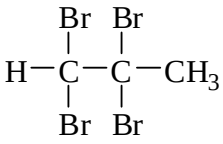
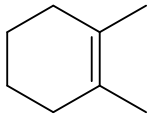
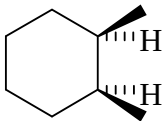
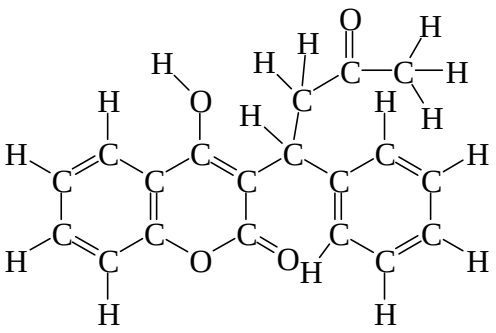
- Complete the following table. Make sure you indicate any relevant stereochemistry.

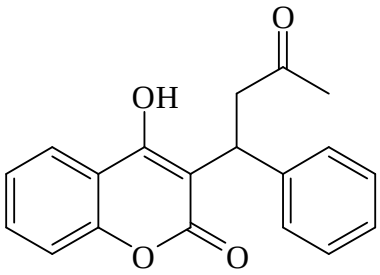
Marks 2

STARTING MATERIAL	REAGENTS/ CONDITIONS	CONSTITUTIONAL FORMULA(S) OF MAJOR ORGANIC PRODUCT(S)
$H-C\equiv C-CH_3$	excess Br_2 in diethyl ether solvent	
	H_2 / Pd / C ethanol solvent	

- A structural formula for Warfarin, an anticoagulant, showing all atoms and bonds is shown below. Draw a stick representation of the formula in the adjacent box.

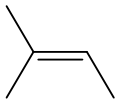
Marks 1





- Consider the alkene, 2-methyl-2-butene (**B**).

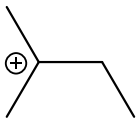
4



(**B**)

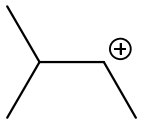
When (**B**) is treated with hydrogen chloride in methanol, two carbocations can be formed. The major carbocation reacts with nucleophiles that are present in the reaction to give an alkyl halide and an ether. Provide constitutional formulas of these intermediates and products in the appropriate boxes below.

major carbocation



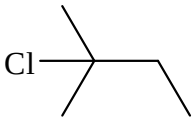
H^+ attaches to the less substituted end of the double bond leaving a positive charge is on the more substituted end of the double bond where it is stabilized.

minor carbocation



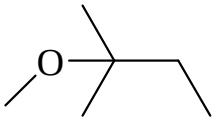
H^+ attaches to the more substituted end of the double bond leaving a positive charge is on the less substituted end of the double bond where it is less stabilized.

alkyl halide product



Cl^- attaches to the carbon with the positive charge in the major carbocation.

ether product



CH_3OH attaches to the carbon with the positive charge in the major carbocation. It then loses H^+ to make the ether shown.