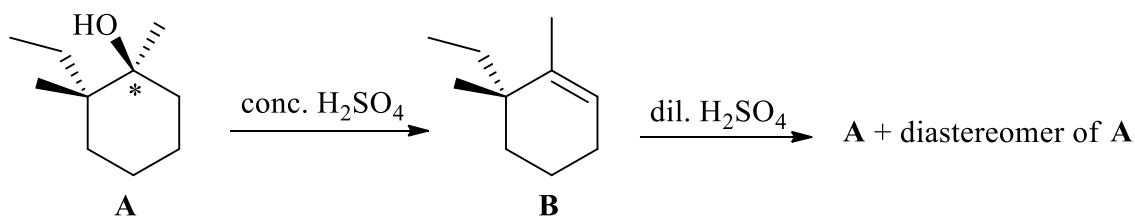


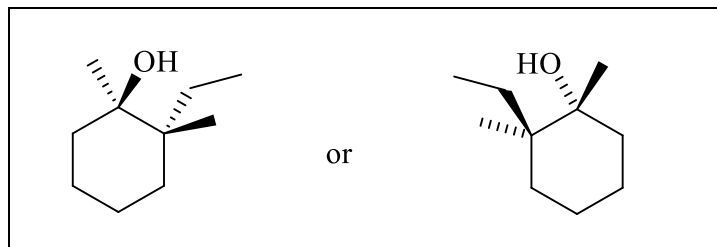
Marks

7

- Shown below is a reaction sequence beginning with the chiral alcohol, **A**.



Draw the enantiomer of **A**.



The specific optical rotation of **A** is +30. If equal amounts of **A** and its enantiomer are mixed, what is the optical rotation of the mixture?

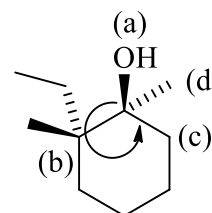
0°

Assign the stereochemistry of the atom in alcohol **A** indicated by the asterisk (\*), showing how you arrived at your answer.

**The order of priority is:**



**With lowest priority (d) at back, the order of the groups goes anticlockwise as shown. Therefore the stereochemistry is (S).**



Alcohol **A** is dehydrated to give the alkene **B**. Is alkene **B** chiral? Why/why not?

**The molecule is still chiral as the molecule still contains a stereogenic centre.**

Alkene **B** is hydrated with dilute sulfuric acid, to give a sample that contains **A** and a diastereomer of **A**. Draw this diastereomer. In this sample, what do you expect to be the ratio of **A** and its diastereomer? Why?

**Ratio A : diastereomer is approximately 1 : 1.**

**The tertiary carbocation intermediate has trigonal planar geometry, so the attacking nucleophile (H<sub>2</sub>O) is equally likely to attack from above or below the plane of the ring.**

