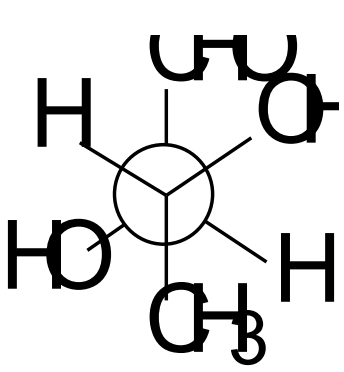
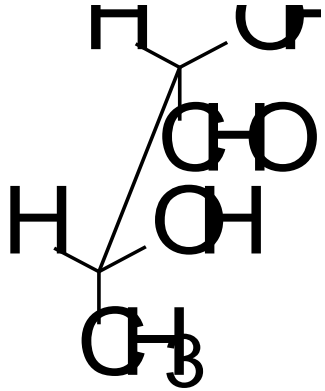
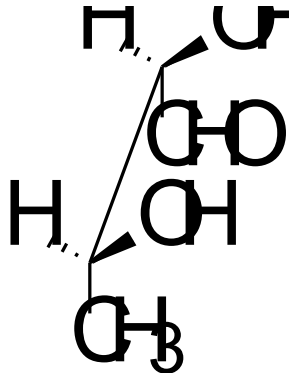
STEREOCHEMIE

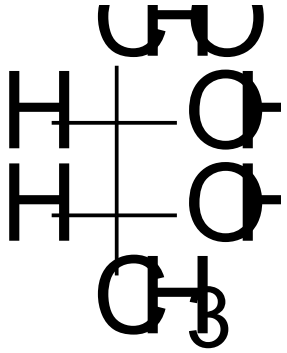
Typy vzorců

Následující vzorec v Newmanově projekci přepište do Fischerovy projekce



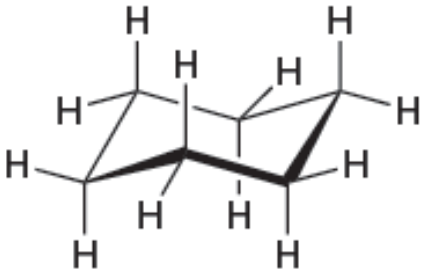


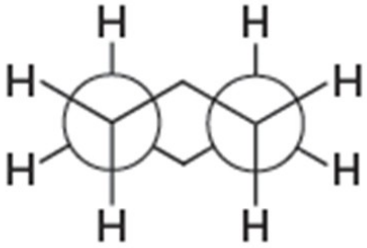




Typy vzorců

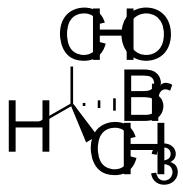
Molekulu cyklohexanu překreslete do Newmanovy projekce

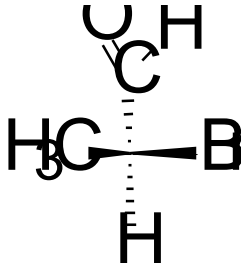


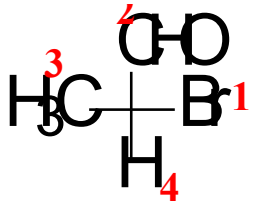


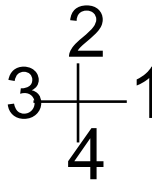
Vytvořte systematický název uvedené sloučeniny

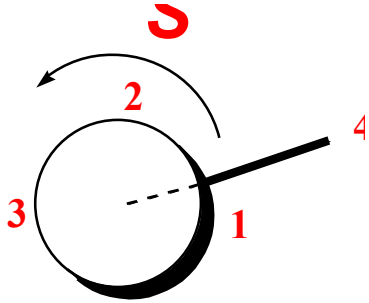
(2*S*)-2-brompropanal



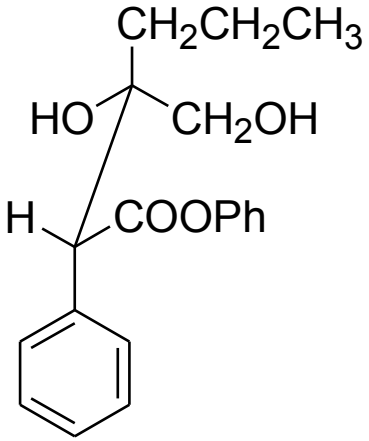


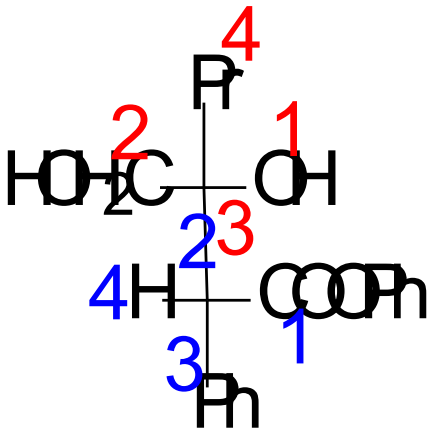


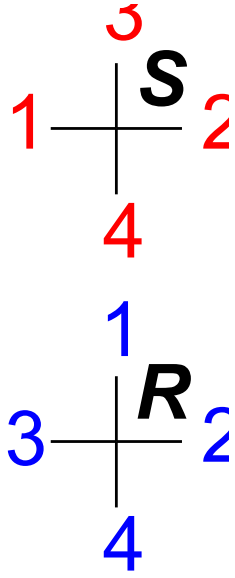


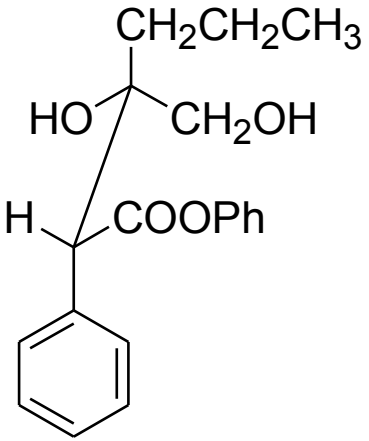


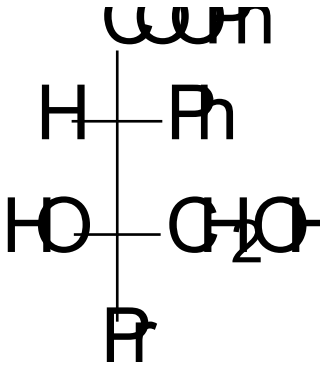
U následující sloučeniny identifikujte centra chirality a určete na nich absolutní konfiguraci





