LeAP: Stereochemistry

- Due Sep 12, 2024 at 11:59pm
- Points 5
- Questions 8
- Available until Sep 16, 2024 at 11:59pm
- Time Limit None
- Allowed Attempts 2

Instructions

Lecture Application Practices (LeAPs) serve as initial opportunities for students to apply the information they've gathered from the pre-lecture videos and in-person lectures/lecture videos.

Students are strongly encouraged to complete LeAPs on the same day that the corresponding topic is completed in class. However, to provide consistent due dates, sets of LeAPs will be due on Thursdays at 11:59 PM - Chicago time. See the Weekly Schedules or Course Calendar for specific due dates for each activity.

Each LeAP is worth 5 points. Credit will be awarded based on accuracy. There is no time limit. Students will receive two attempts for each assignment and the highest score will be recorded in the gradebook. LeAPs may consist of multiple-choice, calculation, ranking, choose all that apply, and fill in the blank type questions.

This quiz was locked Sep 16, 2024 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	**Attempt 1**	272 minutes	5 out of 5

⚠ Correct answers are hidden.

Score for this attempt: 5 out of 5
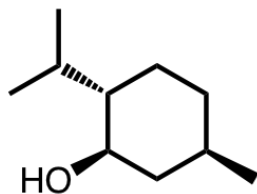Submitted Sep 10, 2024 at 11:36am
This attempt took 272 minutes.

⸬

Question 1

1 / 1 pts

(−)-5-Methyl-2-(1-methylethyl)cyclohexanol, also known as menthol, is used to treat minor throat irritation and can be isolated from mint plants. The specific rotation of menthol at 20 °C is −48° mL g⁻¹ dm⁻¹ and its melting point is 43 °C. Use the Lewis structure shown below to answer problems 1-3.

Menthol can also be called (1R,2S,5R)-5-methyl-2-(1-methylethyl)cyclohexanol based on the absolute configuration of its 3 stereocenters. Classify each stereoisomer of menthol given below as an enantiomer, diastereomer, or constitutional isomer.

(1R,2S,5S)-5-methyl-2-(1-methylethyl)cyclohexanol diastereomer

(1R,4R,3R)-3-methyl-4-(1-methylethyl)cyclohexanol [Select] ⌄

(1S,2S,5S)-5-methyl-2-(1-methylethyl)cyclohexanol [Select] ⌄

(1S,2R,5S)-5-methyl-2-(1-methylethyl)cyclohexanol [Select] ⌄

Answer 1:

diastereomer

enantiomer

constitutional isomer

Answer 2:

constitutional isomer

diastereomer

enantiomer

Answer 3:

diasteromer

enantiomer

constitutional isomer

Answer 4:

enantiomer

diastereomer

constitutional isomer

⦙

Question 2

0.5 / 0.5 pts

Which words can be used to describe menthol? **Choose all that apply.**

☑ Chiral

☐ Achiral

☐ Meso

☑ Optically active

☐ Optically inactive

⋮⋮

Question 3

0.5 / 0.5 pts

What is the specific rotation of menthol's enantiomer?

◉ $+48°$ mL g^{-1} dm^{-1}

○ $-48°$ mL g^{-1} dm^{-1}

○ $-43°$ mL g^{-1} dm^{-1}

○ $+43°$ mL g^{-1} dm^{-1}

○ Cannot be determined with the information provided.

⋮⋮

Question 4

0.5 / 0.5 pts

You have a mixture of the drug methylphenidate that is composed of 27% of the (+)-enantiomer and 73% the (-)-enantiomer. What is the EE of the mixture? (Give you answer in the form of a percent.)

The numerical values in this calculation will change with each attempt. Double check before submitting additional attempts!

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⋮⋮

Question 5

1 / 1 pts

The specific rotation for (−)-methylphenidate is $-38°$ mL g^{-1} dm^{-1}. Path length of the polarimeter is 1 dm.

You dissolve 0.5 g of a mixture of (−)-methylphenidate and its enantiomer in 4 mL of water. You place the sample into a polarimeter and the observed rotation is found to be -1.8°. What percent of the mixture is composed of (−)-methylphenidate? (Round your answer to the nearest whole percent.)

The numerical values in this calculation will change with each attempt. Double check your numbers before submitting additional attempts!
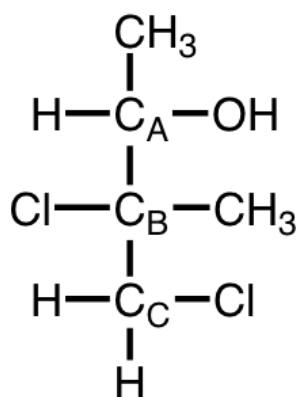
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⋮⋮

Question 6

0.5 / 0.5 pts

Use the Fischer projection shown below to answer questions 6-8.

$$
\begin{array}{c}
CH_3 \\
| \\
H-C_A-OH \\
| \\
Cl-C_B-CH_3 \\
| \\
H-C_C-Cl \\
| \\
H
\end{array}
$$

How many stereocenters are found in this molecule?

○ 1

◉ 2

○ 3

○ None

⋮

Question 7

0.5 / 0.5 pts

Analyze carbon B (C_B). Rank the substituents on C_B from highest priority (1) to lowest priority (4).

1

| Cl | ⌄ |

2

| Chain toward CC | ⌄ |

3

| Chain toward CA | ⌄ |

4

| CH3 | ⌄ |

⋮

Question 8

0.5 / 0.5 pts

What is the absolute configuration of C_B?

- ◉ R
- ◯ S
- ◯ C_B is not a stereocenter. It doesn't have an absolute configuration.

Quiz Score: 5 out of 5