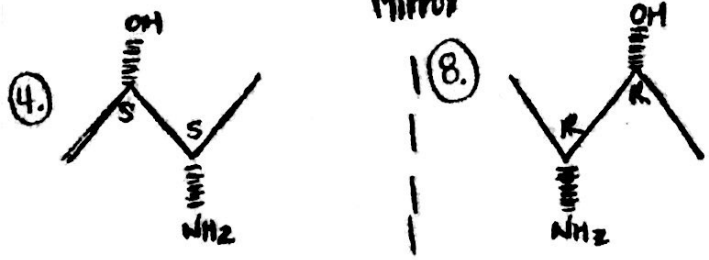
Mirror



Mirror



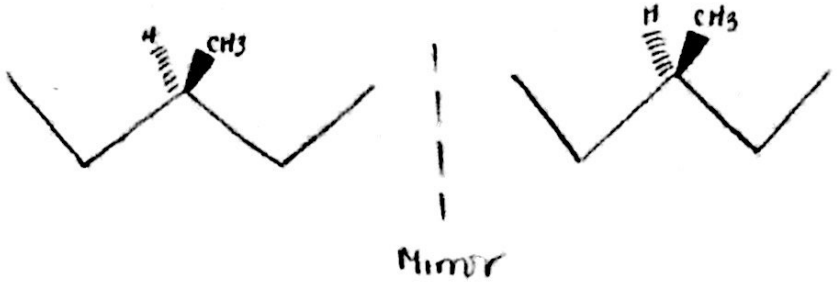
Mirror



Mirror

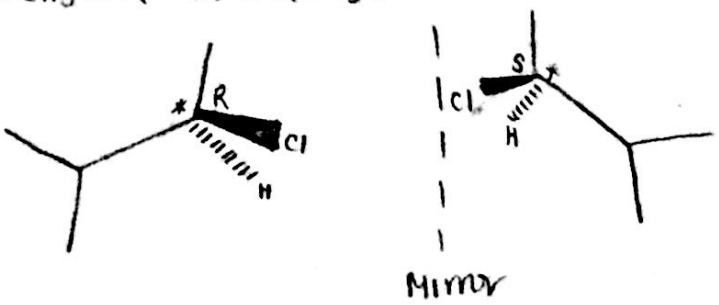
- All of the mirror images are non superposable/enantiomers
- Non superposable/enantiomers = 5,8/1,4/2,3/6,7
- Diastereomers = 1-2,6,3,7/5-2,6,3,7/4-2,637/8-2,637

c) $CH_3CH_2CH(CH_3)CH_2CH_3$



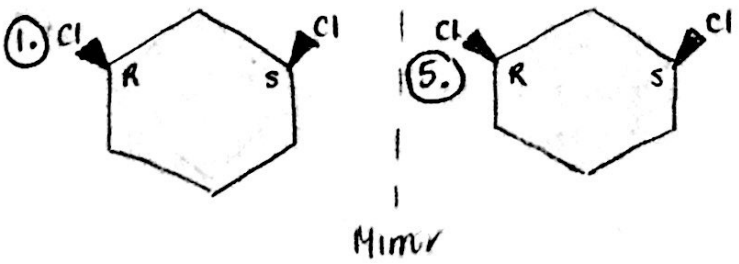
- superposable
- neither enantiomers/ diastereomers
- ∴ same compound

