1) Draw the structure of **A** and provide detailed arrow pushing mechanisms for its formation.

2) Draw the structure of $\bf B$ and provide detailed arrow pushing mechanisms for its formation. Explain why $\bf A$ [your answer from question 1] is not formed instead.

3) Propose a mechanism. Pay attention to stereochemical detail

4) Propose a multistep synthesis of **D** using **C** as a starting material.

5) Deduce the structures of E-I

$$\begin{array}{c|c}
O \\
NMe_2
\end{array}
\begin{array}{c}
CH_3MgBr (1 equiv) \\
\hline
Et_2O
\end{array}
\begin{array}{c}
H
\end{array}
\begin{array}{c}
H^+\\
\hline
G (the compound you just made above)
\end{array}
\begin{array}{c}
I \\
C_7H_{14}O_2
\end{array}$$

1 H NMR spectrum of I 3.38 (m, 2H) 1.28 (s, 6H) 1.15 (d, 6H, *J*=5.9 Hz)