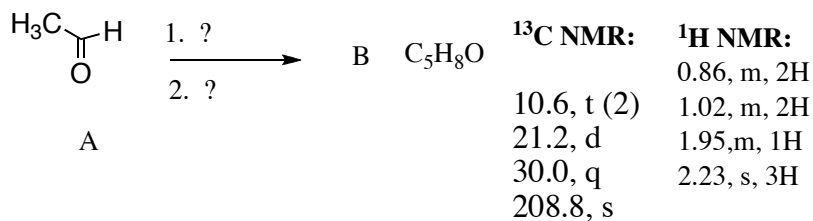
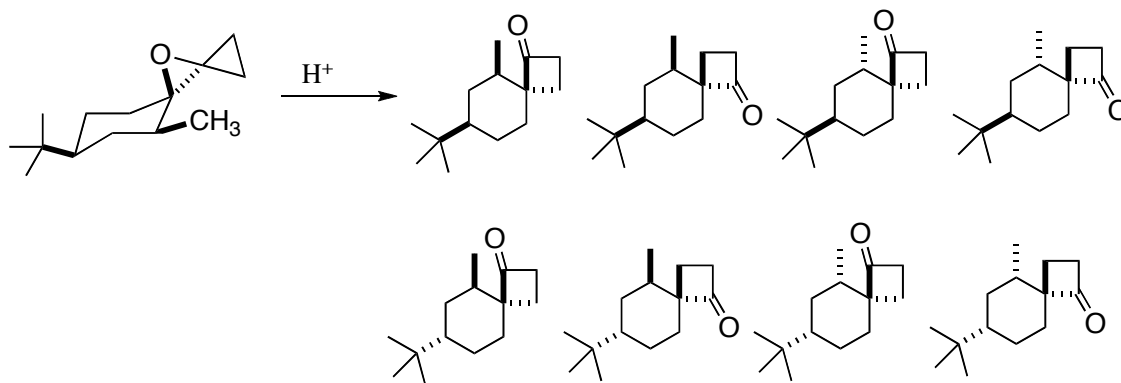


This is an open-book, open notes exam. Please show your work in detail.

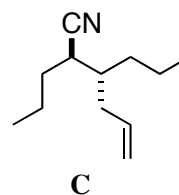
1. (20 points) Fill in the missing reagents, and draw the structure of **B**. You do not have to show mechanisms.



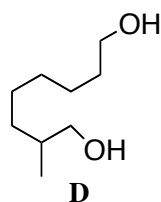
2. (20 points) Indicate the expected product. Explain your reasoning in detail.



3. (20 points) Outline a synthesis of **C**. You may use any piece that contributes three or fewer carbons to the final product. Absolute configuration is not important, but relative configuration is.



4. (20 points) Deduce the structure of **E**, and draw a detailed arrow-pushing mechanism for the transformation.



E	C₉H₁₉IO
¹³C NMR:	¹H NMR:
24.8, t 26.2, t 29.5, s 32.4, q (2) 33.2, t 40.7, t 42.4, t 63.0, t	1.2-1.3, m, 4H 1.32, s, 6H 1.4-1.5, m, 4H 1.65, m, 2H 3.17, bs, 1H (exchanges) 3.60, t, J=6.5 Hz, 2H

5. (20 points) Draw a detailed arrow-pushing mechanism for the following transformation. 5/20 points for fully listing bonds broken and bonds formed.

