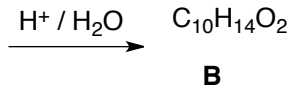
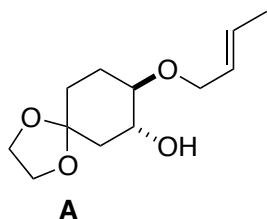


1. (15 points) Deduce the structure of **B**, and draw an arrow-pushing mechanism for its formation.



IR: 2946, 2851, 1686, 1251, 1094  $cm^{-1}$

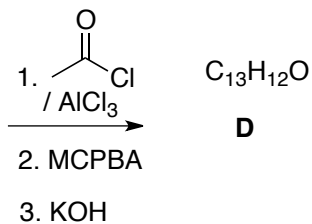
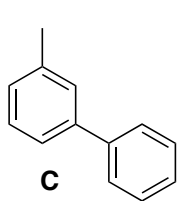
**$^{13}C$  NMR**

198.7, s  
 150.7, d  
 130.2, d  
 129.5, d  
 127.0, d  
 72.0, d  
 69.6, t  
 35.2, t  
 29.1, t  
 17.7, q

**$^1H$  NMR**

1.74, d,  $J = 6.8$  Hz, 3H  
 1.9, m, 1H  
 2.3, m, 2H  
 2.6, m, 1H  
 3.98, d,  $J = 7.2$  Hz, 2H  
 4.20, m, 1H  
 5.60, dq,  $J = 15.4, 6.8$  Hz, 1H  
 5.72, dt,  $J = 15.4, 7.2$  Hz, 1H  
 5.98, d,  $J = 10.8$  Hz, 1H  
 6.97, dd,  $J = 3.2, 10.8$  Hz, 1H

2. (15 points) Deduce the structure of **D**, and draw an arrow-pushing mechanism for its formation.



**$^{13}C$  NMR**

150.7, s  
 137.5, s  
 130.7, s  
 129.5, d (2)  
 129.3, d  
 128.0, d  
 127.9, d (2)  
 127.8, d  
 124.8, s  
 120.4, d  
 16.4, q

**$^1H$  NMR**

7.45, m, 5H  
 7.13, d,  $J = 7.4$  Hz, 1H  
 7.08, d,  $J = 7.4$  Hz, 1H  
 6.89, t,  $J = 7.4$  Hz, 1H  
 5.21, bs, 1H (exchanges)  
 2.31, s, 3H