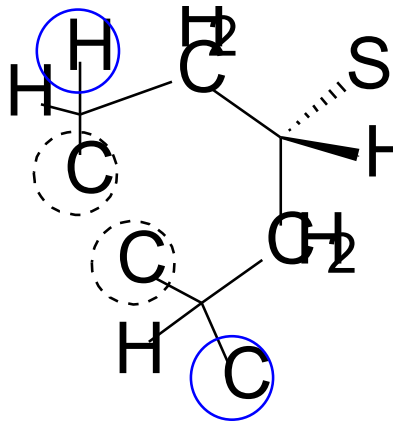


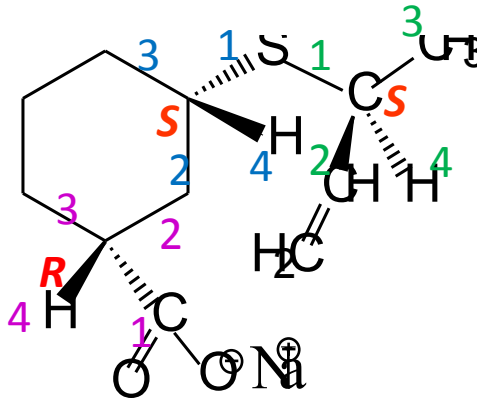


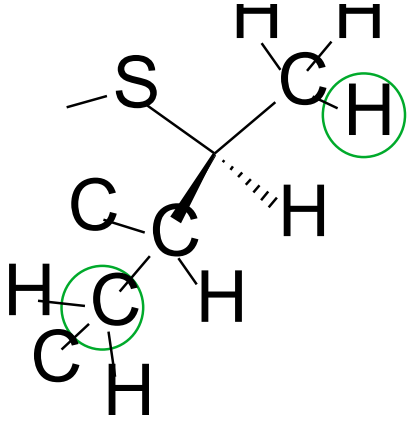


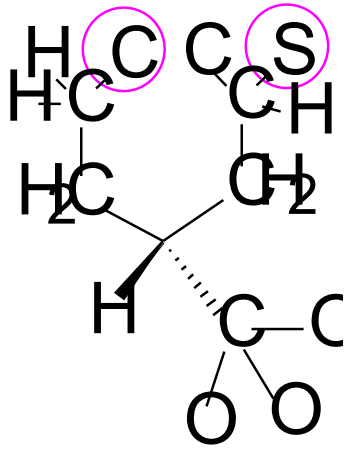
Správně zakreslená Fischerova projekce

Označte centra chirality a určete na nich absolutní konfiguraci

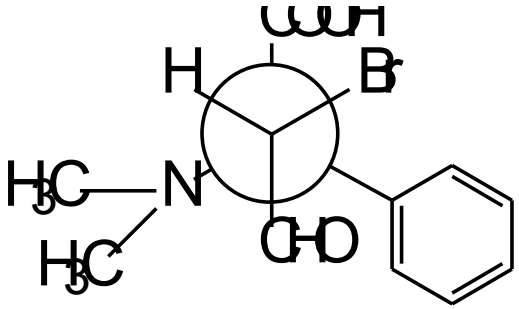


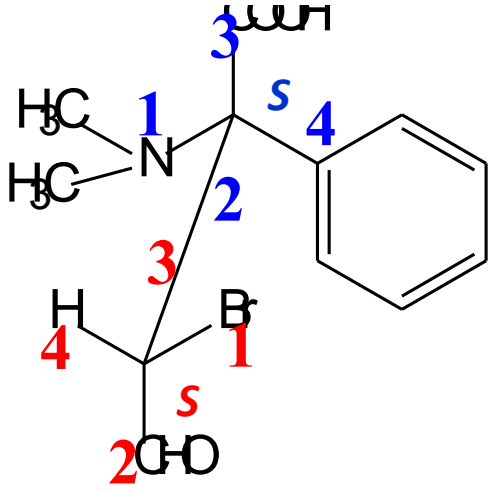


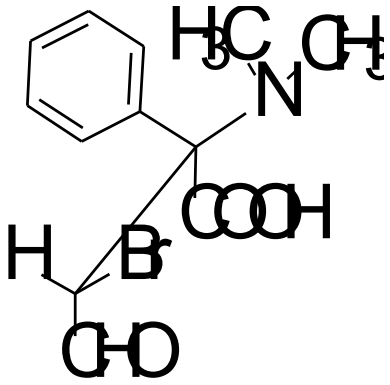


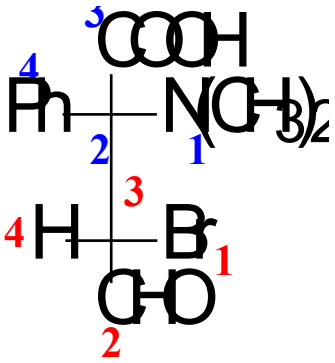


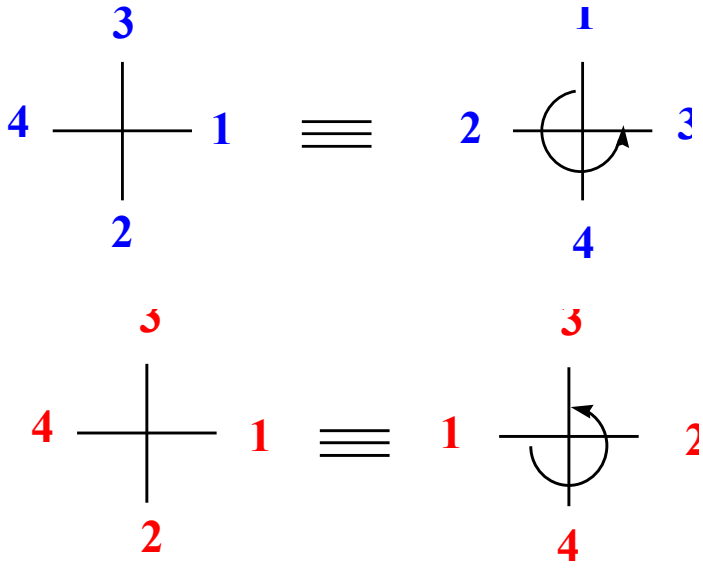
Najděte v molekule centra chirality a určete na nich absolutní konfiguraci a sloučeninu pojmenujte





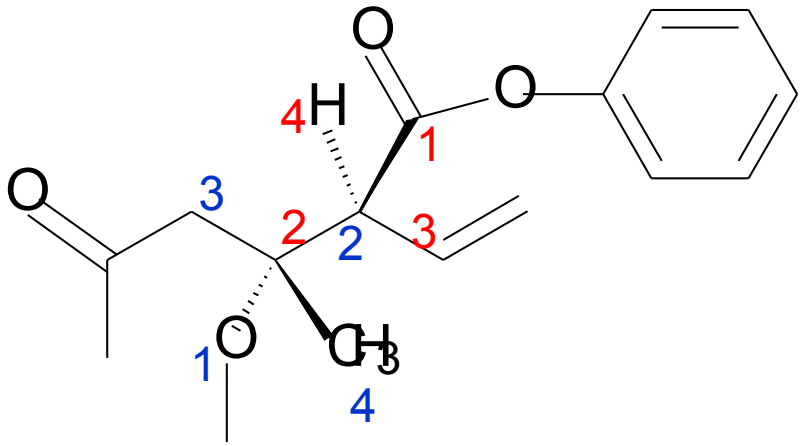


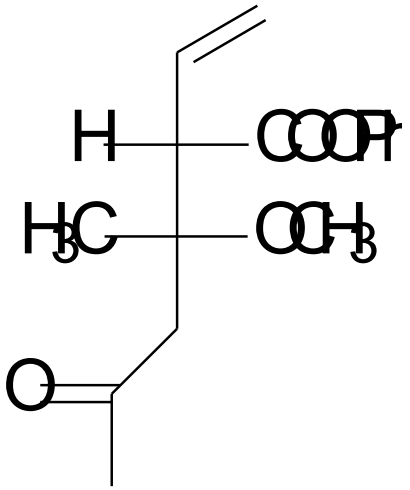


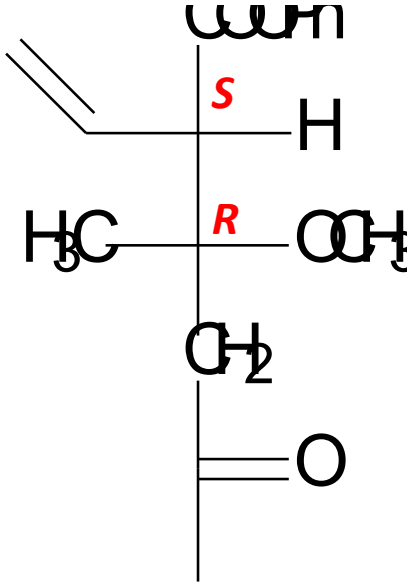


(2*S*,3*S*)-3-brom-2-(*N*,*N*-dimethylamino)-2-fenyl-4-oxobutanová kyselina

Molekulu překreslete do Fischerovy projekce a určete absolutní konfiguraci na centrech chirality

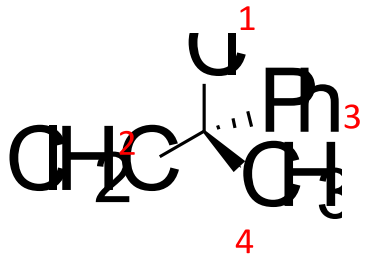


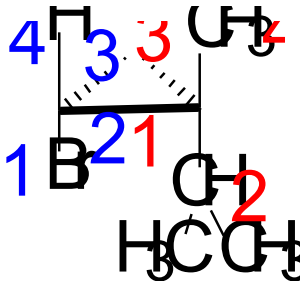


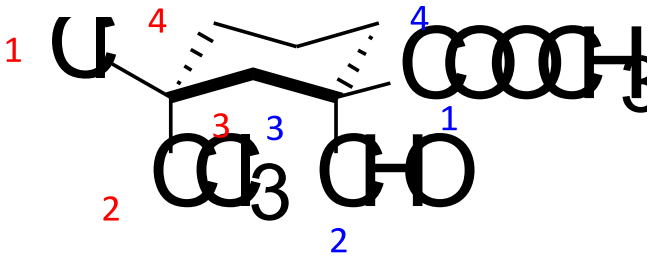


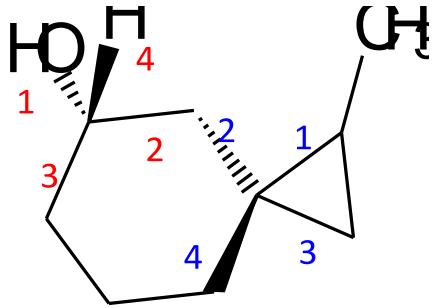
(2*S*,3*R*)-fenyl-3-methoxy-3-methyl-5-oxo-2-vinylhexanoát

