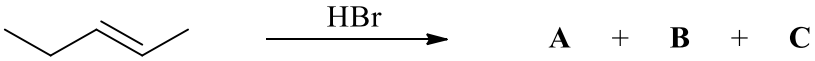
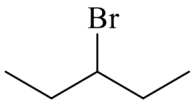
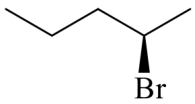
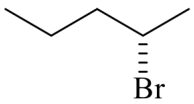
Marks 8

- Addition of HBr to the isomer of 2-pentene shown below gives 3 isomeric products, **A**, **B** and **C**, in an approximate ratio of 50:25:25 respectively.



Draw the three products **A**, **B** and **C**.

A	**B**	**C**
 **A**	 **B**	 **C**

Explain the ratio of products observed.

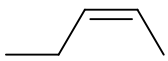
The double bond is equally substituted, so attack of the electrophile H^+ is equally likely at C2 or C3. The carbocations at C3 and C2 should therefore be formed in equal amounts. Subsequent attack of the trigonal planar carbocation by Br^- is equally likely from above or below the molecule. Attack at C3 produces only one compound. Attack at C2 produces either the (*R*)- or (*S*)- enantiomer in equal amounts.

What is the isomeric relationship between **A** and **B**?	**Constitutional isomers**
What is the isomeric relationship between **B** and **C**?	**Enantiomers**

Assign the stereochemistry of the starting material isomer. Show your working.

The higher priority groups are methyl (at C2) and ethyl (at C3). These are on opposite sides of the double bond and hence the molecule has (*E*) stereochemistry.

Draw the other configurational isomer of 2-pentene and assign its stereochemistry.



(*Z*)- isomer

What product(s) would you expect from the addition of HBr to this stereoisomer, and in what ratio?

Same ratio as for the (*E*) isomer, *i.e.* 50% A, 25% B, 25% C.