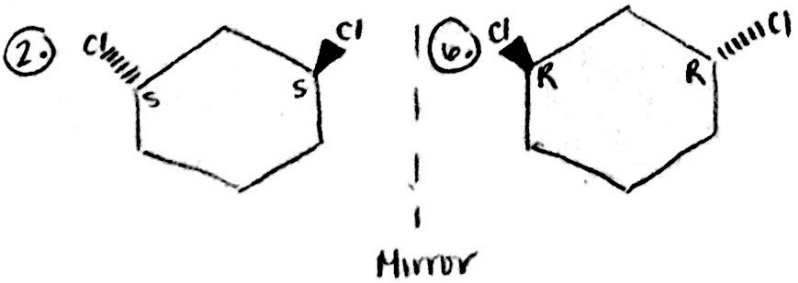
d) $CH_3CH(CH_3)CH(CH_3)Cl$

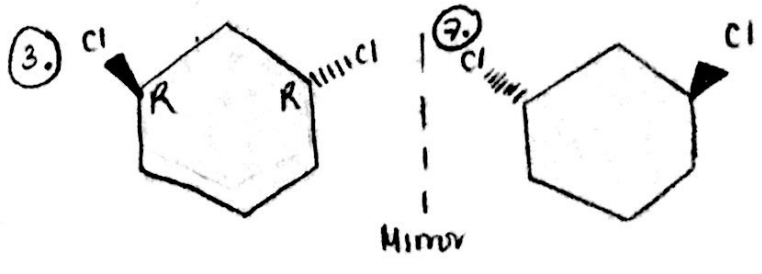


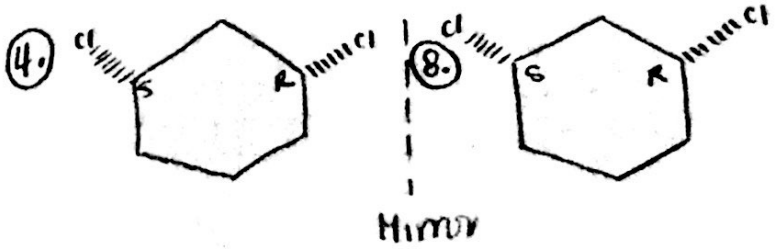
- non superposable enantiomers

e)