Označte * centra chirality a určete na nich absolutní konfiguraci

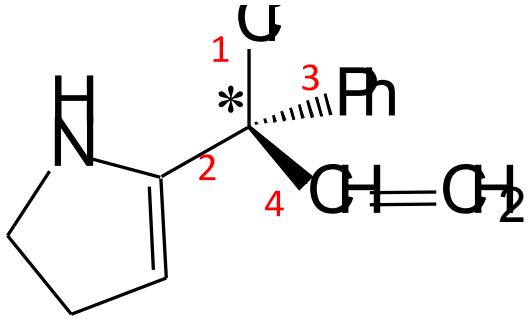


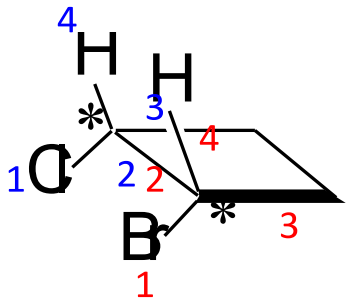


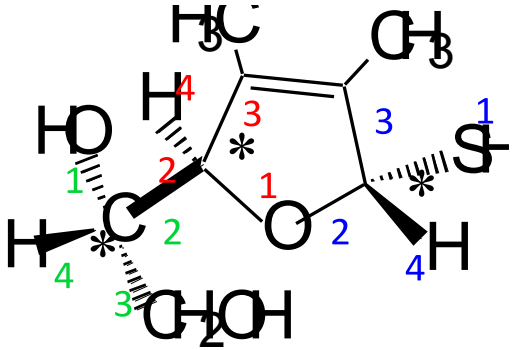




Na vyznačených centrech chirality určete absolutní konfiguraci

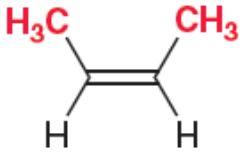


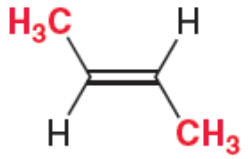




» Geometrické izomery

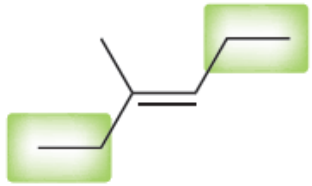
cis





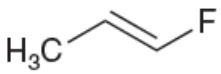
trans

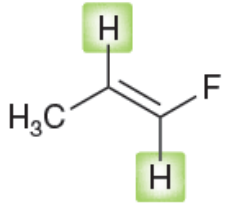
cis



trans

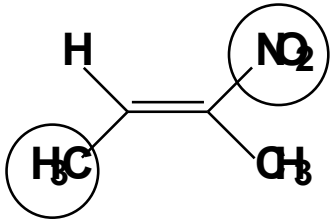
trans

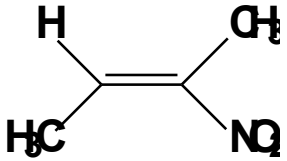




cis

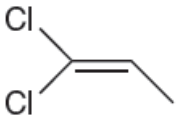
E-



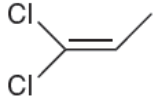


trans

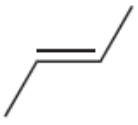
Z-



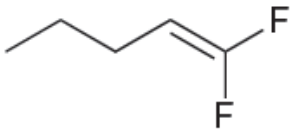
stejné

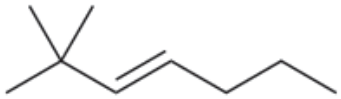


Kde je to potřeba, určete, o jaký stereoizomer se jedná (*cis - trans, E - Z*)

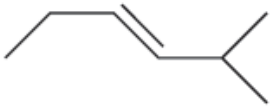
(a) 

trans

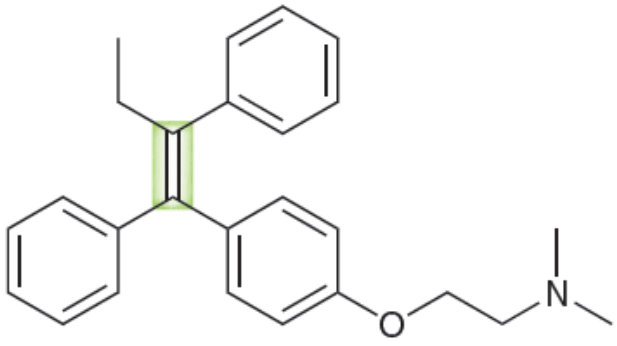
(b) 

(c) 

trans (E)

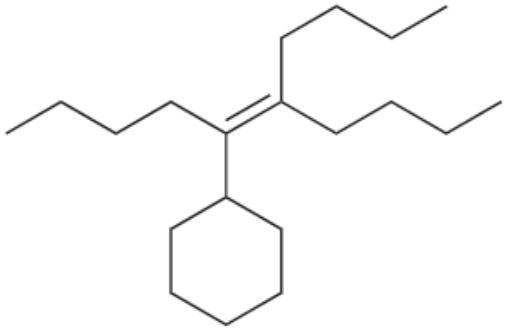
(d) 

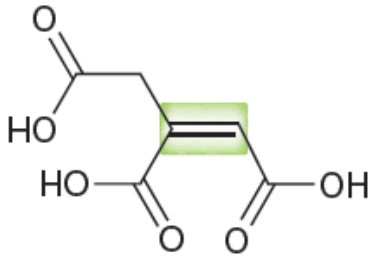
trans (E)

(e) 

trans (Z)

Tamoxifen
Used in treatment of breast cancer

(f) 

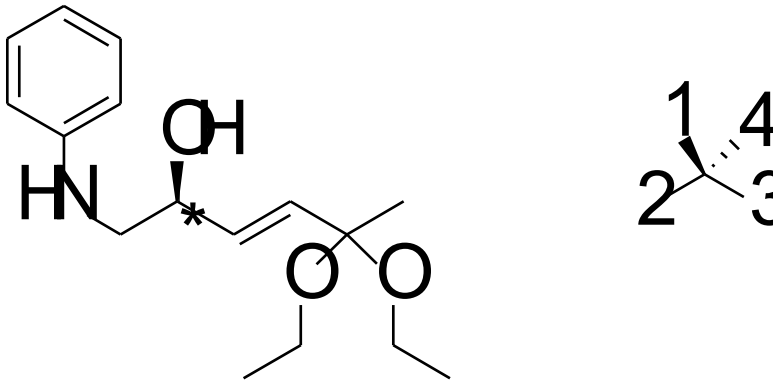
(g) 

cis (Z)

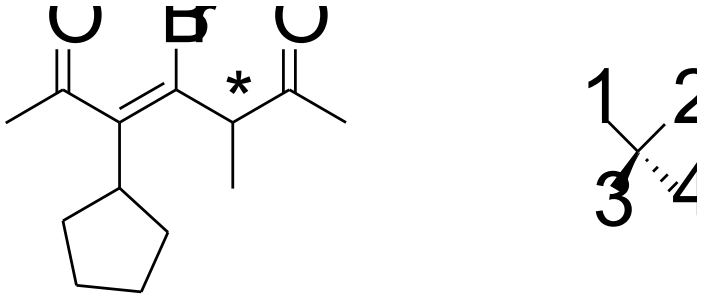
Aconitic acid
Involved in metabolism

Nakreslete vzorce následujících sloučenin včetně znázornění prostorového uspořádání

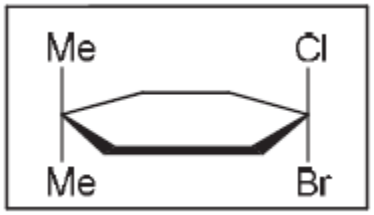
(*2S,3E*)-1-(*N*-fenylamino)-5,5-diethoxyhex-3-en-2-ol



(5R,3Z)-4-brom-3-cyklopentyl-5-methylhept-3-en-2,6-dion

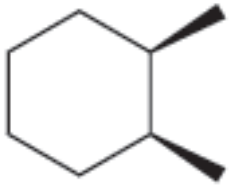


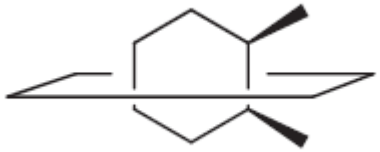
Najděte rovinu symetrie u následujících sloučenin

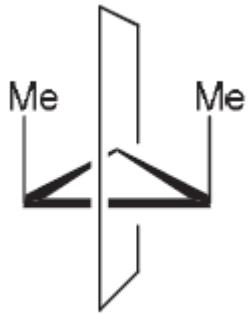


a)

(b)

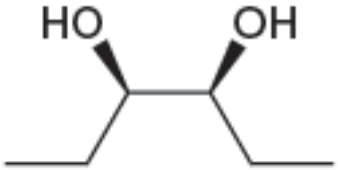


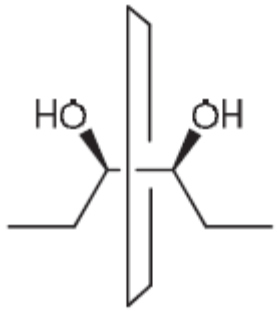




(c)

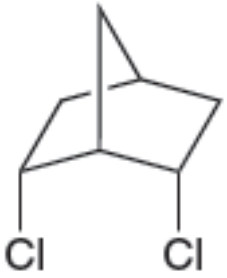
(d)



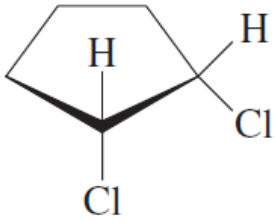


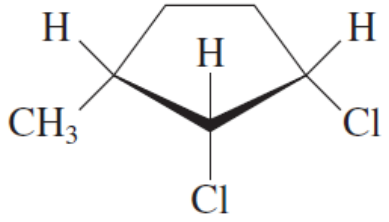
(e)

(f)

