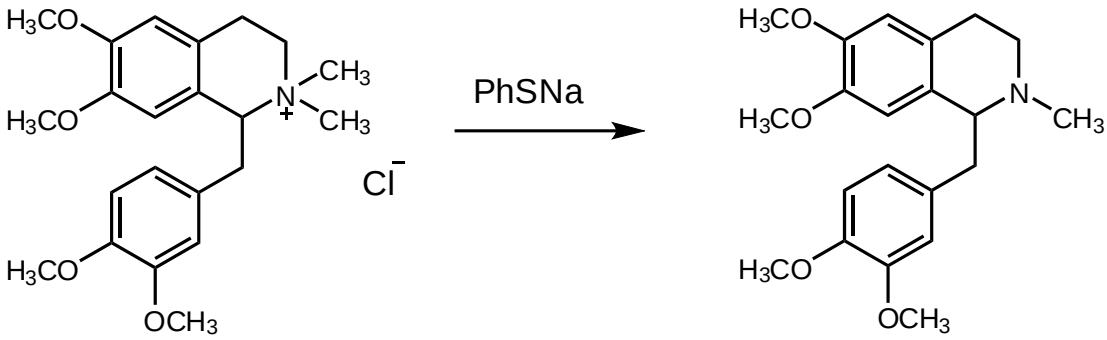
Problem 3



Ref: M. Sharma, M. C. Deno and J. F. Remar, Tetrahedron Lett., 1966, 1375-1379.

1. Draw all the bonds near the reactive center in the starting materials

2. Draw all the H-atoms near the reactive sites of starting materials and products

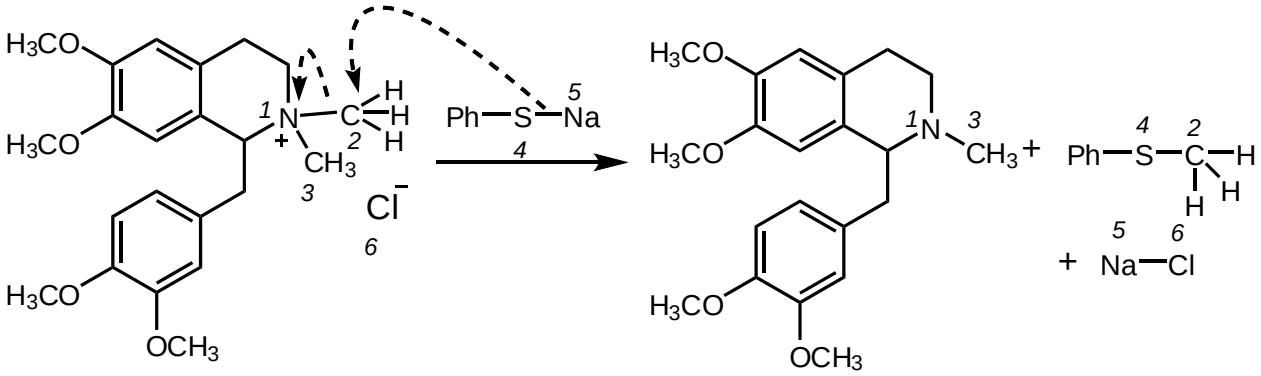
3. Balance the equation:

4. Number the non-H atoms:

5. Identify bonds made and broken:

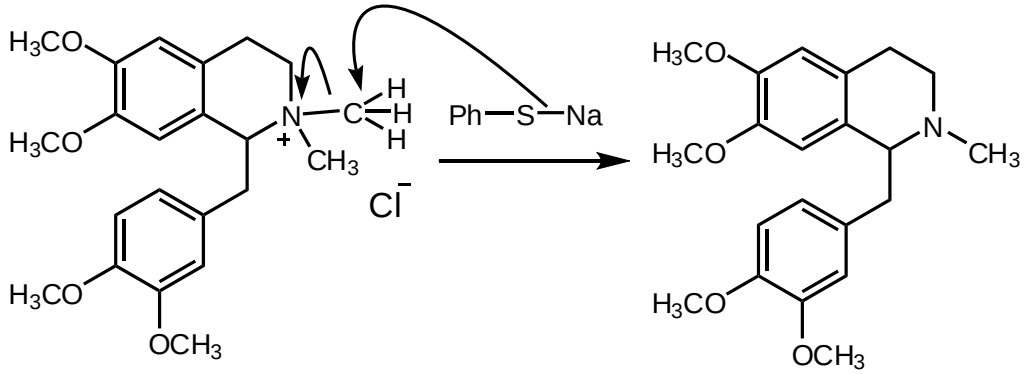
Bonds made: 4-2, 5-6

Bonds broken: 1-2, 4-5.