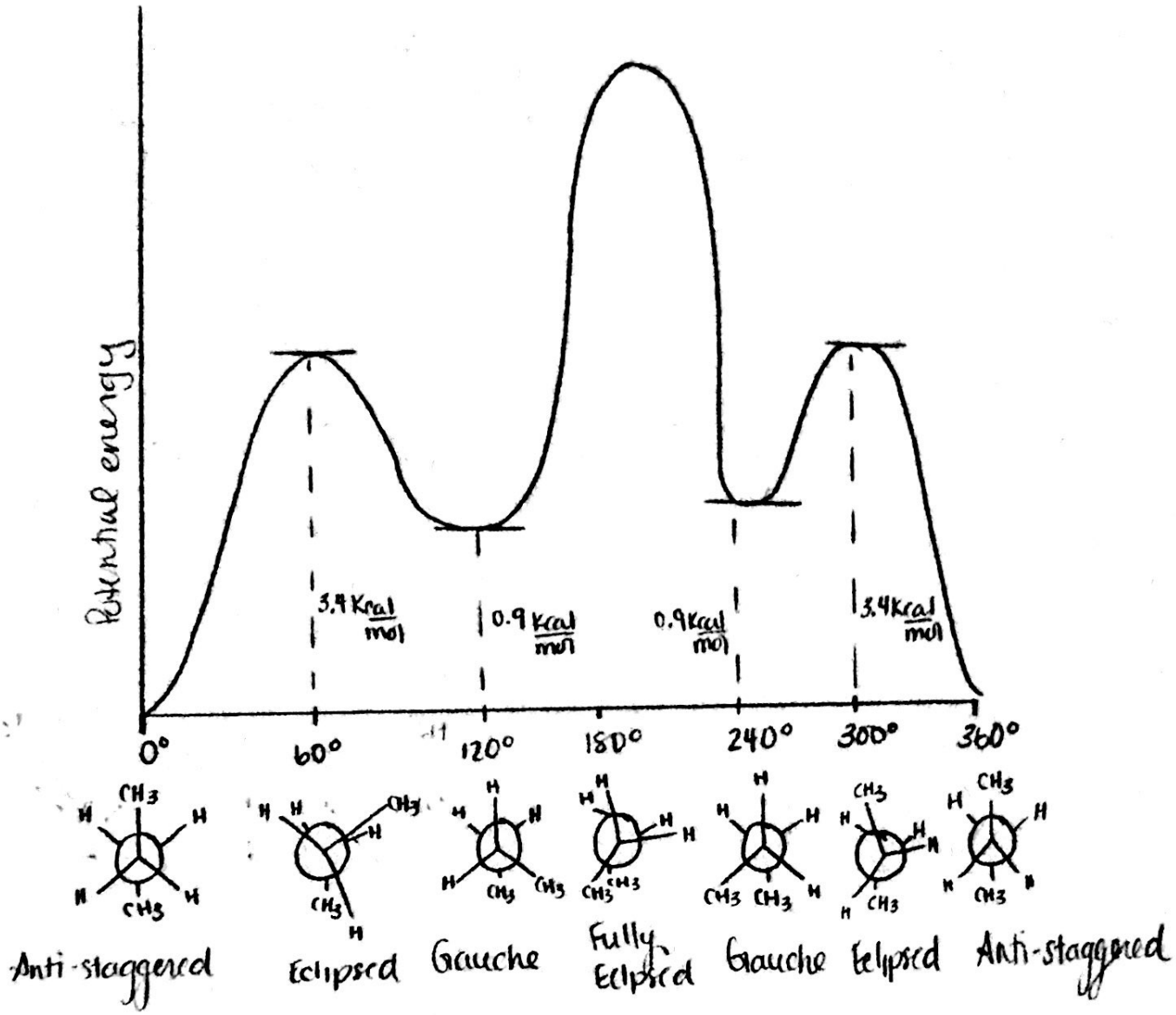






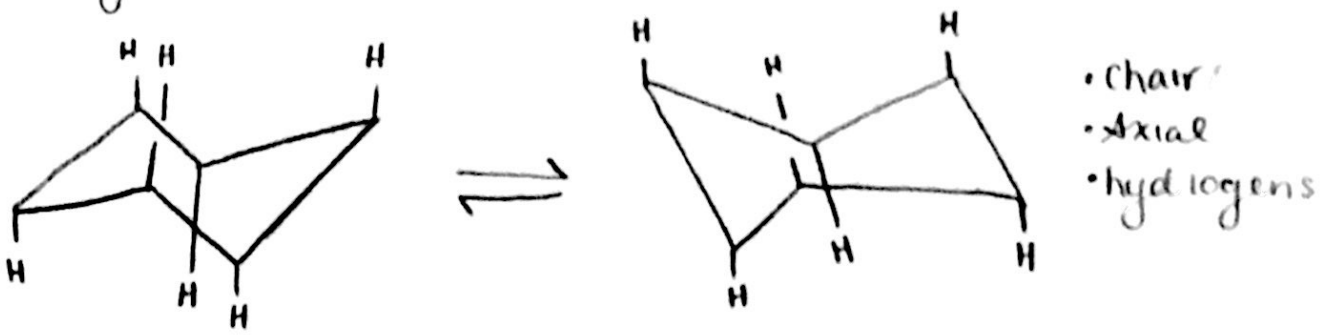
- Meso compounds = 1,5/4,8/2,7/3,6
- Diastereomers = 1-6, 2, 3, 7/5-6, 2, 3, 7/ 4-2, 3, 6, 7/8-2, 3, 6, 7
- Enantiomers = 1-4, 8/5-4, 8/2-6, 3/ 6-2, 7

Part 2 : Newman Projection

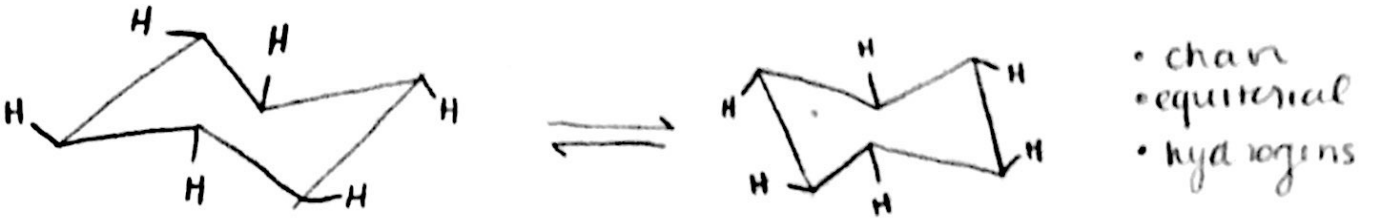


→ the energy difference between the Anti-Staggered and Gauche conformers is 0.9 Kcal·mol^{-1}