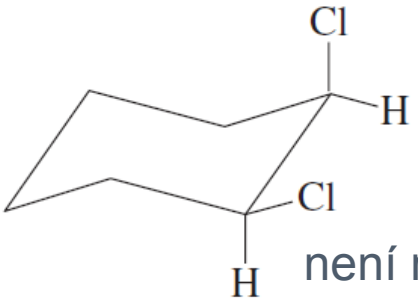


Která ze sloučenin není *meso* - sloučeninou

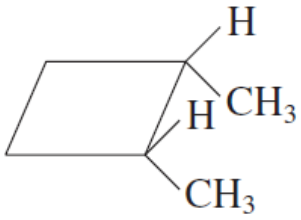
(a) 

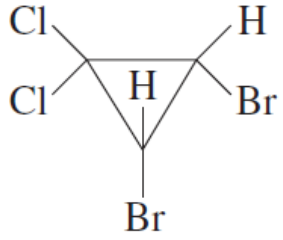
(b) 

není meso

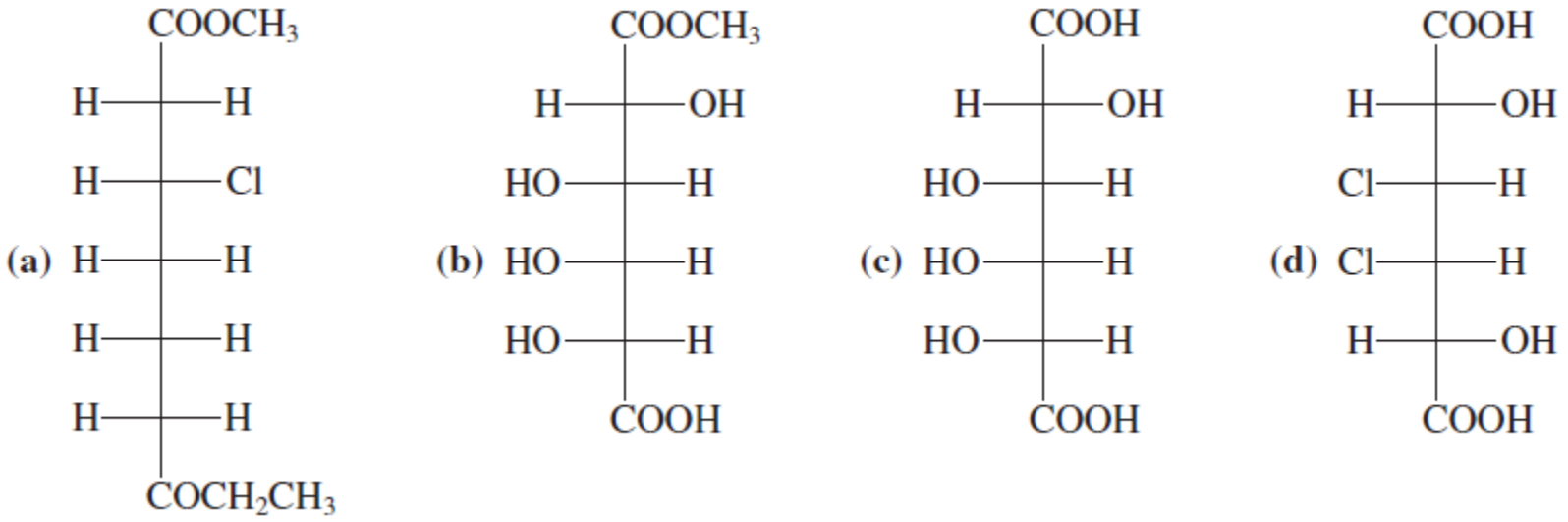
(c) 

není meso

(d) 

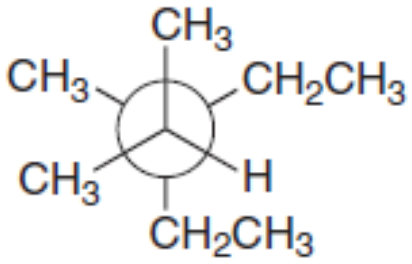
(e) 

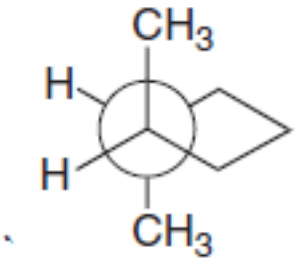
Která ze sloučenin nebude opticky aktivní

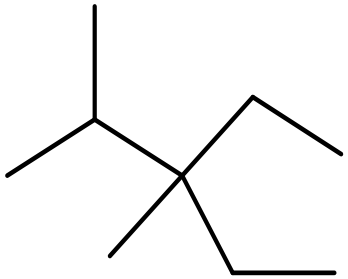


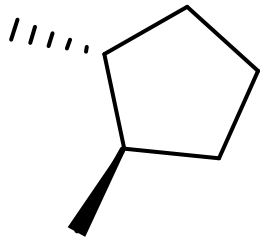
Opticky aktivní není **d**

Nakreslete strukturní vzorce uvedených sloučenin

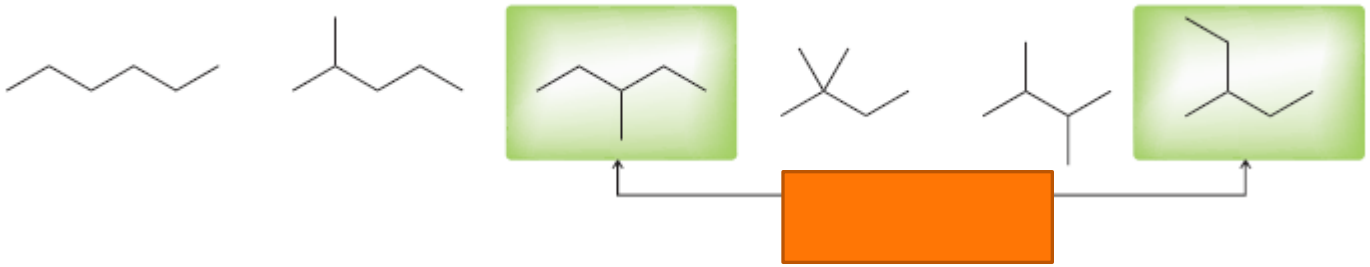




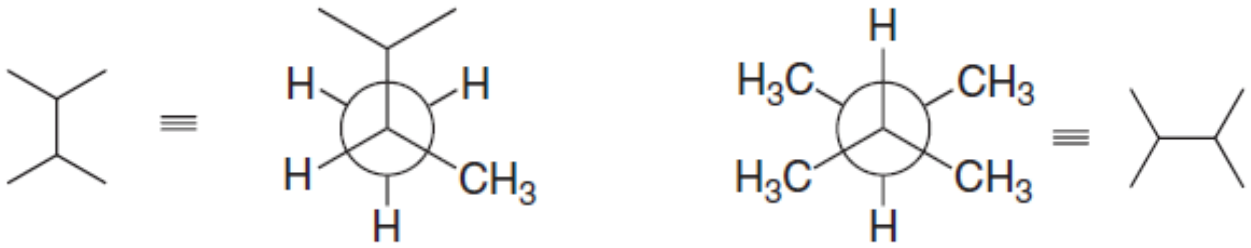




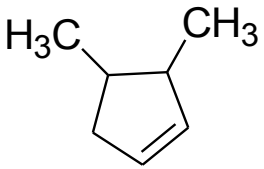
» Konstituční izomery



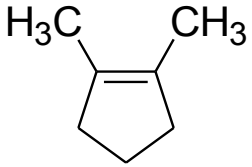
Určete, zda jsou uvedené sloučeniny konstituční izomery



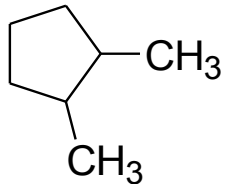
Nakreslete možné stereoizomery uvedených sloučenin. U každé z nich označte, zda otáčí rovinu polarizovaného světla či nikoli.