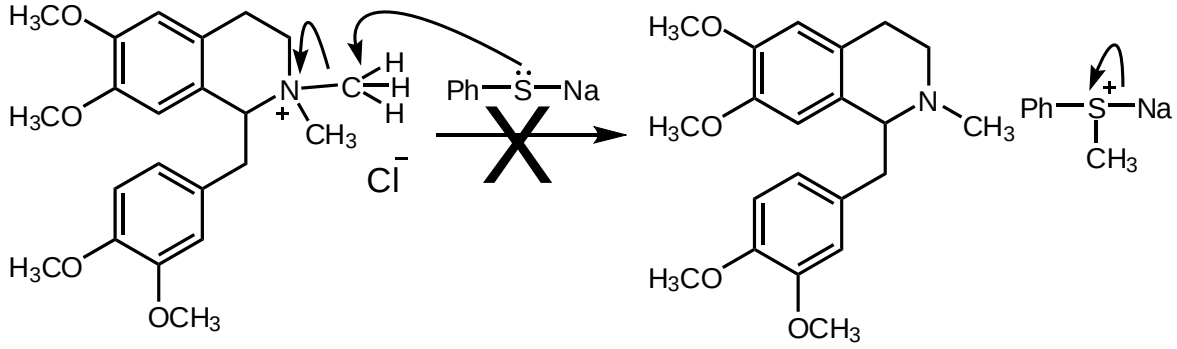
Identify the conditions:
Basic (do not generate strong acids)

Mechanism:



Discussion:

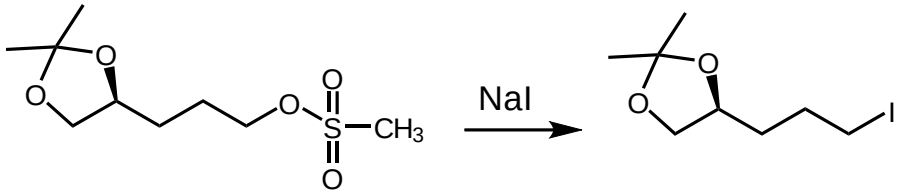
1. When a bond is made and broken from the same atom of a nucleophile, only one dotted line and arrow needs to be drawn from that bond (and not the atoms). This is true for all atoms that cannot make more σ bonds than can be seen in the starting materials or if the atom is bonded with a metal. Thus, in the above case only one arrow was shown for the making of S-CH_3 bond and the breaking of S-Na bond.



2. Organic chemists tend to draw the arrows for the formation of the desired compounds only. Thus, in the above mechanism the arrows for the formation of NaCl are not shown.

Now try the following mechanisms:

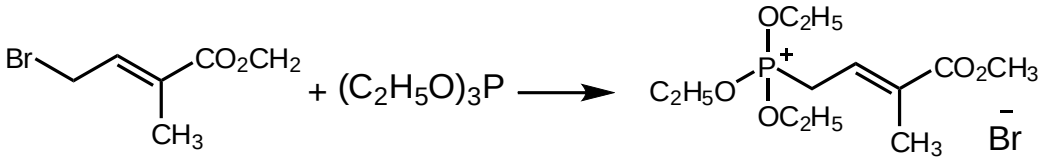
1.



H.-S. Jeong, H. Kim & H.-J. Kang, Bull. Korean. Chem. Soc. 1997, 18, 754-760.

This is a named reaction. It is called Finkelstein Reaction.

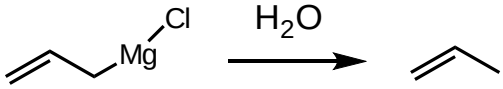
2.



Ref: N. S. Chakor, L. Musso and S. Dallavalle, J. Org. Chem., 2009, 74, 844-849.

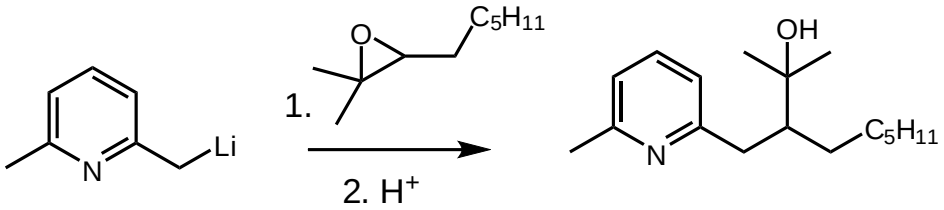
The above reaction is the first step of a named reaction, called Arbuzov reaction.

3.



The Mg containing reagent is an example of Grignard reagents. Grignard reagents mostly act as nucleophiles. We will see many examples of Grignard reagents in carbonyl reactions.

4.



J. R. Vyvyan, R. C. Brown and B. P. Woods, J. Org. Chem., 2009, 74, 1374-1376