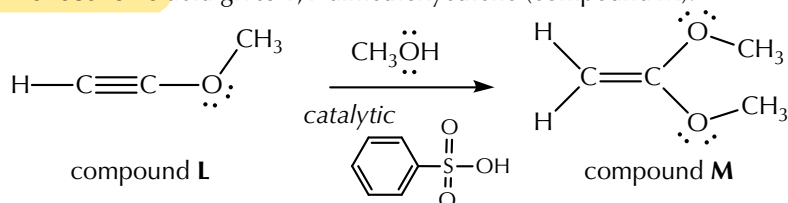
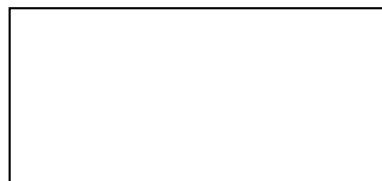


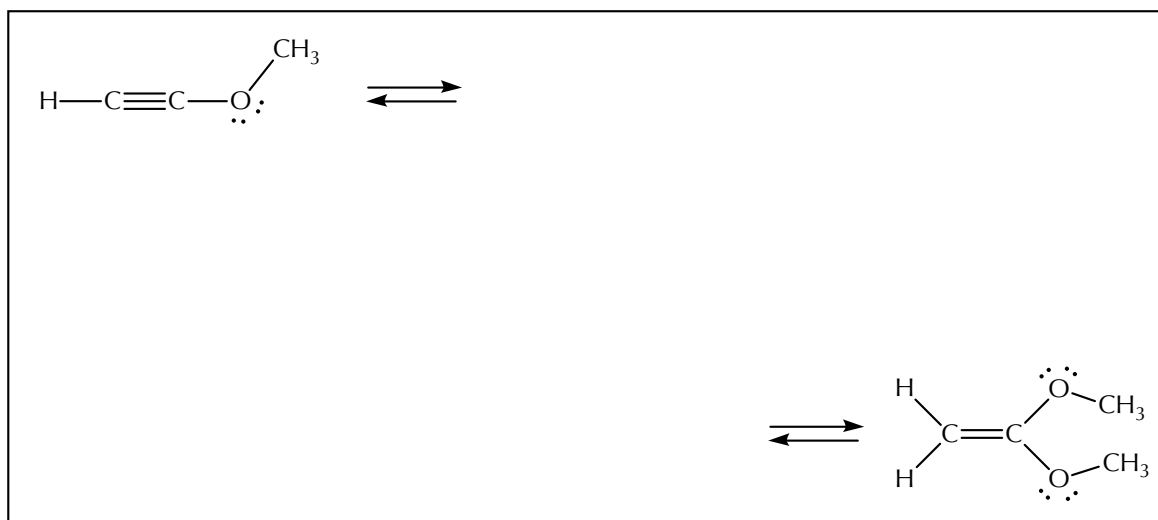
- 4.17 The electrophilic addition reaction of 1-methoxyethyne (compound **L**) with methanol (CH_3OH) in the presence of catalytic benzenesulfonic acid gives 1,1-dimethoxyethene (compound **M**).



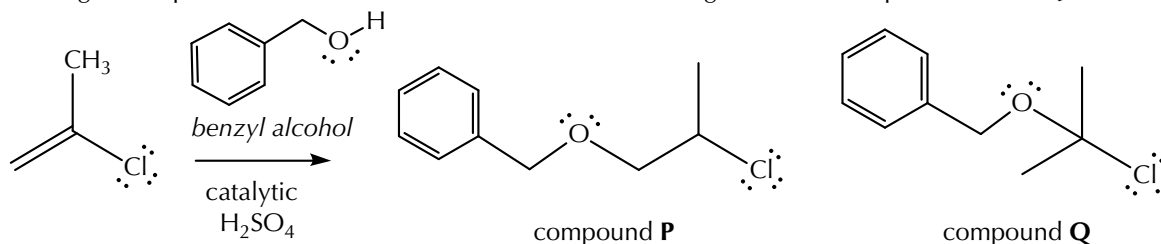
- (a) Mechanistically, the acid catalyst that participates directly in this reaction is not the molecule shown under the arrow in this equation (an organic acid with a pK_a value of -1). What is the structure of the acid that is present in solution when a small amount of this organic acid is added to a large excess of methanol.



- (b) Provide the complete, stepwise, curved arrow mechanism for the transformation of compound **L** to compound **M**. Use the generic "H-B" for any Brønsted acid you need, and B^\ominus for its conjugate base.



- 4.18 The following electrophilic addition reaction results in a mixture of regioisomers (compounds **P** and **Q**).



- (a) Either **P** or **Q** is the major regioisomer, and the other is minor. Provide the structure for the single most important intermediate that is used to explain the regioselectivity, that is, why the major regioisomer is favored. Show the most significant resonance contributor of this intermediate, which leads to the major product.

- (b) In the next step, the intermediate reacts with the benzyl alcohol. Show the curved arrow mechanism for the reaction between benzyl alcohol and this most significant resonance contributor you have drawn in part (a).