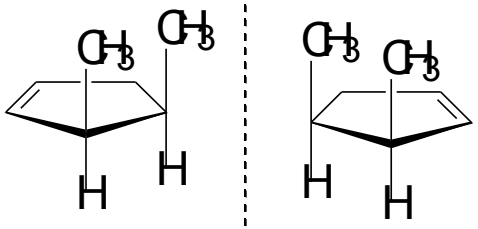
otáčí všechny



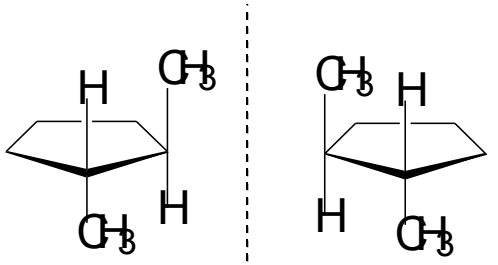
neotáčí

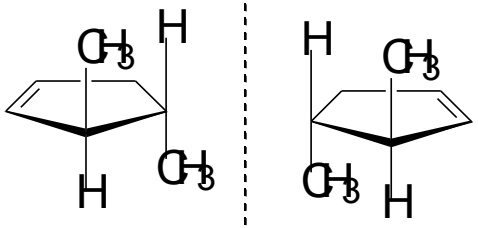


otáčí

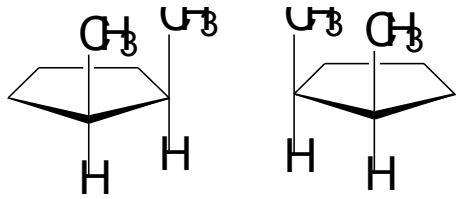


diastereomery





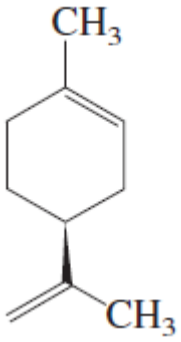
enantiomery



tatáž látka
meso-sloučenina

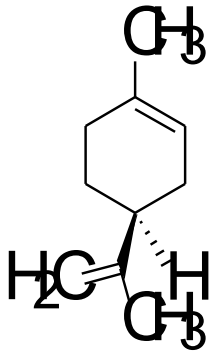
neotáčí

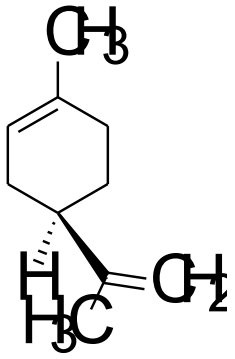
Určete vzájemný stereochemický vztah mezi sloučeninami a pojmenujte je systematickými názvy



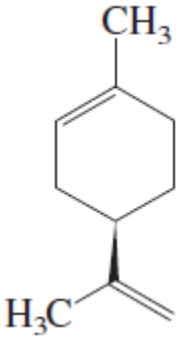
(*S*)-limonen

(*S*)-1-methyl-4-(1-methylethenyl)cyklohexen

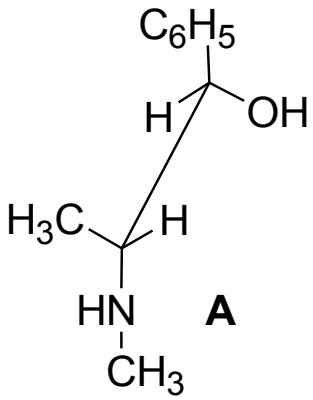




(*R*)-limonen

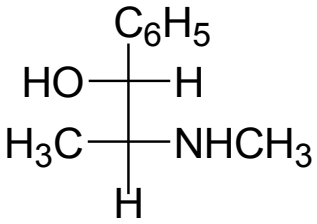


Efedrin (A) se používá jako lék, která z uvedených projekcí odpovídá Fischerově projekci látky (A). Vytvořte systematický název efedrinu včetně určení absolutní konfigurace na centrech chirality.

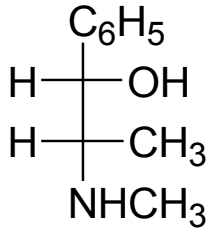


A

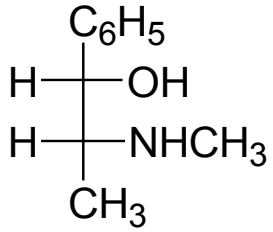
B



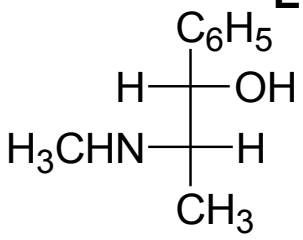
C



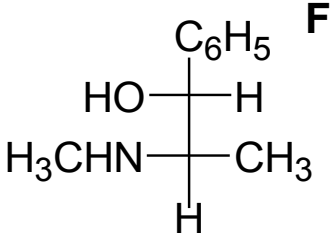
D



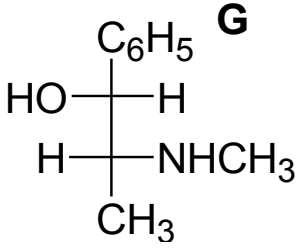
E



F



G

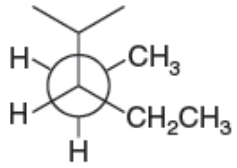


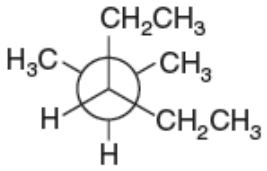
Vzorce **F** a **G**

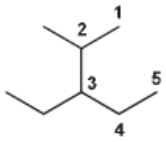
***(1R,2R)*-1-fenyl-2-(*N*-methylamino)propanol**

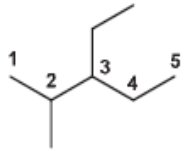
Určete, jaký je mezi uvedenými sloučeninami vzájemný stereochemický vztah

(a)



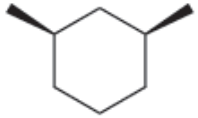






stejné

(b)

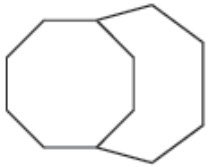


konstituční izomery

(c)

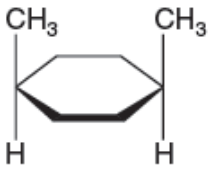
stejné

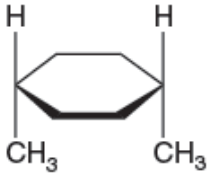
(d)



konstituční izomery

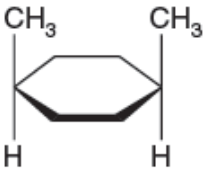
(e)

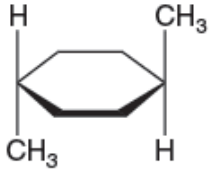




stejné

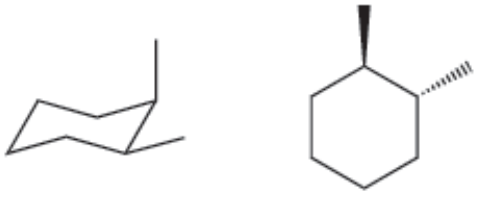
(f)





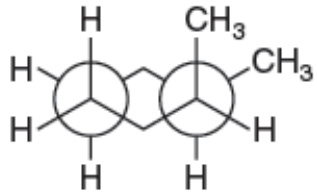
stereoizomery

(g)



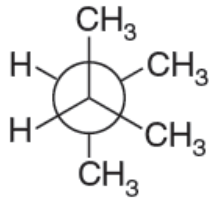
stereoizomery (*cis – trans,* diastereomery)

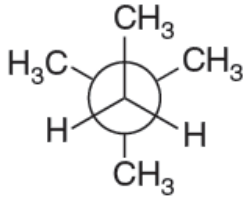
(h)

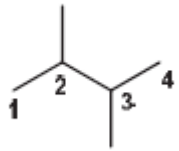


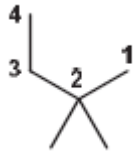
stereoizomery (*cis – trans,* diastereomery)

(i)



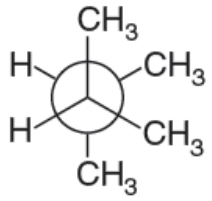


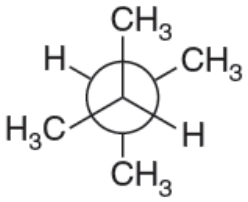




konstituční izomery

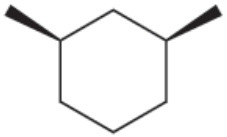
(j)

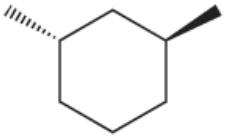




konformace téže sloučeniny

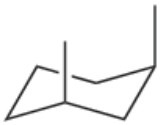
(k)

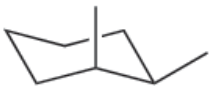




stereoizomery (*cis – trans,* diastereomery)

(l)



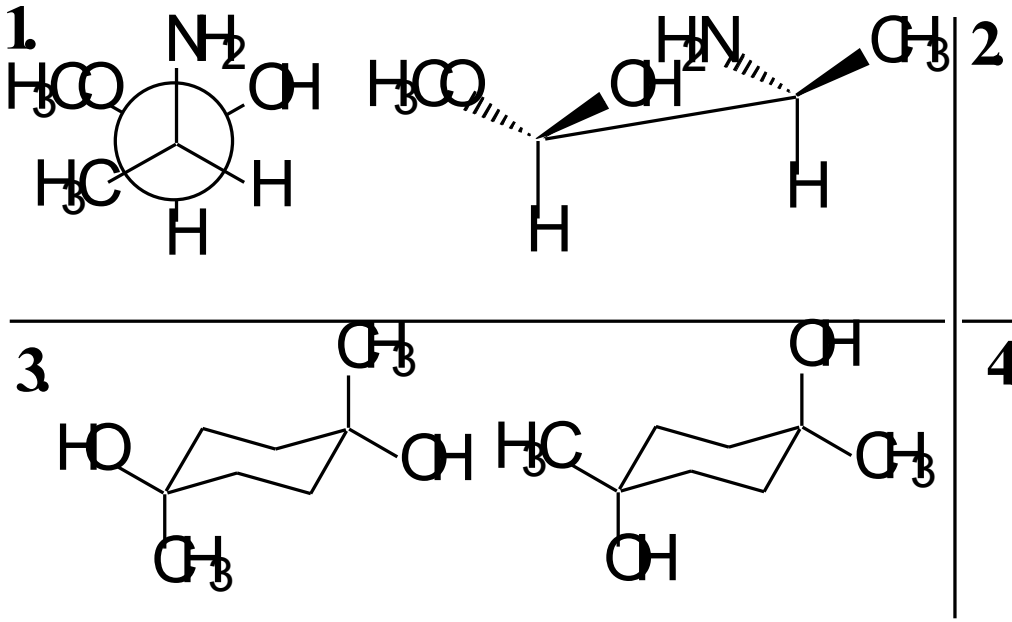


konstituční izomery

Určete, jaký je mezi uvedenými sloučeninami vzájemný stereochemický vztah

1. diastereomery

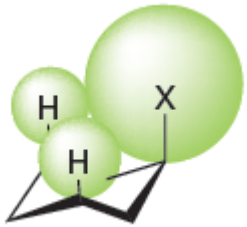
2. stejné (*meso*-)