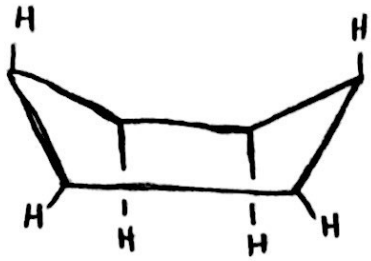
Part 3: cyclohexanol



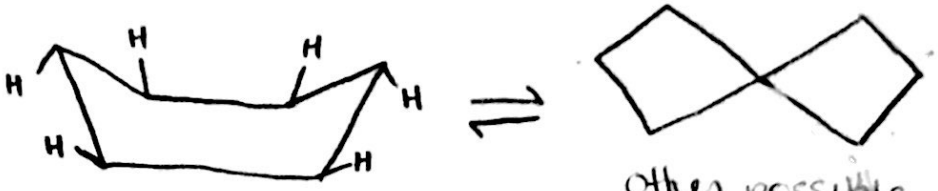
- Chair
- Axial
- hydrogens



- chair
- equitorial
- hydrogens

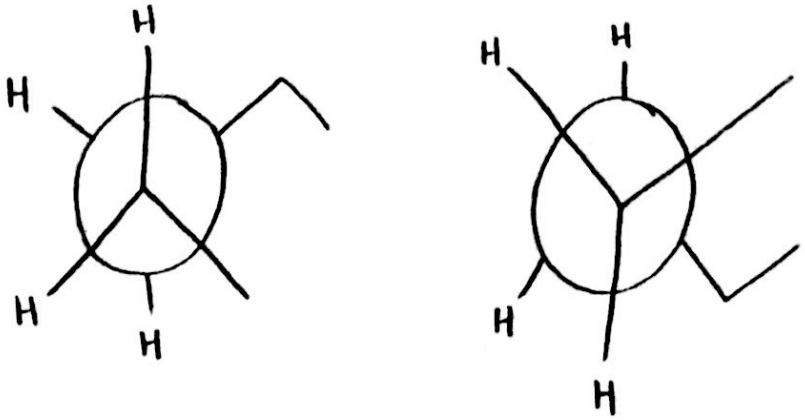


Axial Boat



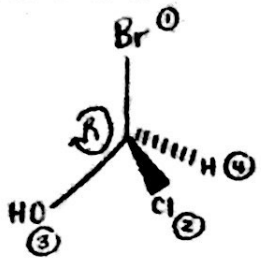
Equitorial Boat

Other possible conformation is twist boat



Questions

1.



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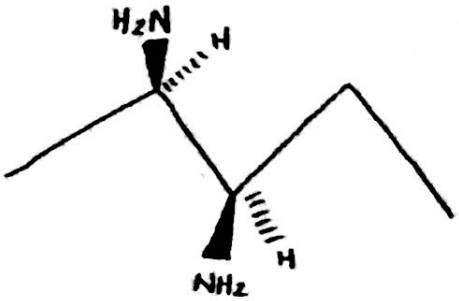
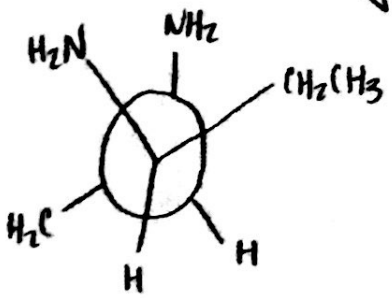
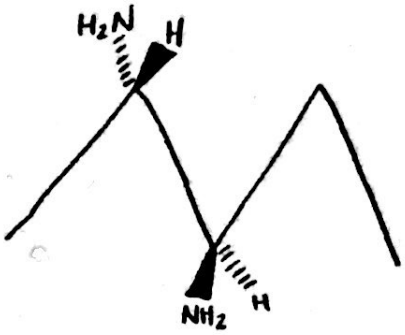
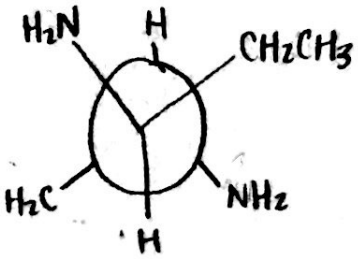
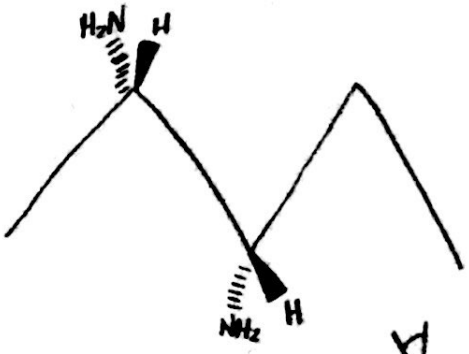
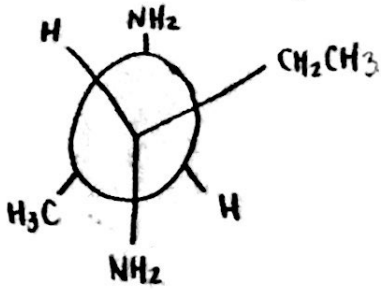