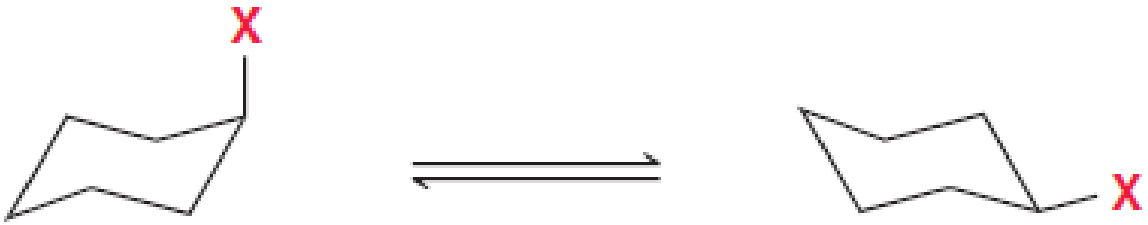


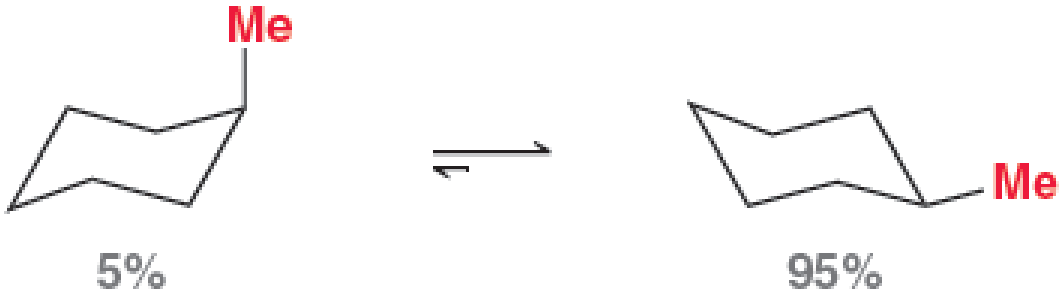
3. konformace téže látky

4. diastereomery
geometrické izomery

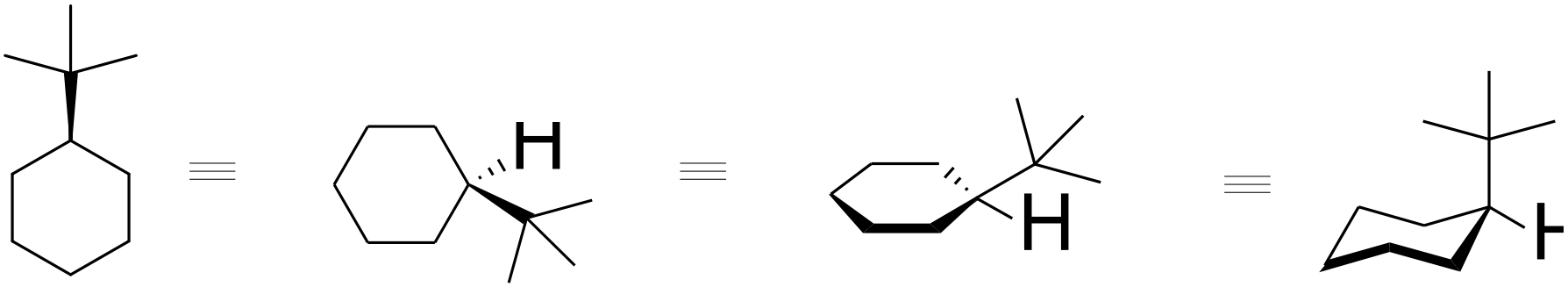
» Nejstabilnější konformace

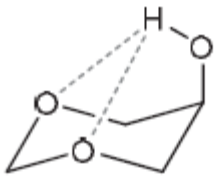




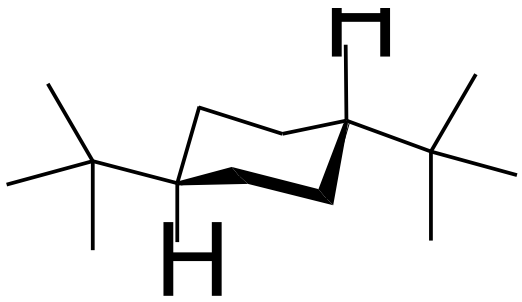


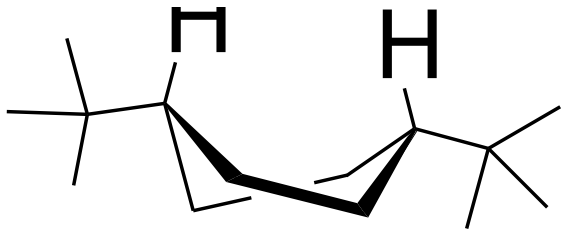
» Nejstabilnější konformace

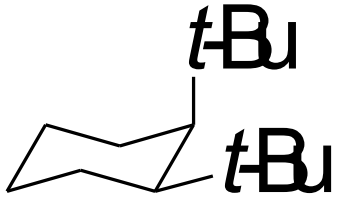




Která ze sloučenin se nachází přednostně v židličkové konformaci a která v twist formě?

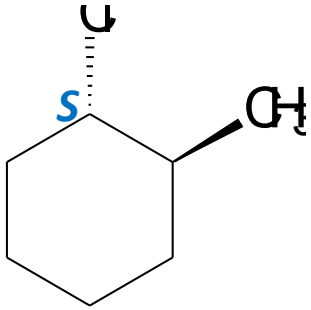


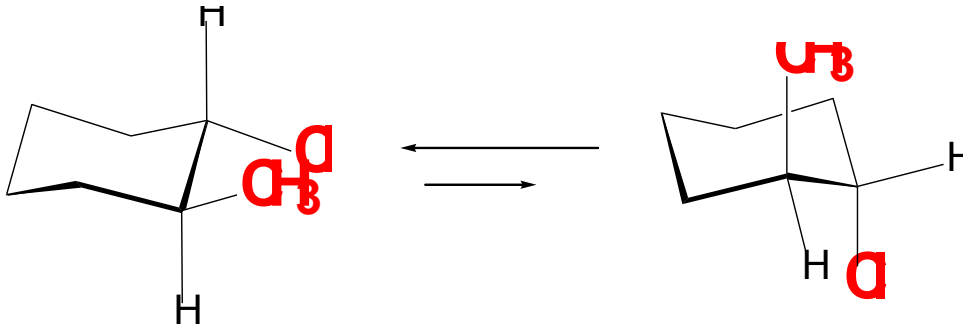


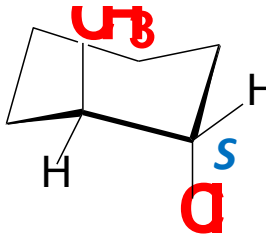


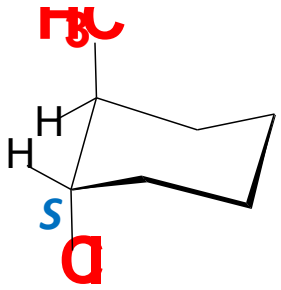
taktone

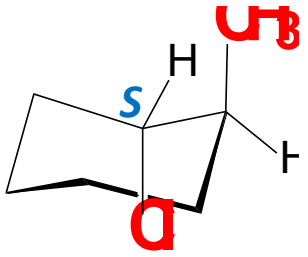
Uvedenou sloučeninu nakreslete v její nejstabilnější konformaci

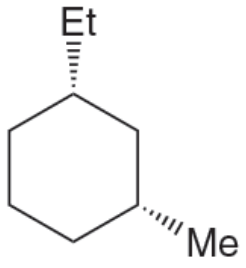


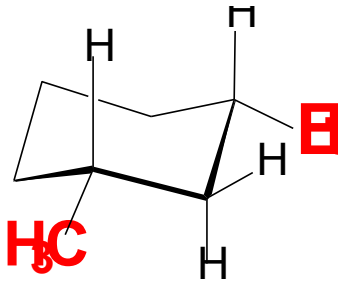


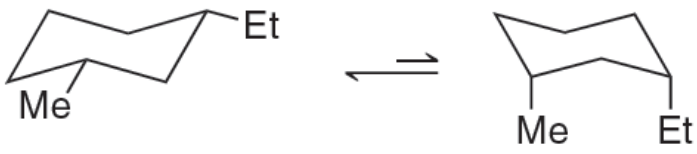


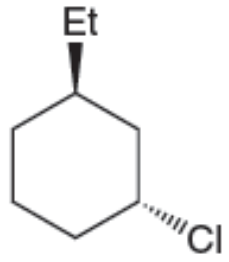


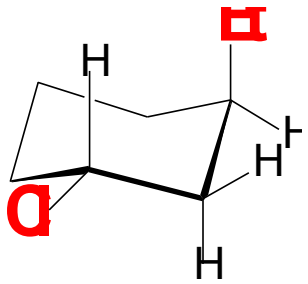










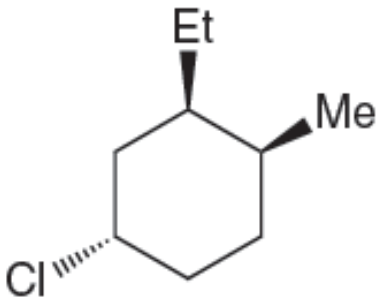


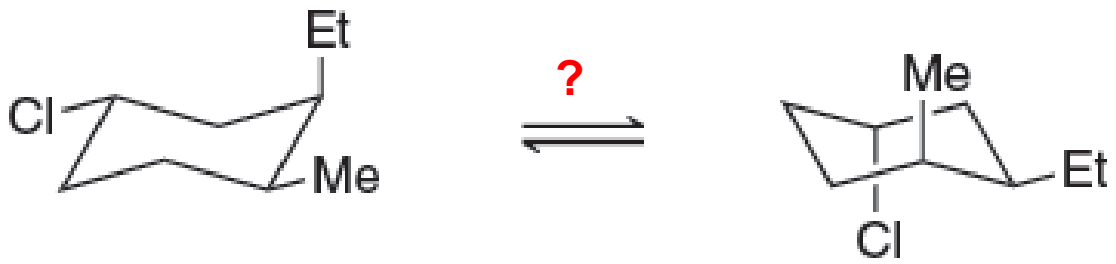
Axial ethyl=8 kJ/mol

Axial chlorine=2 kJ/mol

TABLE 4.8 1,3-DIAXIAL INTERACTIONS FOR SEVERAL COMMON SUBSTITUENTS

SUBSTITUENT	1,3-DIAXIAL INTERACTIONS (KJ/MOL)	EQUATORIAL-AXIAL RATIO (AT EQUILIBRIUM)
—Cl	2.0	70 : 30
—OH	4.2	83 : 17
—CH_3	7.6	95 : 5
—CH_2CH_3	8.0	96 : 4
—$CH(CH_3)_2$	9.2	97 : 3
—$C(CH_3)_3$	22.8	9999 : 1





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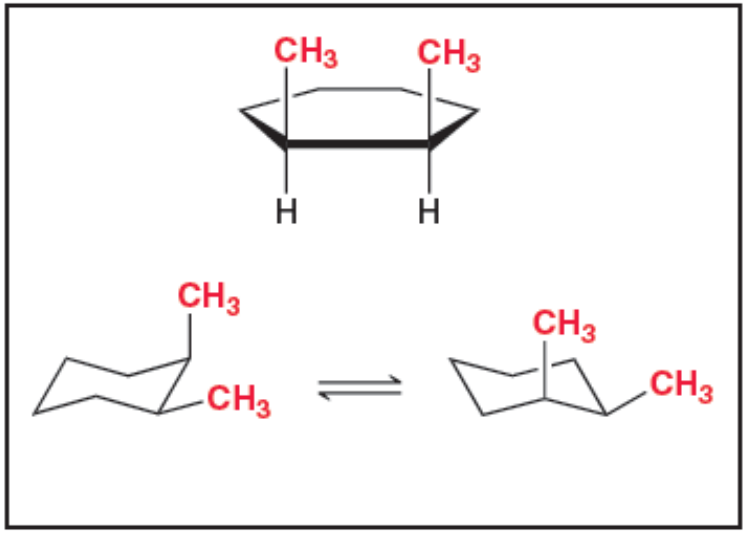
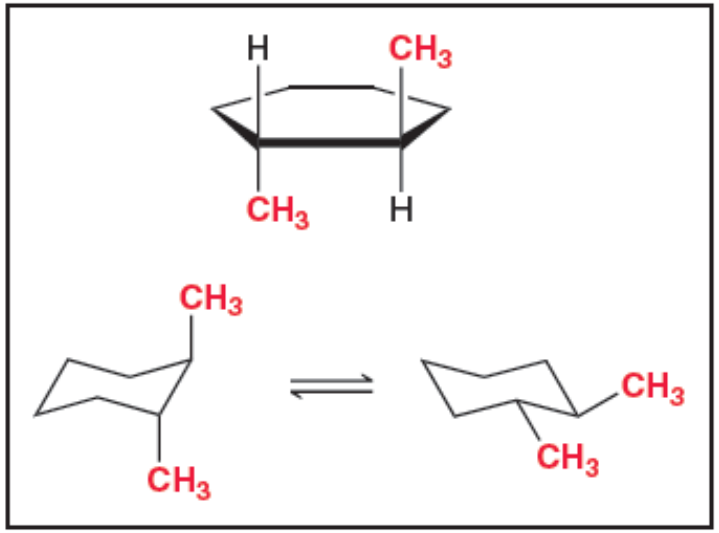
Určete, který ze dvou možných geometrických izomerů 1,2-dimethylcyklohexanu je termodynamicky stabilnější?

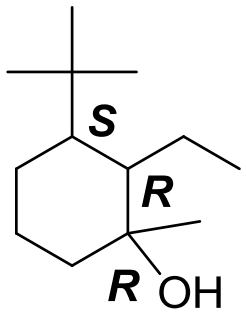


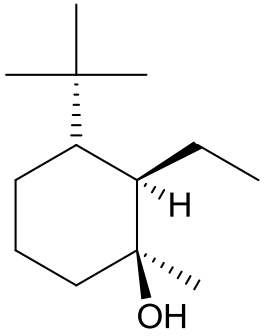


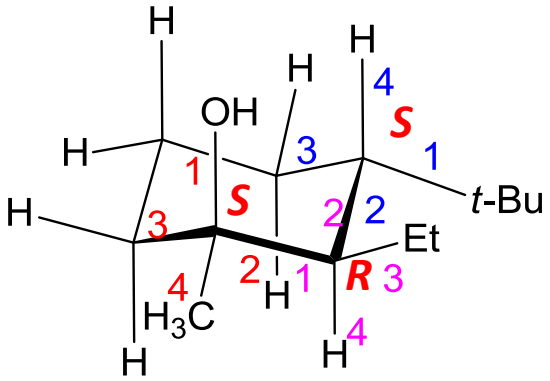
Může zaujmout konformaci, v níž je diekvatoriální pozice obou objemných substituentů

Níže uvedenou sloučeninu nakreslete v její nejstabilnější konformaci

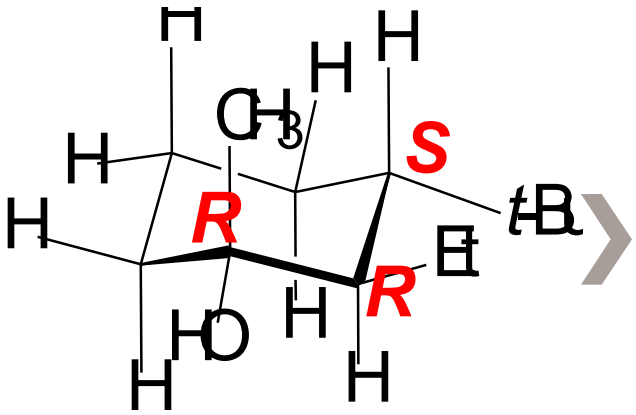
(*1R,2R,3S*)-3-*terc*-butyl-2-ethyl-1-methylcyklohexanol