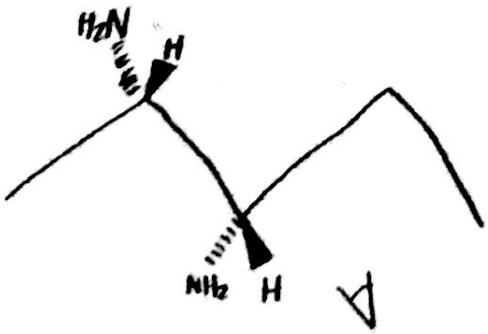


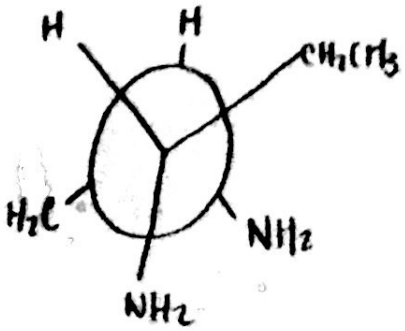




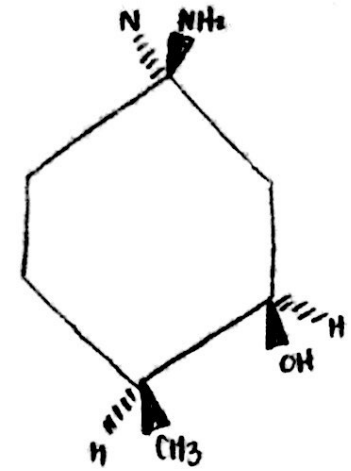


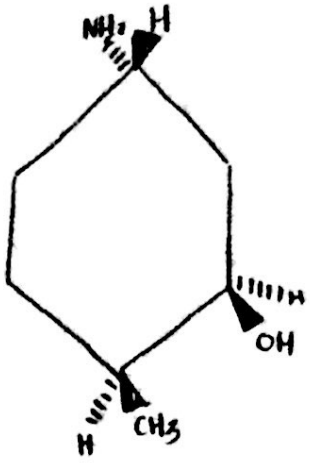


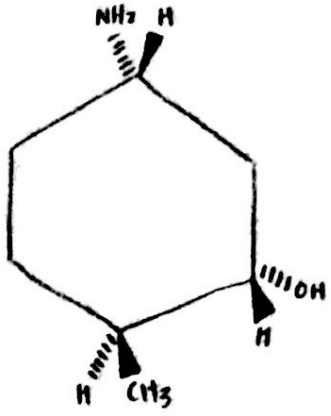


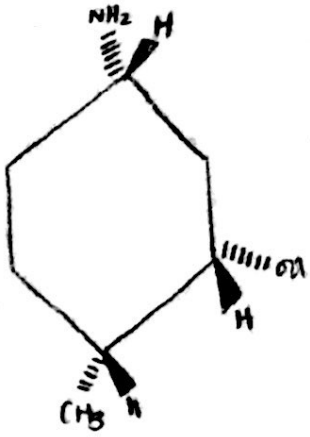


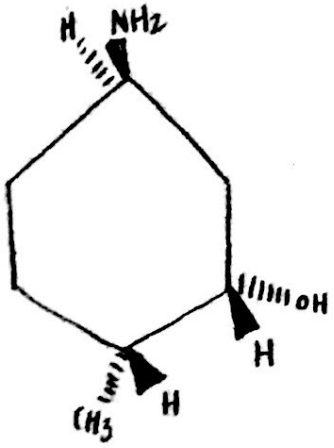
3.

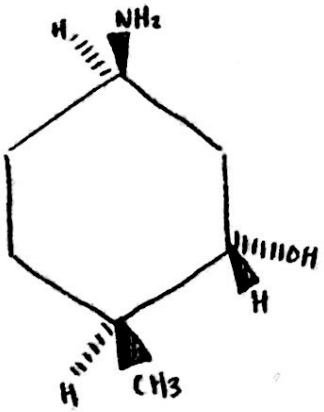


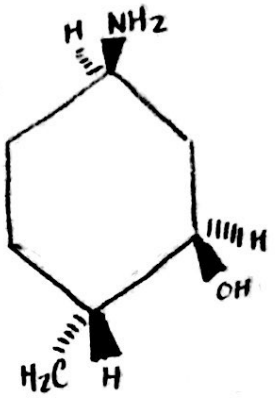


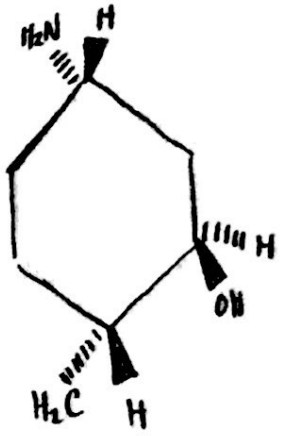












$2^{3(\text{stereocenters})} = 8$ possible stereocenters