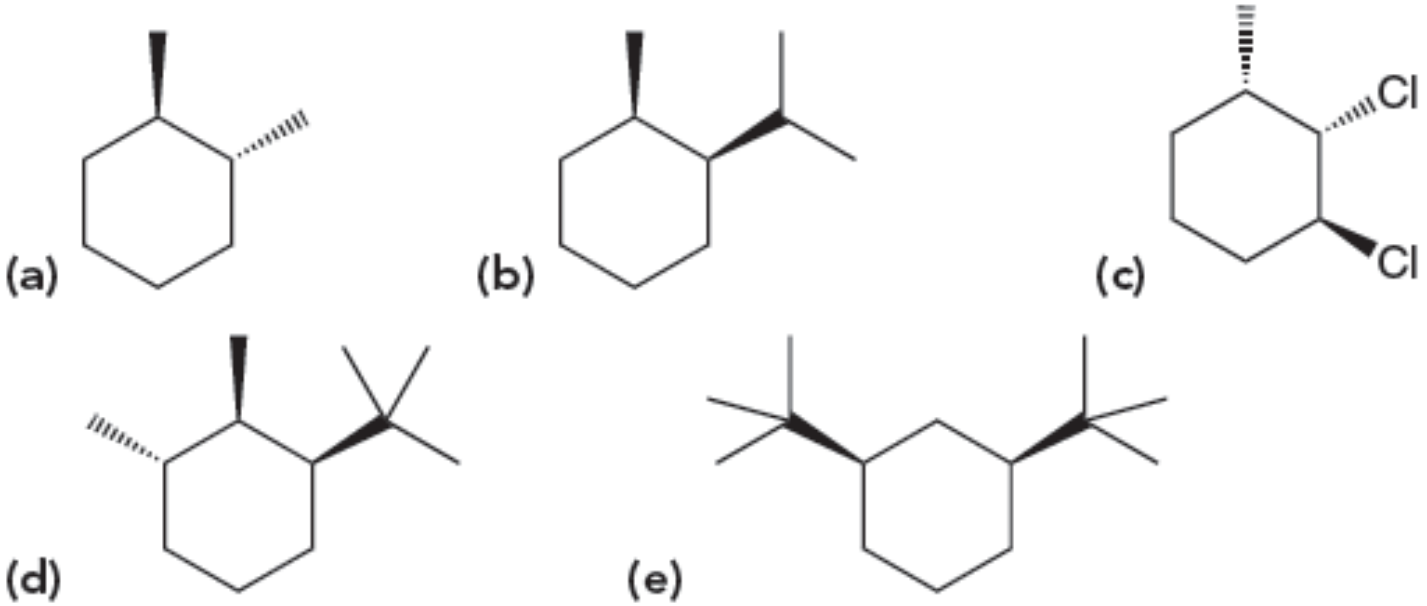




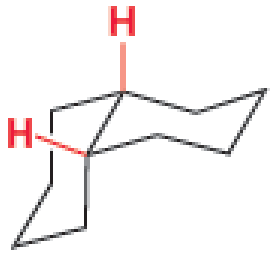
1) Nakreslíme strukturní vzorec sloučeniny
2) Libovolně umístíme substituenty, *t*-Bu umístíme do ekvatoriální pozice, neboť nejstabilnější konformace preferuje objemný substituent v ekv. pozici
3) Určíme abs. konfiguraci
4) Na uhlíku C1 prohodíme dva substituenty, neboť dle zadání má být abs. konfigurace *R* a nám vyšla *S*



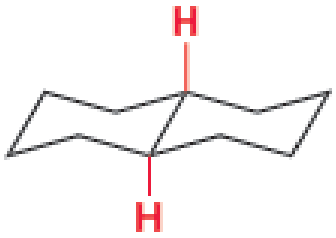
Nakreslete nejstabilnější konformaci uvedených sloučenin



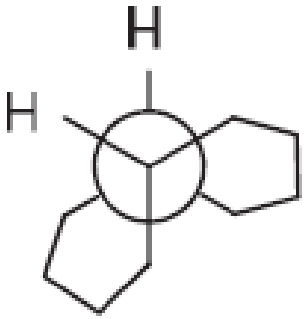
Určete, který ze dvou možných geometrických izomerů dekalinu je termodynamicky stabilnější?

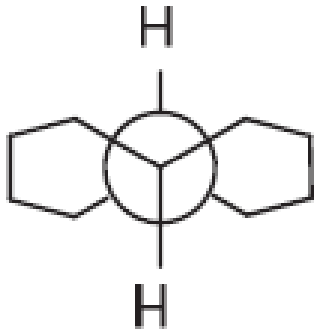


cis-Decalin



trans-Decalin

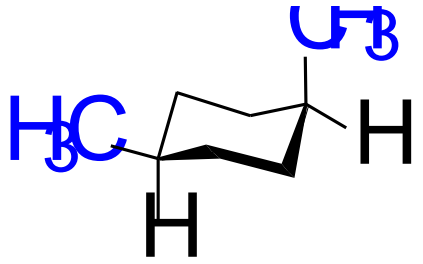




trans- dekalin je stabilnější – pouze 2 gauche interakce (*cis* má 3)

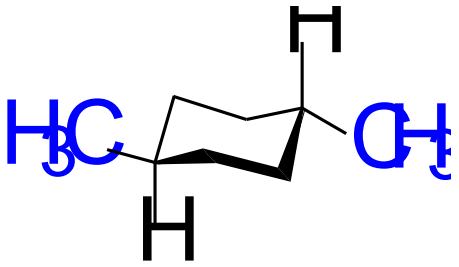
Určete, který z izomerů dimethylcyklohexanu je chirální?

1,4-dimethylcyklohexan



cis

achirální, rovina symetrie

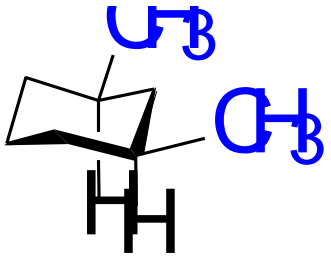


trans

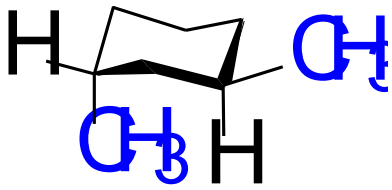
achirální, rovina symetrie

Určete, který z izomerů dimethylcyklohexanu je chirální?

1,3-dimethylcyklohexan



cis



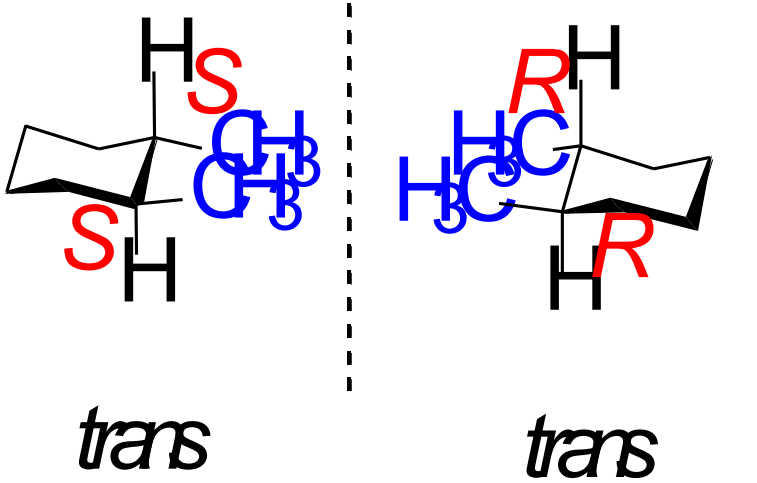
trans

achirální, rovina symetrie

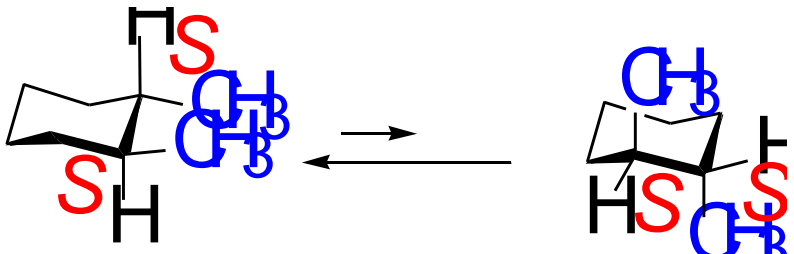
chirální

Určete, který z izomerů dimethylcyklohexanu je chirální?

1,2-dimethylcyklohexan



trans *trans*

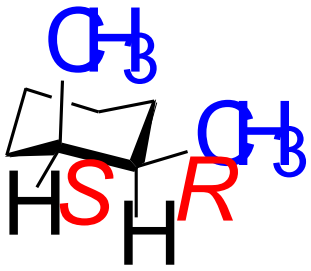


trans *trans*

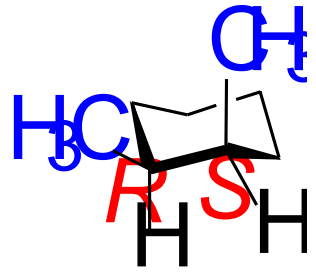
chirální

Určete, který z izomerů dimethylcyklohexanu je chirální?

1,2-dimethylcyklohexan

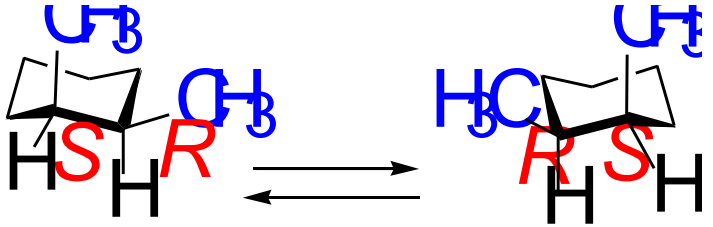


cis



cis

chirální ALE POZOR!



cis *cis*

za normální teploty je není možné separovat a jedná se o konformace téže látky